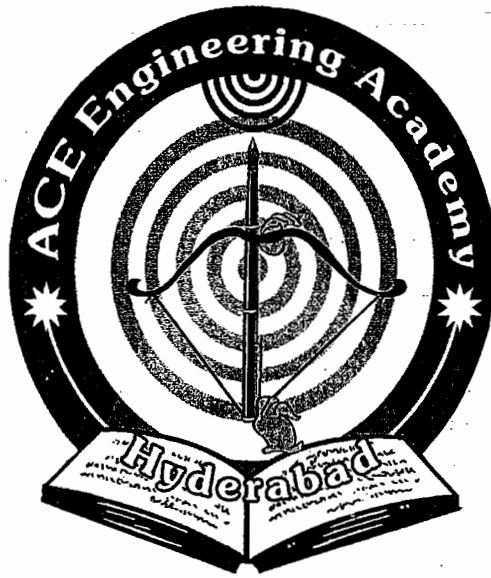


ALL INDIA 1<sup>st</sup> RANK 19 TIMES IN GATE

&

ALL INDIA 2<sup>nd</sup> RANK 10 TIMES IN GATE



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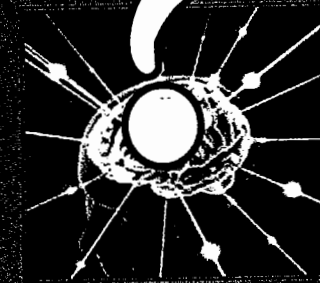
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Est. 1995

# General Aptitude



For  
GATE, DRDO & PSU's

## ACE ENGINEERING ACADEMY

Abids, Hyderabad - 500 001

# GENERAL APTITUDE

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FOR

**GATE, DRDO & PSU's**

Managing Director

Y. V. Gopala Krishna Murthy

**SYLLABUS**  
**GENERAL APTITUDE**  
**GATE**

**Verbal Ability:**

English Grammar, Sentence Completion, Verbal Analogies, Word Analogies, Word groups, Instructions, Critical reasoning and Verbal deduction.

**Numerical Ability:**

Numerical Computation, Numerical Estimation, Numerical Reasoning and Data interpretation.

**NUMERICAL ABILITY**

**Numerical computation:-** These questions test your ability to use the basic principles of arithmetic like addition, subtraction, multiplication and division. They may also use mathematical terms, and methods such as decimals, percentages, ratios, fractions, powers and exponents. These questions make no attempt to test your reasoning abilities. The method you need to get the correct answer will be obvious and to score well on these questions you will simply need to make quick and accurate calculations.

**Numerical Estimation:-** These questions test your ability to make quick estimates of the fairly straightforward numerical questions. To score well on these questions you will need to make quick approximations of the answer. You must avoid the trap of working out the answer exactly, which will take up too much time and prevent you from answering enough questions to get a good score. Numerical estimation is key in many craft and technical jobs where the ability to quickly and accurately estimate material quantities is essential.

**Numerical Reasoning:-** Information is provided that requires you to interpret it and then apply the appropriate logic to answer the questions. In other words, you need to work out how to get the answer rather than what calculations to apply. Sometimes the questions are designed to approximate the type of reasoning required in the workplace. The questions will often use very specific illustrations, for example the question may present financial data or use information technology jargon. However, an understanding of these areas is not required to answer the question. Number series questions can also be classified as numerical reasoning questions. These types of question are very commonly used in graduate and managerial selection.

**Data Interpretation:-** The ability to interpret data presented in tables, graphs and chart is a common requirement in many management and professional jobs. If you are applying for a job which involves analysis of or decision making based on numerical data then you can expect to answer this type of question.

**Critical Reasoning:** Logical reasoning, Logical relationship, inference, logical deductions.

**CHAPTER – I**

**NUMERICAL ESTIMATION**

Numerical estimation questions test your ability to make quick estimates of the answer to fairly straight forward numerical question. To score well on these questions you will need to make quick approximations of the answer. You must avoid the trap of working out the answer exactly, which will take up too much time and prevent you from answering enough questions to get a good score.

Numerical Estimation	Operatives	Supervisory	Management
Craft & Technical Clerical & Administrative Police, Fire, Military etc.	Y	Y	Y
Management Trainee Graduate & Professional	Y	Y	Y

Numerical estimation is key in many craft and technical jobs where the ability to quickly and accurately estimate material quantities is essential. The speed at which you can answer these questions is the critical measure, as most people could achieve a very high score given unlimited time in which to answer.

Even though numerical estimation questions appear straight forward, it can take some time to develop the optimum compromise between speed and accuracy. Before you attempt to answer each question, look at the range of answers available and ask yourself how accurate your estimate needs to be. For example  $m$  is an order of magnitude sufficient or does the answer need to be worked out to the nearest whole number?

If you are out of practice with arithmetic, then try re-learning the times tables up to 12 and practice rough and ready multiplication, division and percentage calculations. Practice can improve your test scores for all types of aptitude tests but numerical estimation is one area where it can really make a difference, so try as many examples as you can.

These sample numerical estimation questions are directly applicable to tests used to select for craft and technical jobs. However, the ability to make quick estimates is a useful skill to have even if you are sitting a graduate or professional level test as it will enable you to roughly check your answers to data interpretation questions.

In this type of questions, generally you are given along series of numbers. The candidate is required to find out how many times a number satisfying the conditions, specified in the question, occurs.

Ex: 1

How many 5's are there in the following sequence which are immediately followed by 3 but not immediately preceded by 7?

895325385687335775365335738

- (a) One (b) two (c) three (d) four (e) more than four

Sol: As you know, a number which comes after a given number is said to follow it while the one which comes before the given number precedes it.

Thus, the numbers satisfying the given conditions, can be shown as follows.

9[5]32[5]38568733577536[5]335738

Ex: 2

In the series, 641228742153862171413286 how many pairs of successive numbers have a difference of 2 each?

- (a) 4 (b) 5 (c) 6 (d) 7

Sol:

Clearly, the pairs of successive numbers having a difference of 2 can be shown as follows.

[6 4] 1 2 2 8 7 [4 2] 1 [5 3] [8 6] 21714 [1 3] 2 [8 6]

Thus, there are six such pairs. Hence, the answer is (c)

Ex: 3

How many even number are there in the following sequence of numbers which are immediately followed by an odd number as well as immediately preceded by an even number?

86768932753422355228119

- (a) One (b) Three (c) Five (d) Six (e) None of these

Sol:

As you know, numbers divisible by 2 are called even while those not divisible by 2 are called odd numbers. Thus, the numbers satisfying the given conditions, can be shown as follows:

8[6]76[8]9327534[2]235522[8]119

early, there are for such numbers. Hence the answer is (c).

### EXERCISE

01. How many 3's are there in the following sequence which are neither preceded by 6 nor immediately followed by 9?

9366395937891639639

- (a) One (b) Two (c) three (d) four (e) None of these

02. How many 7's are there in the following series which are preceded by 6 which is not preceded by 8?

87678675679761677688697687

- (a) Nil (b) One (c) Two (d) Three (e) None of these

03. In the following list of numerical, how many 2's are followed by 1's but not preceded by 4?

421214211244412212144214121242124146

- (a) Two (b) Three (c) Four (d) Five

Directions (Questions 4-5):

Study the number series given below and answer the questions that follow:

78976534928972459297647

04. How many 7's are preceded by 9 and followed by 6?

- (a) 2 (b) 3 (c) 4 (d) 5 (e) None of these

05. Which figures have equal frequency?

- (a) 253 (b) 245 (c) 375 (d) 865 (e) None of these

06. How many 6's are there in the following number sequence which are immediately preceded by 9 but not immediately followed by 4?

56432963164964215967214749642

- (a) One (b) Two (c) Three (d) Four (e) More than four

07. In the following series of numbers, find out how many times, 1, 3 and 7 have appeared together, 7 being in the middle and 1 and 3 on either side of 7?

2973173771331738571377173906

- (a) 3 (b) 4 (c) 5 (d) More than 5 (e) None of the above

08. In the series, 641228742153862171413286 how many pairs of alternate numbers have a difference of 2?

- (a) One (b) Two (c) Three (d) Four (e) None

09. How many even numbers are there in the following sequence of numbers which are immediately followed by an odd number as well as immediately preceded by an even number?

86768932753422355228119

- (a) One (b) Three (c) Five (d) Six (e) None of these

Directions (Questions 10 to 12):

Study the following number sequence and answer the questions given below it

51473985726315863852243496

10. How many odd numbers are there in the sequence which are immediately followed by an odd number?

- (a) 1 (b) 2 (c) 3 (d) 4 (e) More than 4

11. How many even numbers are there in the sequence which are immediately preceded by an odd number but immediately followed by an even number?  
(a) 1 (b) 2 (c) 3 (d) 4 (e) More than 4
12. How many odd numbers are there in the sequence which are immediately preceded and also immediately followed by an even number?  
(a) 1 (b) 2 (c) 3 (d) 4 (e) None than 4
13. In the following number series how many times an odd number is followed by two even numbers 18763542342632894  
(a) 5 (b) 2 (c) 3 (d) 4 (e) None
14. In the following series 69699676979669779667. How many 9's are sandwiched between 6 and 7?  
(a) 2 (b) 3 (c) 4 (d) None
15. How many 6's are sandwiched between 9?  
(a) 1 (b) 2 (c) 3 (d) 4 (e) None
16. How many 7's have a 6 before and after?  
(a) 1 (b) 2 (c) 3 (d) 4 (e) None

**Directions (Questions 17 to 21) are based on the following set of figures.**  
7897653428972459297647

17. How many 7's are preceded by 9 and following?  
(a) 3 (b) 2 (c) 4 (d) 5 (e) All
18. Which figure is missing?  
(a) 6 (b) 9 (c) 1 (d) 2 (e) None
19. Which figure has highest frequency?  
(a) 7 (b) 9 (c) 6 (d) 8 (e) All except 0
20. Which figures have equal frequency?  
(a) 253 (b) 865 (c) 245 (d) 375 (e) None
21. Which figure has the lowest frequency?  
(a) 2 (b) 8 (c) 3 (d) 4 (e) 9
22. If the first and second digits in the sequence 598132743 are interchanged, also the third and fourth digits, the fifth and sixth digits and so on, which digit would be the seventh counting your left?  
(a) 1 (b) 4 (c) 7 (d) 8 (e) None of these
23. If the position of the first and the sixth digits of the sequence of numbers 8903214675 are interchanged the second and the seventh and so on, which number would be seventh from the right end?  
(a) 2 (b) 6 (c) 7 (d) 8 (e) 9

24. In the following sequence of instructions, 1 stands for Run, 2 stands for stop, 3 stands for GO, 4 stands for sit and 5 stands for wait. If the sequence were continued, which instruction will come next?  
44545345314531245453453  
(a) wait (b) sit (c) GO (d) stop (e) Run
25. In a school, the following codes were used during physical exercise, '1' means start walking '2' means keep standing, 3 means start running at the same spot, 4 means sit down. How many times will a student who performs the following sequence without error from the beginning to the end have to sit down?  
1234423144322124314412  
(a) 2 (b) 3 (c) 4 (d) 5 (e) None of these
26. The letter L, M, N, O, P, Q, R, S and T in their order are substituted by nine integers 1 to 9 but not in that order. 4 is assigned to P. The difference between P and T is 5. The difference between N and T is S. What is the integer assigned to N?  
(a) 4 (b) 5 (c) 6 (d) 7 (e) None
27. If the numbers from 1 to 45 which are exactly divisible by 3 are arranged in ascending order, minimum number being on the top, which would come at the ninth place from the top?  
(a) 18 (b) 21 (c) 50 (d) 60 (e) None
28. If the numbers from 5 to 85 which are exactly divisible by 5 are arranged in descending order from bottom. Which would come at the eleventh place from the bottom?  
(a) 35 (b) 45 (c) 50 (d) 60 (e) None of these
29. How many numbers from 1 to 100 are there each of which is not only exactly divisible by 4 but also has 4 as a digit?  
(a) 7 (b) 10 (c) 20 (d) 21 (e) More than 21
30. How many numbers amongst the numbers 9 to 50 are there which are exactly divisible by 9 but not by 3?  
(a) 8 (b) 6 (c) 5 (d) 5 (e) Nil
31. How many numbers from 11 to 50 are there which are exactly divisible by 7 but not by 3?  
(a) Two (b) four (c) five (d) six (e) seven
32. A number is greater than 3 but less than 8. Also, it is greater than 6 but less than 10. The number is .....  
(a) 5 (b) 6 (c) 7 (d) 8 (e) 9

**KEY:**

- 01.b 02.d 03.c 04.a 05.e 06.b 07.a 08.e 09.e 10.e 11.c 12.c  
13.e 14.b 15.a 16.c 17.b 18.c 19.a 20.c 21.c 22.e 23.c 24.e  
25.e 26.e 27.e 28.a 29.a 30.e 31.b 32.c

## COMPARISON AND RANKING

01. Among five friends, Mohit is taller than Satish, but not as tall as Jayanth. Jayant is taller than Shanker and Manish. Shankar is shorter than Satish but taller than the one who is shortest among them. Who is the fourth in the descending order of their height?  
(a) Mohit (b) Satish (c) Manish (d) Cannot be determined (e) None of these
02. Among five friends, Mohan is elder than Raj but not as old as Lalit. Lalit is elder than Neelesh and Kabir, Neelesh is younger than Raj but not the youngest. Who is the fourth in the descending order of age?  
(a) Mohan (b) Raj (c) Kabir (d) Lalit (e) None of these
03. Akshay is younger than Sharad. Sharad is older than Ravi but not as old as Sumit. Rajan is third in the age sequence among the five friends. Who is the youngest?  
(a) Akshay (b) Sharad (c) Ravi (d) Data inadequate (e) None of these
04. Some boys are sitting in a row. P is sitting fourteenth from the left and Q is seventh from the right. If there are four boys between P and Q, how many boys are there in the row?  
(a) 19 (b) 21 (c) 25 (d) 23 (e) None of these
05. In a row of children, Hari is eleventh from the left and Manjula is seventeenth from the right. When they exchange their places, hari will be thirteenth from the left. Which of the following will be the new position of Manjula from right?  
(a) Eleventh (b) Twenty-ninth (c) Twenty-first (d) None of these
06. Kapil ranked thirteenth from the top and twenty-sixth from the bottom among those who have passed in the annual examination in a class. If six students have failed in the annual examination. What was the total number of students in that class?  
(a) 45 (b) 38 (c) 44 (d) 50 (e) None of these
07. In a class, Ajaya is 15<sup>th</sup> in rank from the top and 21<sup>st</sup> from the bottom. How many students are there in the class?  
(a) 34 (b) 35 (c) 36 (d) 37 (e) cannot be determined
08. In a row of boys, Anil is 15<sup>th</sup> from the left and Vishaka is 7<sup>th</sup> from the right. If they interchange their positions, Vishakh becomes 15<sup>th</sup> from the right. How many boys are there in the row?  
(a) 21 (b) 22 (c) 29 (d) cannot be determined (e) None of these
09. Samir's rank is tenth from the top in his class. Prabir, who is fifteenth from the end is lower in rank than Samir by ten. How many students are there in Samir's class?  
(a) 32 (b) 31 (c) 38 (d) 34 (e) None of these
10. In a row of children, Deepa is ninth from the left and Ajay is thirteenth from the right. When they exchange places, Deepa will be seventeenth from the left. Which of the following will be the new position of Ajay from the right?  
(a) Twentieth (b) Seventh (c) Twenty-first (d) Ninth (e) None of these

11. In a row of children, Shibu is fifth from the left and Ravi is sixth from the right. When they exchange position, Shibu will be thirteenth from the left. What will be Ravi's position from the right?  
(a) Fourth (b) Fifth (c) Thirteenth (d) Fourteenth (e) Fifteenth
12. Madhav ranks thirteenth in a class of thirty-one. What is his rank from the last?  
(a) 15 (b) 17 (c) 18 (d) 20 (e) None of these
13. Sandeep and Raju are ranked 13<sup>th</sup> and 14<sup>th</sup> respectively in a class of 23. What is their respective ranks from the last?  
(a) 10<sup>th</sup> to 11<sup>th</sup> (b) 11<sup>th</sup> & 12<sup>th</sup> (c) 11<sup>th</sup> & 10<sup>th</sup> (d) 9<sup>th</sup> & 10<sup>th</sup> (e) None of these
14. Lokesh remembers that his brother Laxman's birthday falls after 20<sup>th</sup> of August but before 28<sup>th</sup> of August, while Rita remembers that Laxman's birthday falls before 22<sup>nd</sup> of August but after 12<sup>th</sup> of August. On what date Laxman's birthday falls?  
(a) 20<sup>th</sup> August (b) 21<sup>st</sup> August (c) 22<sup>nd</sup> August (d) Cannot be determined (e) None of these
15. Prabir remembers that his father's birthday is between thirteenth and sixteenth of May whereas his sister remembers that their father's birthday is between fourteenth and eighteenth of May. On which day of may is their father's birthday?  
(a) 14<sup>th</sup> (b) 16<sup>th</sup> (c) 14<sup>th</sup> (d) Seventeenth (e) None of these
16. Prakash remembers that his father's birthday is between thirteenth and sixteenth of May, whereas his sister remembers that their father's birthday is after fourteenth but before seventeenth April. Which day in April is their father's birthday?  
(a) 14<sup>th</sup> (b) 16<sup>th</sup> (c) 14<sup>th</sup> or 15<sup>th</sup> (d) 15<sup>th</sup> (e) 15<sup>th</sup> or 16<sup>th</sup>
17. The coach arrived at the playground at 8.35. Rakesh arrived 45 minutes later and was 15 minutes late for the training. By how much time did the coach come early than the scheduled time?  
(a) 35 minutes (b) 45 minutes (c) 15 minutes (d) 10 minutes (e) None of these
18. Alock remembers that his sister Uma's birthday is after nineteenth but before twenty second of April. Whereas his mother remembers that Uma's birthday is after twentieth but before twenty-fourth of April. Which day is Uma's birthday.  
(a) 21<sup>st</sup> April (b) 23<sup>rd</sup> April (c) 20<sup>th</sup> April (d) 22<sup>nd</sup> April (e) None of these
19. Among five friends, A is heavier than B, C is lighter than D. B is lighter than D but heavier than E, who among them is the heaviest?  
(a) B (b) C (c) A (d) D (e) None of these
20. Mohipal, the younger brother of Bibhu, is older than Rebati, Prema, who is younger to Seema is older than Bibhu, who among them is the oldest?  
(a) Raju (b) Munna (c) Mitalee (d) Vani (e) Lalu
21. Lalu is taller than Munna but shorter than Mitalee. Vani is taller than Raju. Munna is taller than Vani. Who is the shortest?  
(a) Raju (b) Munna (c) Mitalee (d) Vani (e) Lalu

22. Shishir is taller than Samir but not as tall as Prakash. Ashok is taller than Prabodh but not as tall as Samir. Who among them is the tallest?  
(a) Ashok (b) Shishir (c) Prabodh (d) Samir (e) Prakash
23. Ramesh is taller than Vinay who is not as tall as Karan. Sanjay is taller than Anupam but shorter than Vinay. Who among them is the tallest?  
(a) Ramesh (b) Karan (c) Vinay (d) Cannot be determined (e) None of these
24. Five persons were playing card game sitting in a circle all facing the centre. Mukund was to the left of Rajesh, Vijay was to the right of Anil and between Anil and Nagesh. Who was to the right of Nagesh?  
(a) Vijay (b) Rajesh (c) Anil (d) Mukund (e) Cannot be determined
25. Prakash is taller than Geeta. Amar is taller than Prabhat but not as tall as Geeta. Prabodh is taller than Prakash. Who among them is the shortest?  
(a) Prakash (b) Geeta (c) Amar (d) Prabodh (e) Prabhat
26. Roshan is taller than Hardik, who is shorter than Susheel. Mirza is taller than Harry but shorter than Hardik. Susheel is shorter than Roshan. Who is the tallest?  
(a) Roshan (b) Susheel (c) Hardik (d) Harry (e) Mirza
27. Jayesh is taller than Ramesh who is shorter than Nandu. Satish is taller than Vinod but shorter than Subodh, who is not as tall as Prabodh. Who is the tallest in the group?  
(a) Prabodh (b) Subodh (c) Kavita (d) Ashok (e) Jayesh
28. Ashok is taller than Kavita but not as tall as Jayesh. Jayesh is shorter than Subodh, who is not as tall as Prabodh. Who is the tallest in the group?  
(a) Prabodh (b) Subodh (c) Kavita (d) Ashok (e) Jayesh
29. Kiran is taller than Sameer but shorter than Pramod. John is taller than Urmila. Sameer is taller than Job. Who is the tallest in the group?  
(a) Kiran (b) Sameer (c) Pramod (d) John (e) Urmila
30. Amar is taller than Samir, Pranath is taller than Umesh but not as tall as Samir, Ashok is shorter than Umesh. Who is the shortest?  
(a) Amar (b) Samir (c) Pranath (d) Ashok (e) None of these
31. Vipin is taller than Ramlal, who is shorter than Ahmed. Mohinder is taller than Sheikh but shorter than Ramlal, Ahmed is shorter than Vipin. Who is the shortest?  
(a) Vipin (b) Ahmed (c) Ramlal (d) Sheikh (e) Mohinder
32. Among five friends, Dina is older than Sosamma, Mona is younger than Sarayu. Jaya is older than Dina but not as old as Mona. Who is the youngest?  
(a) Dina (b) Sosamma (c) Mona (d) Sarayu (e) Jaya
33. Sudha is taller than Pushpa but shorter than Malti. Geeta is shorter than Viju and Viju is not as tall as Pushpa. Who should be in the middle if they stand in a row according to height?  
(a) Sudha (b) Pushpa (c) Malti (d) Geeta (e) Viju

34. Five boys are so standing that they form a circle. Ajay is between Ramesh and Tom. Solomon is to the left of Babu and Ramesh is to the left of Solomon. Who is to the right of Ajay?  
(a) Babu (b) Ramesh (c) Rom (d) Solomon (e) Either Solomon or Tom

**Directions (Questions 35 to 36):****Read the following information and answer the questions given below:**

i. C is not duller than B

ii. D is brighter than A, but duller than E.

One of the following statements will enable you to list the five persons in the order of their brightness(or dullness).

I. A is duller than E.

II. D is brighter than B.

III. C is duller than A.

IV. B is brighter than A.

35. Which one of the above statements enables us to list all the five persons in order of brightness?  
(a) I (b) II (c) III (d) IV (e) Both II and III

36. Which of the above statements is false?  
(a) I (b) II (c) III (d) IV (e) None

**Directions (Questions 37):****Read the following information and answer the question given below:**

Dhawal, Gunjan, Navin, Prince and Sanjay got the first five ranks (but not necessarily in this order), with each getting a different rank. The ranks were based on the aggregate marks.

I. Neither Navin nor Sanjay got less than Dhawal in the aggregate

II. Prince's aggregate was the exact average of their total aggregate.

III. Gunjan got more marks (in aggregate) than at least two of the other.

IV. Sanjay's aggregate was the average of those of Gunjan and Dhawal

V. Comparing Gunjan, Sanjay and Navin, Gunjan was neither the best nor the worst (among these three).

VI. Sanjay got a higher rank than prince.

37. Who got the fourth rank?  
(a) Dhawal (b) Gunjan (c) Navin (d) Prince (e) Sanjay

**Directions (Question 38):****Read the following information and answer the question given below:**

A, B, C, D, E and F sit down around a table to play cards. Those in alternate seats are in one team (note that two teams are thus formed).

I. A does not sit next to either C or F.

II. B and D sit opposite to each other.

III. A is in B's team, but E is not in F's team.

38. The other players in A's team are

(a) B&amp;E (b) B&amp;F (c) C&amp;F (d) E&amp;F (e) B&amp;C



**Directions (Question 39 to 40):**

Read the following information and answer the questions given below:

Seven students A, B, C, D, E, F and G appeared for two papers, each carrying the same numbers of maximum marks. The ranks they got in the aggregate of the two papers tallied with above order (A first, B second and so on). There were no ties in either of the papers i.e. no students got the same rank in paper I; no two students got the same rank in paper II, either.

- I. E was second in paper I, while F was second in paper II.  
 II. A was third in paper I and fourth in Paper II  
 III. G got the same rank in both the papers.  
 IV. D and E did not get adjacent ranks in either of the papers; but C and G got adjacent ranks in one of the papers. (Adjacent rank means one rank higher or one rank lower).  
 V. B was the fifth in paper I.  
 VI. E got lower rank than C in paper II.

39. What was B's rank in paper II?  
 (a) first (b) third (c) fifth (d) sixth (e) seventh
40. What was G's rank in paper II?  
 (a) third (b) fifth (c) sixth (d) seventh (e) first

**Directions (Question 41):**

Read the following information and answer the question given below:

- A, B, C, D and E all vary in their heights.  
 I. Any one less tall than C is less tall than A too.  
 II. C is not the shortest among them.  
 III. Any one less tall than A is less tall than D too.  
 IV. E is taller than only two other persons.

41. The fourth tallest is  
 (a) A (b) B (c) C (d) D (e) E

**Directions (Question 42):**

Read the following information and answer the question given below:

- I. A was 5 when B was born, and C was 8 when D was born.  
 II. A was 6 when D was born.  
 III. E was 4 when A was born.

42. Who is in the middle?  
 (a) A (b) B (c) C (d) D (e) E

**Directions (Question 43 to 44):**

Read the following information and answer the questions given below:

- Five persons P, Q, R, S and T are arranged in decreasing order of age and of height and ranked 1 to 5 in each arrangement.  
 I. T and R have the same rank in both arrangements.  
 II. S has a lower rank than R in both.  
 III. The ranks of P in age and of Q in height are the same.

- IV. The ranks of Q in age and height differ by 3.  
 V. T is taller and older than Q.  
 VI. Q occupies the last rank in height.

43. The person who has the same rank in age and height, is  
 (a) P (b) Q (c) R (d) S (e) T
44. The rank that P occupies in height is  
 (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

**Directions (Questions 45 to 46):**

Read the following information and answer the question given below:

- I. A drank more at a party than B and left later than C.  
 II. D drank more than A and less than C and left later than A and earlier than G.  
 III. E drank less than F and more than C and left later than G.  
 IV. B drank more than H and left earlier than C.

45. Which of the following drank more than C?  
 (a) E, F (b) E, D (c) F, D (d) F, H (e) H, B
46. Which of the following drank less than A?  
 (a) B, D (b) B, H (c) D, H (d) C, H (e) C, E

**Directions (Questions 47 to 48):**

Read the following information and answer the questions given below:

Given below is the account of how six cars have been parked by their owners. Green car is in between Blue and white. Red and Blue cars have two cars in between them. White car is not near Black or Grey and Black and Grey cars are neither neighbours. Black and green cars have two cars in between them. Red car is to the left of Black car.

47. Which car is on the extreme left?  
 (a) Grey (b) Blue (c) Black (d) Red
48. Which car is on the extreme right?  
 (a) Grey (b) Red (c) White (d) Black

**Directions (Question 49):**

Read the following information and answer the questions given below:

Out of A, B, C, D, E, F and G a team of four has to be selected.

1. A and F have to be together  
 2. D cannot be paired with C  
 3. F and G cannot be together  
 4. D and E must be together  
 5. A and B will not be together

49. The team will comprise of  
 (a) ABCF (b) BCEF (c) CEFG (d) ADEF



**Directions (Question 50):**

Read the following information and answer the questions given below:

Boys A, B, C, D, E, F, G and H have formed two teams of four boys each.

- (a) B and D are together (b) A and C are together  
(c) E and H are together (d) C and D are not together

50. If B is the captain of the team which other boys are in his team?

- (a) DEH (b) DAC (c) FEH (d) DGH (e) DFG

**Directions (Question 51):**

Read the following information and answer the question given below:

- A and B cannot be together  
F and B cannot be together  
C and G must be together  
D and G cannot be together  
E and G must not be together  
F and E must be together

51. The final team will be

- (a) BCDG (b) AEFH (c) BCDF (d) ABCG (e) None

**Direction (Question 52):**

Read the following information and answer the questions given below:

From a group of seven boys A, B, C, D, E, F and G, a team of four has to be selected with the following

- a. B and D must be together  
b. A and F cannot be together  
c. G must be with C  
d. B and E cannot be together  
e. D and A must be together

52. The selected boys are

- (a) BCEF (b) ABDG (c) CEFG (d) CDFG (e) None

**Direction (Question 53):**

Read the following information and answer the questions given below:

Out of boys A, B, C, D, E, F, G and H select a team of three

- a. C and A must be together  
b. B and G cannot be together  
c. D and H must be together  
d. G and D cannot be together  
e. E and F must be together  
f. F and H cannot be together  
g. C and G must be together

53. The selected team include

- (a) BDA (b) BDC (c) BDE (d) BDH (e) None

**Directions (Questions 54 to 55):**

Read the following information and answer the questions given below:

Madan is taller than Narayan but not as tall as Pavan. Amar is taller than Sarvan but not as tall as Narayan

54. Who is the tallest

- (a) Pavan (b) Madan (c) Narayan (d) Amar (e) None

55. Who is the shortest?

- (a) Amar (b) Sarvan (c) Pavan (d) Madan

**Directions (Questions 56 to 57):**

Ahmed is taller than Saleem but not as tall as Akbar. John is taller than Joseph, but not as tall as Saleem

56. Who is the tallest.

- (a) Ahmed (b) Akbar (c) Saleem (d) John (e) Joseph

57. Who is exactly in the middle.

- (a) Ahmed (b) Akbar (c) Saleem (d) John (e) Joseph

**Directions (Questions 58 to 59):**

There are seven persons in a ladder. Amar is higher than Edward but lower than Chand. Ganesh is in between Amar and Bhasker. Bhasker is in between Amar and Edward. Farooq is in between Dwarak and Edward.

58. Who is at the top?

- (a) Amar (b) Bhasker (c) Chand (d) Dwarak

59. Who is exactly in the middle?

- (a) Bhasker (b) Farooq (c) Edward (d) Dwarak

**ANSWER**

01. e 02. e 03. d 04. -- 05. d 06. c 07. b 08. c 09. d 10. c 11. d 12. e  
13. c 14. b 15. c 16. d 17. e 18. a 19. e 20. d 21. a 22. e 23. d 24. d  
25. e 26. a 27. a 28. a 29. e 30. d 31. d 32. b 33. b 34. b 35. c 36. d  
37. d 38. b 39. a 40. c 41. c 42. a 43. d 44. b 45. a 46. b 47. a 48. d  
49. d 50. b 51. e 52. c 53. d 54. a 55. b 56. b 57. c 58. c 59. c

LOGICAL REASONING QUESTIONS

Type 1: Logical Inference Questions and Syllogism

1.1 INTRODUCTION

The word 'Logic' is derived from the Greek word 'Logos' which means 'Thoughts in Language'. We can say that 'Logic' is the 'Science of thought' expressed in language.

The mental recognition of cause-and-effect relationship is called 'reasoning'. It may be prediction of an event from an observed cause or the inference of a cause from an observed event.

Logical reasoning is a process of passing from the known to the unknown. It is the process of deriving a logical inference from a hypothesis through reasoning.

This type of reasoning involves three important attributes, viz. What? Why? and How?

Another important factor in logical reasoning is logical deduction. Deriving an inference from units of arguments which are called proposition in logic or deducing an inference from statements is called logical deduction. For example:

- (a) Man is mortal.
  - (b) Raveesh is a man.
- Therefore, Raveesh is mortal.

From statement (a) and (b) we derive a logical conclusion that Raveesh is mortal.

(a) Basic Concepts in Logic

Term means the subject or predicate of a logical proposition. A proposition is the statement of a certain relation between two terms. All propositions either assert or deny something. The subject is that about which an assertion is made and whatever is asserted is called the predicate. The sign of relation between subject and predicate is called copula.

For example, "Man is mortal" is a proposition, the term 'Man' is a subject and 'Mortal' is a predicate and both terms are joined by the copula "is".

Propositions can be classified as follows:

- (a) Universal: What is asserted applies to the whole of a subject. Usually, 'AU' is prefixed to such propositions. "All religious men are good" is a Universal proposition.
- (b) Particular: Only part of the subject is covered. Usually, "some" is prefixed in such propositions. "Some steaks are tough" is a particular proposition.

Universal and particular propositions are based on quantity. They are further classified on the basis of quality, viz. affirmative (e.g. Raveesh is an Indian) and negatives (Raveesh is not Indian).

Based on quality and quantity, propositions are further classified into

- (a) Universal affirmative: "All teetotalers are short lived" affirms something of the whole subject. This is represented by "A".
- (b) Universal negative: "No politician is rancorous". Something is denied of the whole subject. This is represented by "E".

- (c) Particular affirmative: "Some professors are hard-working". Something is affirmed of a part of the subject. This is represented by "I".
- (d) Particular negative: Something is denied of a part of the subject. "Some writers are professionals". This is represented by "O".

Symbols A, E, I and O, above are adapted from first two vowels of "Affirmo" and "Nego". A and I are therefore affirmative and E and O are negative.

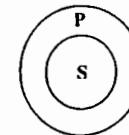
(b) Distribution of Terms

- A term is distributed when reference is made to all. A term is undistributed when reference is made to an indefinite part of the whole.
- In universal propositions, the subject term is always distributed while in a particular proposition, the subject is undistributed.
- The predicate in 'A' proposition is undistributed and the same is true for 'I' proposition. Hence affirmative propositions do not distribute their predicate.

In 'E' proposition the predicate is distributed and this also applied to 'O' proposition. The universal proposition distributes the subject, while the particular proposition does not distribute the subject. On the other hand, the predicate is distributed in negative proposition but undistributed in affirmative ones. This can be diagrammatically described as follows:

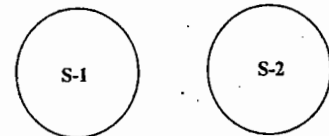
'A' Proposition

"All Indians are religious-minded"  
P-religious minded  
S-Indians



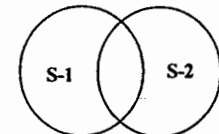
'E' Proposition

"No birds are mammals"  
The classes are mutually exclusive  
S-1: Birds  
S-2: Mammals



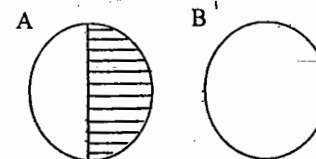
'I' Proposition

"Some birds are web-footed"  
Two classes are partially included in one another  
S-1: Birds  
S-2: Webfooted



'O' Proposition

"Some birds are not able to fly"  
A-Some birds ( Shaded area pinpoints some)  
B-Birds that fly



The shaded part of circle (A) represents 'Some birds'. The circle (B) refers to all those who are not able to fly. The subject "some" is undistributable but the circle represents substances that are unable to fly; it means it comes all. So in 'O' proposition, the predicate is distributed but not the subject.

Now, we shall study the logical relationships between two statements and their subsequent conclusions/inferences. The following section shall enable you to understand and answer the validity of relationships between two statements and also the inferences they lead to.

## 1.2. TYPES OF LOGICAL RELATIONSHIPS

The relation between propositions which are logically relevant are those in which the possible truth or falsity of one or more propositions limits the possible truth or falsity of others. For instance:

- Art cannot be taught
- If art is knowledge, then art cannot be taught
- If art is knowledge, then it can be taught
- Art can be taught
- Art is knowledge
- Art is not knowledge

In (a) and (b) both cannot be true, since one affirms what the other denies and both cannot be false for the same reasons. Same relation applied between (c) and (f). Such propositions are contradictions. In (b) and (c) there is no contradiction because art can be taught under certain contingencies. There is no mutual limitation upon the possible truth/falsity of two propositions. They are called independent.

(a) and (f) asserted jointly for a conjunctive proposition and ask for the relation with (c). This is, if both (b) and (f) are true, (a) must be true.

Propositions so related that if the first is true, the second is also true, but if the second is true, the first is undetermined and not thereby limited in its truth value, are said to be in the relation of superaltern to subaltern, also called superimplication. The truth-value of a proposition in logic means either truth or falsity, for example:

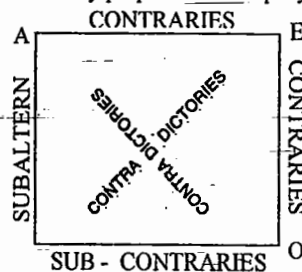
if P is true,  
q is true

if P is false,  
q is undetermined

if P is true,  
q is undetermined

if P is false,  
q is false.

(hence, P symbolizes any proposition and q any other)



Contradictories of two propositions both cannot be true, but one of them must be true. Contraries are extreme opposites; and do not between them exhaust all possibilities. They cannot both be true but they may both be false. Sub-contraries are precisely reverse of each other.

## 1.3 LOGICAL INFERENCE QUESTIONS

Now, after learning the basics of Logical reasoning, we proceed ahead with the type of questions we come across in competitive examinations.

These questions depend upon deducing the logical inference from the statements.

*Inference* is a mental process of arriving at a conclusion from more than one proposition. Inferences are of two types. They are deductive: When we move from the general to the particular and inductive where the conclusion is wider in extent than the premises. In intelligence testing, mostly deductive inference ability is judged. Deductive inference may be further classified as

- Immediate inference and
- Mediate inference

### (a) Immediate Inference

Here the conclusion is derived from a single-premise. It is a process of directly coming to a conclusion from one premise.

For example,

Statement : Some students are not bright.

Conclusion: Some bright persons are not students.

Statement: Industrial workers are paid well.

Conclusion: Some well paid persons are industrial workers.

### Questions on immediate inference can be set in two ways:

- A correct statement is given and then it is asked whether the inference can be derived from that or not.
- An incorrect (false) statement is given and then it is asked whether the inferences are correct or not.

The results obtainable by immediate inference process are termed conversion; obversion; contraposition; and inversion.

### (b) Conversion

From a given proposition we infer another proposition by interchanging or transforming the subject and predicate thereby.

- Subject and predicate interchange their places.
- Quality does not change.
- Quantity (the denotation of the terms) also not change.
- The converse of A is I, of E is E, I is I but O cannot be converted.

For example,

- All students are bright (A)  
Therefore, some bright people are students. (I) – valid
- No man is virtuous. (E)  
Therefore, no virtuous being is a man. (E)- valid
- Some men are intelligent (I).  
Therefore, some intelligent beings are men, (I)-valid  
But Proposition O cannot be converted as it will become an invalid inference, for example
- Some men are not wise. (O)  
Some who are wise are not men. (invalid)



## 2. Statement

No coin is a dollar  
Red token is a coin

## Conclusion

1. Red token is not a dollar
2. Red token may not be a dollar

Answer: If we change the order to align the propositions, it becomes  $A + E = E$ , thus making 1 to follow but for 2, this is not so

## 3. Statement

All fathers are sons  
No sons are educated

## Conclusion

1. All sons are educated
- No fathers are educated

Answer: B for conclusion 2,  $A + E = E$ , but not for 1

## 4. Statements

All cups are saucers  
No saucers is a kettle

## Conclusion

1. No cup is a kettle
2. No kettle is a cup

Answer: E Now  $A + E = E$ , therefore the conclusion should be "No cup is a kettle", which is the same as "No kettle is a cup". Thus, both 1 and 2 follow.

## 5. Statements

All books are magazines.  
Some magazines are novels.

## Conclusion

1. Some books are novels.
2. Some novels are magazines.

Answer: B;  $A + I$  leads to no conclusion, thus from both these two statements, no conclusions follow, but if we consider only statement 2, we will find that this is the same proposition as conclusion 2. Thus only 2 follow

## PRACTICE QUESTIONS

## 1. Statements

Some books are magazines  
Some magazines are novels

## Conclusion

1. Some books are novels
2. Some foolish girls are smart

## 2. Statements

All beautiful girls are foolish  
No foolish girls are smart

## Conclusion

1. No girls is smart
2. No beautiful persons are smart

## 3. Statements

Some cows are deer  
Some deer are fish

## Conclusion

1. Some cows are fish
2. Some fish are cows.

## 4. Statements

Some shirts are stocks  
No sock is red

## Conclusion

1. Some socks are skirts
2. No shirt is red

## 5. Statements

All bulbs are birds  
Some birds are butterflies

## Conclusion

1. All butterflies are bulbs
2. Some bulbs are butterflies

## 6. Statements

Some tins are round  
Some cups are round

## Conclusion

1. Some tins are cups
2. All round things are either tins or cups

## 7. Statements

All rivers are mountains  
All forests are mountains

## Conclusion

1. Some rivers are forests
2. No forest is a river

## 8. Statements

Ankit is a good sportsman  
Sportsmen are usually handsome

## Conclusion

1. All handsome persons are sportsmen
2. Ankit is handsome

## 9. Statements

Some persons are educated  
Educated persons prefer small Families

## Conclusion

1. All small families are educated.
2. Some persons prefer small families.

## 10. Statements

All men are captains  
All captains are boys

**Conclusion**

- All men are boys
- Some captains are men

**11. Statements**

All birds are boys  
Rohit is a peacock

**Conclusion**

- Rohit is a bird
- All peacock are birds

**12. Statements**

Some educated are cigarettes  
Some uneducated are table

**Conclusion**

- Some educated are tables
- All educated are not cigarettes

**13. Statements**

All lamps are poles  
Some poles are pipes

**Conclusion**

- Some lamps are pipes
- Some pipes are poles

**14. Statements**

Some tanks are ponds  
Some ponds are buckets

**Conclusion**

- Some buckets are ponds
- Some tanks are buckets

**15. Statements**

All cars are houses  
Some horns are houses

**Conclusion**

- Some cars are horns
- Some horns are cars

**Answers:**

1.D 2.D 3.D 4.A 5.D 6.D 7.C 8.B 9.B 10.E 11.D 12.D  
13.D 14.D 15.D

**1.5 MEDIATE INFERENCE (SYLLOGISM)**

Here two premises are given on the basis of which the inference has to be drawn. For example

- All men are mortal

All Teachers are men

Therefore, all teachers are mortals

- All men are good

Raveesh is a man

Therefore, Raveesh is good

- (a) **Categorical** : The given preposition or the premise are categorical. The conclusions is also categorical for example

All men are strong

He is a man

Therefore, you met him

- (b) **Hypothetical-categorical**: The major premise is hypothetical (conditional assertion) and minor premise is categorical. Inference or conclusion remains categorical. For example:

If you come in time, you will meet him

You come in time

Therefore, you met him

- (c) **Disjunctive-Categorical**: The major premise is disjunctive (conditional proposition) and the minor premise is categorical. Inference also remains categorical. For example:

Either he is intelligent or you are teaching him

He is intelligent

You are teaching him

- (d) **Dilemma**: The major premise is a compound hypothetical, the minor premise is disjunctive and the conclusion is either categorical or disjunctive. For example

- If A is B

C is D

And E is F

C is D

- Either A is B or E is F

- C is D

- (e) **Fallacies (Syllogistic)**: In a logical reasoning questions, validity of the conclusion is to be determined. Fallacies are misleading arguments (sophism) and their validity, depends upon certain rules and their violation amounts to committing fallacy. There are various kinds of fallacies

- Undistributed middle: Study the following example

All fruits are good for health

Iron tonic is good for health

Therefore, iron tonic is a fruit

The middle term "good for health" is undistributed and, therefore, the conclusion is Fallacious

- Illicit process : When the term undistributed in its own premise is distributed in the conclusion, an illicit fallacy occurs.

Some intelligent persons are liars

Raveesh is a liar,

Therefore, a loaf of bread is better than wisdom

- Fallacy of two middle terms: Study the following examples?

Nothing is better than wisdom

A loaf of bread is better than nothing

Therefore, the aim of man's life are apples

In this example, there are four terms:

“nothing”, “better than nothing”, “wisdom” and “a loaf of bread”.

- Fallacy of diction: Here the use of ambiguous word in statements amounts to a fallacy. For example:

Apples are good  
Good is the aim of man's life

Therefore, the aim of man's of are apples

- Use of ambiguous phrases: Also lead to fallacies, or when the construction of the sentence is misleading. These fallacies are called, ‘fallacy of amphibology’. For example, Gavaskar, Kapil will lead  
In this, it is not clear as to who will lead-whether Gavaskar or kapil

- Fallacies of composition and division: An argument becomes erroneous in composition when what is true of certain things, each taken separately, is assumed to be true of them collectively in the conclusion. For example,

Three and two are odd and even

Three and two are five,

Therefore, five is odd and even

An argument becomes erroneous in division when what is true of certain things collectively is taken to be true of them separately in the conclusion. For example,

Red Indians are disappearing

He is a Red Indian.

Hence, he is disappearing

In addition, there are fallacies relating to wrong accent, false cause and arguing beside the point which can be easily made out from the given statement.

#### Illustrations

**Directions:** In each of the following questions, two statements are given followed by two conclusions numbered 1 and 2. You are to take the two statements to be true even if they seen to be at variance from commonly known facts and then decide which one of the conclusions logically follows from the two statements. You answer will be.

- (A) if only conclusion 1 follows  
(B) if only conclusion 2 follows  
(C) if either 1 or 2 follows  
(D) if neither 1 nor 2 follows  
(E) if both 1 and 2 follows

#### 1. Statement

Smoking is dangerous Rash driving is dangerous

#### Conclusions

1. Rash driving is smoking
2. Smoking is rash driving

Answer: D

#### 2. Statement

Some cooks are young. All boys are young

#### Conclusions

1. Some boys are cooks
2. Some cooks are boys

Answer: D

#### 3. Statement

Stories are interesting. All interesting incidents are rumors

#### Conclusions

1. Stories are rumors
2. Rumors are stories

Answer: A

#### 4. Statement

All girls are beautiful. Vandana is a girl

#### Conclusions

1. Vandana is a beautiful
2. Vandana is not beautiful

Answer: A

#### 5. Statement

Some dogs bite. All dogs bark

#### Conclusions

1. Dogs which bite also bark
2. Dogs which bark do not necessarily bite

Answer: A

#### 6. Statement

Doctors serve their country

#### Conclusions

1. Engineers do not serve their country
2. Some engineers serve their country

Answer: A

#### 7. Statement

All travelers are men. All men are graduates

#### Conclusions

1. All men are travelers
2. All travelers are graduates

Answer: B

#### 8. Statement

Dogs have four legs. Tables have four legs

#### Conclusions

1. Tables are dogs
2. Dogs are tables

Answer: D

#### 9. Statement

Rats are Bats. Bats are Mats

#### Conclusions

1. Mats are Rats
2. Rats are Mats

Answer: D

#### 10. Statement

Some men are wolves. All wolves are hungry

#### Conclusions

1. Men are hungry wolves
2. All those who are hungry are wolves

Answer: D



**11. Statement**

Rats are bats, rats eat mats

**Conclusions**

1. Bats eat mats
2. Mats eat bats

**Answer: D****12. Statement**

Love is God

Faith is God

**Conclusions**

1. Love is Faith
2. Faith is Love

**Answer: D****13. Statement**

All radios are transistors. Some transistors are imported

**Conclusions**

1. All radios are imported
2. All transistors are not radios

**Answer: B****PRACTICE QUESTIONS****1. Statement**

Whales are fish. Fish are in the sea

**Conclusions**

1. Whales are in the sea
2. Whales are sea

**2. Statement**

The committee rewarded him. Kuldeep Jain is the member of a committee

**Conclusions**

1. Kuldeep Jain rewarded him
2. Kuldeep Jain did not reward him

**3. Statement**

Industrial cities are highly polluted

Pollution means more diseases

**Conclusions**

1. People who live in industrial cities become immune to diseases
2. People living in cities which are not industrial are healthier than those who live in industrial cities

**4. Statement**

Space has no gravitational pull

It has no atmosphere

**Conclusions**

1. Gravity is due to atmospheric pressure
2. its not difficult to breathe in space

**5. Statement**

People live in wooden houses in Simla?

Earthquakes are frequent in Simla

**Conclusions**

1. Wooden houses are tremor proof
2. Wooden houses are stronger than brick house

**6. Statement**

Computer literates are good reasoning ability

Seema can understand the puzzle quickly

**Conclusions**

1. Seema is computer literate
2. Seema has good reasoning ability

**7. Statement**

Some stones are diamonds

All diamonds are glasses

**Conclusions**

1. All glasses are stones
2. All stones are glasses

**8. Statement**

Evaporations causes cooling

Coke is very cold

**Conclusions**

1. Some of the coke must have evaporated
2. Cock offered in this restaurant is very cold

**9. Statement**

All my daughters are beautiful

**Conclusions**

1. Komal is my daughter
2. Komal may not be my daughter

**10. Statement**

My brother sings very well. My sister is a basket-ball player. I am very-intelligent

**Conclusions**

1. We all are very talented
2. We all are sportsmen

**11. Statement**

Nena is brother of Lolo

Tata is brother of Nana

**Conclusions**

1. Lolo is a boy
2. Lolo is a girl

**12. Statement**

Some eggs are potatoes

All potatoes are tomatoes

**Conclusions**

1. All eggs are tomatoes
2. All tomatoes are eggs

**13. Statement**

Sheetal is a friend of Mukta

Mukta is a friend of Vandana

## Conclusions

1. Sheetal, Mukta and Vandana are friends
2. Sheeta is friend of Vandana

## Answers:

01.D 02.D 03.B 04.D 05.B 06.E 07.D 08.D 09.B 10.A 11.C 12.D  
13.D

## 1.6 LOGICAL DEDUCTIONS

Here we use logical diagrams to deduce the logic in the given statements and find the conclusions

## Illustrations

1. Directions: Read the following statement and draw the correct conclusion: If all books are tables and no table is a chair, then definitely no chair is a book

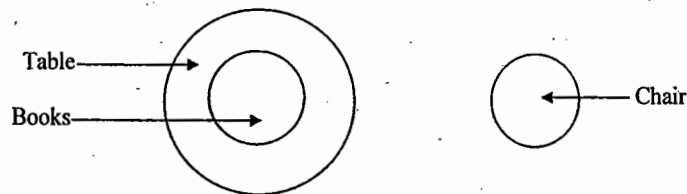
- (a) True (b) False (c) Neither (d) Cannot be inferred

Answer: (a) We can solve this question in one of two methods as shown below

(i) Take another example. If all dogs are animals and no animals are plants, than no plants are definitely dogs

ii) Draw Venn's diagram

It is therefore true that no chair is definitely a book



Q.2 to 7: Directions: In each of the following questions, there are two statements (A) and (B) followed by four conclusions numbered I, II, III and IV. Though the statements are at variance from commonly known facts, you have to assume them to be true. Read the conclusions and, based on the information given in statements (A) and (B), decide which of the opinions follow from A and B

2. Statement: (A) All books are trees.

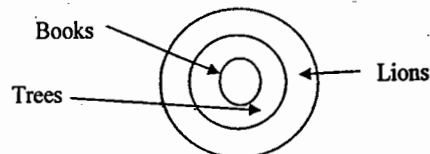
(B) All tree are lions.

## Conclusions

- I. All books are lions.
- II. All lions are books.
- III. All trees are books.
- IV. Some lions are books.

- (a) Only II and III follow (b) Only I and IV follow  
(c) None of the conclusions follow (d) All conclusions follow

Answer: (a) From statement (A) (all books are trees) and statement (B) (all trees are lions), it is clear that all books are lions (conclusions I), but not that all lions are books or all trees are books (conclusion II and III). However, some lions can be books (conclusion IV). Hence, conclusions II and III are not applicable and only I and IV can be inferred. The Venn diagram will make the situation clear.



## 3. Statements

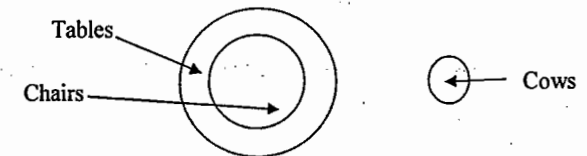
- A. No cow is a chair.
- B. All chairs are tables.

## Conclusions

- I. Some tables are chairs.
- II. Some tables are cows.
- III. Some chairs are cows.
- IV. No table is a cow.

- (a) Either II or III follow (b) Either II or IV follow  
(c) Only I follows (d) All conclusions follow

Answer: (c) It is clear that a cow can never be a chair or a table. Since all chairs are tables, it is evident that some tables are chairs (conclusion I). Conclusions-II, III and-IV are not applicable. See the following diagram.



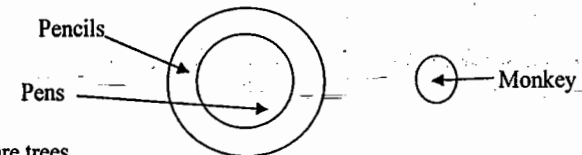
## 4. Statements

- A. All pens are pencils.
- B. No pencil is a monkey.

## Conclusions

- I. No pen is a monkey.
  - II. Some pens are monkeys.
  - III. All monkeys are pens.
  - IV. Some monkeys are pens.
- (a) Only I and III follow (b) Either II or III follow  
(c) None of the conclusions follow (d) Only I follows

Answer: (d) From the given statements, it is clear that a monkey is a separate class and has no relationship with pens or pencils. Therefore, only conclusion I can be inferred and conclusion II, III or IV are not applicable. See the following diagram.



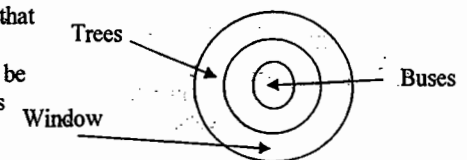
## 5. Statements

- A. All buses are trees.
- B. All trees are windows.

## Conclusions

- I. all buses are windows.
  - II. All windows are buses.
  - III. All trees are buses.
  - IV. Some windows are buses.
- (a) Only I and II follow (b) None of the conclusions follow.  
(c) Only II and III follow (d) Only I and IV follow.

Answer: (c) When all buses are tree and all trees are window (statements A and B), it implies that all buses are windows (conclusion I), but all windows cannot be trees and all trees cannot be buses. However, some windows can be buses (conclusion IV). Study the following Venn diagram which will make the situation clear.



## PRACTICE QUESTIONS

## 01. Statements

- A. All goats are tigers.  
B. All tigers are lions.

## Conclusions

- I. All tigers are goats.  
III. No goat is a lion.

- (a) Only III and IV follow  
(c) None of the conclusions follow

- II. All lions are tigers.  
IV. No lion is a goat.

- (b) Only I and II follow  
(d) All conclusions follow

## 02. Statements

- A. Some skirts are benches.  
B. No bench is a table.

## Conclusions

- I. Some skirts are tables.  
III. All benches are skirts.

- (a) Only I follows  
(c) Only II and IV follow

- II. Some benches are skirts.  
IV. Some tables are skirts.

- (b) Only II follows  
(d) None of the conclusions follow

## 03. Statements

- A. All chairs are tables.  
B. Some table are sofa sets.

## Conclusions

- I. Some sofa sets are chairs.  
III. Some chairs are sofa sets.

- (a) All conclusions follow  
(c) None of the conclusion follow

- II. All sofa sets are chairs.  
IV. All chairs are sofa sets.

- (b) Only I and II follow  
(d) Only II and III follow

## 04. Statements

- A. No book is a pencil.  
B. All pencils are erasers.

## Conclusions

- I. No pencil is a book.  
III. No eraser is a book.

- (a) Only I and IV follow  
(c) Only I, II and IV follow

- II. Some erasers are books.  
IV. No pencil is a book

- (b) None of the conclusions follow  
(d) All the conclusion follow

## 05. Statements

- A. All men are women.  
B. All women are crazy.

## Conclusions

- I. All men are crazy.  
II. All the crazy are men.  
III. Some of the crazy are men.  
IV. Some of the crazy are women.

- (a) None of the conclusions follow  
(c) Only I, III & IV follow

- (b) All the conclusions follow  
(d) Only II and III follow

## 06. Statements

- A. Some donkeys are elephants.  
B. Some donkeys are cats.

## Conclusions

- I. Some cats are donkeys.  
II. Some elephants are donkeys.  
(a) None of the conclusions follow  
(c) All the conclusions follow

- III. Some donkeys are cats.  
IV. Some cats are elephants.  
(b) Only II and III follow  
(d) Only I, II and IV follow

## Answers

01. c 02. b 03. b 04. c 05. c 06. c

## EXERCISE

**Directions (1-10):** In each of the questions below are given three statements followed by four conclusions number I, II, III and IV. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

## 01. Statements

- Some buildings are telephones.  
Some helicopters are telephones.

## Conclusions

- I. Some helicopters are buildings.  
II. Some trees are buildings.  
III. Some trees are telephones  
IV. No tree is building.

1. None follows  
3. Only either II or IV follows  
5. All follow

2. Only either II or IV and III follow  
4. Only III follows

## 2. Statements

- All books are skies.  
Some skies are waters.  
All inks are waters.

## Conclusions

- I. Some water are books.  
II. Some inks are books.  
III. Some skies are books.  
IV. Some inks are skies.

1. None follows  
3. Only III or IV follows  
5. All follow

2. Only IV follows  
4. Only III follows

## 3. Statements

- No paper is pen  
No pen is pencil  
All erasers are papers.

## Conclusions

- I. Some papers are erasers.  
II. No pencil is eraser.  
III. No pen is eraser.  
IV. All papers are erasers.

1. All follows.
3. Only I, II and III follows.
5. None of these.

## 4. Statements

Some bats are flowers.  
Some chairs are flowers.  
Some tables are chairs.

## Conclusions

- I. Some tables are flowers.
- II. Some tables are bats.
- III. Some chairs are bats.
- IV. All chairs are flowers.

1. None follows.
3. Only II follows.
5. Only I, II and III follow.

## 5. Statements

All men are lions.  
All women are tigers.  
All tigers are lions.

## Conclusions

- I. Some women are men.
- II. All women are lions.
- III. Some lions are tigers.
- IV. Some tigers are women.

1. Only I and II follow.
3. Only II and III follows.
5. All follow.

## 6. Statements

All players are spectators.  
Some spectators are theatres.  
Some theatres are dramas.

## Conclusions

- I. Some dramas are spectators.
- II. Some players are dramas.
- III. Some theatres are players.
- IV. All spectators are players.

1. Only II follows
3. Only II and IV follow
5. All follow

## 7. Statements

Some buckets are waters.  
All waters are papers.  
Some papers are woods.

## Conclusions

- I. Some woods are waters.
- II. Some buckets are woods.
- III. Some papers are buckets.
- IV. Some woods are buckets.

2. Only I and II follows.
4. Only II and III follows.

2. Only I follows.
4. Only III follows.

2. Only I and III follow.
4. Only II, III and IV follows.

2. None follows
4. Only I and III follow

1. None follows
3. Only III follows
5. Only II, III and IV follow

2. Only II follows
4. Only IV follows

## 8. Statements

All needles are threads.  
All threads are boxes.  
All trees are boxes.

## Conclusions

- I. No needle is tree.
- II. Some trees are threads.
- III. Some boxes are needles.
- IV. Some trees are needles.

1. Only either I or IV follows.
3. Only III follows
5. Only either I or IV and III follow

2. Only either I or IV and II follow
4. None follows

## 9. Statements

Some rings are phones.  
Some phones are computers.  
Some computers are stations.

## Conclusions

- I. Some stations are rings.
- II. Some phones are stations.
- III. Some computers are rings.
- IV. All rings are stations.

1. None follows
3. Only I, II and III follow
5. All follow

2. Only I and II follow
4. Only II and III follow

## 10. Statements

All leaves are links.  
No ink is brush.  
All cakes are brushes.

## Conclusions

- I. Some cakes are leaves.
- II. Some inks are cakes.
- III. Some inks are leaves.
- IV. Some cakes are brushes.

1. All follow
3. Only II and III follow
5. None of these

2. Only I and II follow
4. Only III and IV follow

**Directions (11-14):** In each of the questions below are given three statements followed by three conclusions number I, II, and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusion logically follows from the given statements disregarding commonly known facts.

## 11. Statements

Some trees are lions.  
Some lions are cows.  
All cows are bats.

**Conclusions**

- I. Some bats are trees.
- II. Some cows are trees.
- III. No bat is tree.

1. None follows
2. Only III follows
3. Only II follows
4. Only either I or III follows
5. None of these

**12. Statements**

All rings are birds.  
Some birds are cages.  
All cages are kites.

**Conclusions**

- I. All kites are cages.
- II. Some kites are rings.
- III. Some birds are kites.

1. Only I follows.
2. Only II follows.
3. Only III follows.
4. Only I and II follow
5. None of these

**13. Statements**

All pens are grasshoppers.  
Some grasshoppers are clouds.  
All clouds are bottles.

**Conclusions**

- I. Some bottles are grasshoppers.
- II. Some clouds are pens.
- III. No pen is cloud.

1. Only III follows
2. Only either II or III follows
3. Only II follows
4. Only either I or III follows
5. None of these

**14. Statements**

Some reds are crows  
All crows are yellows.  
All yellows are rabbits.

**Conclusions**

- I. All crows are rabbits.
- II. Some yellows are reds.
- III. Some reds are rabbits.

1. All follow
2. Only I follows
3. Only I and II follows
4. Either I or II follows
5. None follows

**15. Statements**

Some dogs are bags.  
No bag is lion.  
All rooms are lions.

**Conclusions**

- I. Some rooms are bags.
- II. Some dogs are lions.
- III. Some rooms are dogs.

1. All follows
2. Only I follows
3. Only II follows
4. Only III follows
5. None of follows

**16. Statements**

All cupboards are bears.  
All diamonds are bears.  
Some bears are chairs.

**Conclusions**

- I. Some chairs are diamond.
- II. Some cupboards are chairs.
- III. All diamonds are chairs.

1. Only I follows
2. Only II follows
3. Only III follows
4. None follows
5. None of these

**17. Statements**

Some chocolates are sticks.  
Some spoons are sticks.  
All spoons are apples.

**Conclusions**

- I. All apples are chocolate.
- II. Some sticks are apples.
- III. Some spoons are chocolates.

1. Only III follows
2. Only II follows
3. Only II and III follows
4. All follows
5. None of these

**Directions (18-25):** In each of the questions below are given three statements followed by four conclusions numbered I, II, III and IV. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

**18. Statements**

All flowers are rooms.  
Some rooms are windows.  
All cards are windows.

**Conclusions**

- I. Some cards are flowers.
- II. Some cards are rooms.
- III. Some windows are flowers.
- IV. All cards are rooms.

1. None follows
2. Only II follows
3. Only I follows
4. Only III follows
5. Only IV follows

**19. Statements**

All men are wolves.  
Some owls are men.  
All parrots are owls.

**Conclusions**

- I. All wolves are owls.  
 H. All owls are wolves.  
 III. All parrots are wolves.  
 IV. All parrots are men.  
 1. All follows  
 3. Only II and III follows  
 5. None of these

2. Only III and IV follow  
 4. Only II, III and IV follow

**20. Statements**

Some leaves are skies,  
 Some skies are clouds.  
 No cloud is a boat.

**Conclusions**

- I. Some boats are leaves.  
 III. All skies are leaves.  
 1. Only I, II and III follow.  
 3. Only either I or IV and II.  
 5. None of these.

- II. Some clouds are leaves.  
 IV. No leaf is a boat.  
 2. Only II, III and IV follow.  
 4. Only either I or IV and III follow.

**21. Statements**

No building is white.  
 All whites are oranges.  
 Some oranges are water.

**Conclusions**

- I. No building is water.  
 III. Some oranges are white.  
 1. Only either I and IV and II follow  
 3. Only either I or IV follow  
 5. Only either I or IV and II and III follow.

- II. No orange is a building.  
 IV. Some waters are buildings.  
 2. Only either I or IV and V follow  
 4. None of these

**22. Statements**

Some mangoes are apples.  
 Some bananas are apples.  
 Some branches are bananas.

**Conclusions**

- I. Some mangoes are bananas.  
 III. Some branches are mangoes.  
 1. None follows  
 3. Only III and IV follows  
 5. All follow

- II. Some branches are apples.  
 IV. All apples are mangoes.  
 2. Only I and II follow  
 4. Only I and IV follow

**23. Statements**

Some hotels are rivers.  
 All rivers are jungles.  
 Some jungles are towns.

**Conclusions**

- I. some towns are hotels.  
 III. Some hotels are jungles.  
 1. Only I and II follow  
 3. Only I and III follow  
 5. All follow

- II. Some towns are rivers.  
 IV. Some jungles are rivers.  
 2. Only II and IV follow  
 4. Only II and IV follow

**24. Statements**

Some tigers are lions.  
 Some lions are rabbits.  
 Some rabbits are horses.

**Conclusions**

- I. Some tigers are horses.  
 III. Some horses are lions  
 1. None follow  
 3. Only II and IV follow  
 5. All follow

- II. Some rabbits are tigers.  
 IV. All horses are rabbits.  
 2. Only IV follow  
 4. Only I and II follow

**25. Statements**

Some vehicles are windows.  
 Some windows are trains.  
 All trains are rains.

**Conclusions**

- I. Some rains are windows.  
 III. some rains are vehicles.  
 1. Only I follow  
 4. Only II and III follow
- II. Some trains are vehicles.  
 IV. Some windows are rains.  
 2. Only IV follow  
 3. Only I and IV follow  
 5. All follow

**Answers:**

01. 3 02. 4 03. 5 04. 1 05. 4 06. 2 07. 3 08. 3 09. 1 10. 4 11. 4 12. 3  
 13. 2 14. 3 15. 2 16. 4 17. 2 18. 1 19. 4 20. 3 21. 2 22. 1 23. 2 24. 1  
 25. 3

**ANALYSIS OF STATEMENT**

Such questions are followed by two (or more) arguments numbered I and II. You have to decide which of the arguments a 'strong' argument is and which a 'weak' argument is. In another format of this type of questions the test-taker may use terms 'Forceful' for 'Strong', and 'irrelevant' when none of the arguments are 'strong'.

In making decisions about important questions, it is desirable to be able to distinguish between 'strong' argument and 'weak' arguments. 'Strong' arguments are those which are both important and directly related to the question. 'Weak' arguments are those which are of minor importance and also may not be directly related to the question or may be related to a trivial aspect of the question.

**POINTS TO PONDER**

In such questions, a problem is posted in an interrogative sentence followed by two or (or more) arguments, one of which begins with YES, and other with NO. To arrive at a correct answer, the following points are to be borne in mind.

- The argument should be factual, i.e. based on facts and not on assumptions
- The arguments should be specific and not generalized
- The arguments should be in conformity with the prevailing ideas and truth and should not support the current thinking of the majority.
- There should be any kind of ambiguity in the arguments.

## Illustrations

## 1. Statement

Computerization in offices is a must to provide efficient services to the citizens.

## Arguments

I. Yes, because the work is done quickly and time is not wasted

II. No, it will generate more unemployment

(A) Only argument I is strong (B) Only argument II is strong

(C) Both I and II are strong (D) Either I or is strong

(E) Neither I nor II are strong

## Answer and Explanations: (A)

The arguments (I) is quite strong to support computerization in offices

## 2. Statement

Should there be a complete ban on opening up of new management educational institutions?

## Arguments

I. Yes, there are more institutions than required and there is no need to open up new institutions.

II. No, we need more professional managers in coming days because the future scenario will be very competitive.

(A) Only argument I is strong (B) Only argument II is strong

(C) Either I or II is strong (D) Neither I nor II is strong

(E) both I and II are strong

## Answer and explanations : (E)

Both the arguments are equally strong. If there are adequate number of institutions, we don't need to open up new ones. Keeping in view the future demand, necessary steps must be taken

## 3. Statement

Should private organizations be allowed to carry on security related research activities?

## Arguments

I. No, private organizations are easily vulnerable to our enemies are therefore, they should not be permitted to carry on such researches.

II. Yes, the Government has not sufficient resources to carry on such researches and the private organizations would manage necessary resource

(A) Only argument I is strong (B) Only argument II is strong

(C) Neither I or II is strong (D) Neither I nor II is strong

(E) Both I and II are strong

## Answers and Explanations: (A)

Here, argument I is strong because security of a country of a country can't be compromised while II is absurd

## 4. Statement

Should there be recruitment in banks on the basis of past academic performance rather than through competitive examinations?

## Arguments

I. Yes, it will be beneficial for those candidates who are unable to bear the expenses of competitive examinations.

II. No, the past academic performance cannot be made the basic of recruitment because there is no uniformity in the assessment by the universities.

(A) Only argument I is strong

(B) Only argument II is strong

(C) Either I or II is strong

(D) Neither I nor II is strong

(E) Both I and II are strong

## Answers and Explanations: (B)

Here, argument I makes no sense, free relaxation should be given to the needy students to meet such problems. II is strong because every university has its own way of evaluation. E.g. students of science stream fetches more marks than the students of arts stream.

## EXERCISE I

Directions: Each questions below is followed by two arguments numbered I and II. You have to decide which of the arguments a 'strong' argument is and which is a 'weak' argument.

Give answer (1) if only argument I is strong

Give answer (2) if only argument II is strong

Give answer (3) if either I or II is strong

Give answer (4) if neither I nor II is strong

Give answer (5) if both I and II are strong

## 1. Statement

Should Individuals/Institutes having treasures of national significance like Nobel prizes be handed over to central government for their safe custody?

## Argument

I. Yes, the individuals or institutions do not have enough resource to protect them

II. No, these are the property of the individuals/institutions who win them and should be in their custody?

## 2. Statement

Should 'education' be brought under the control of the central government like defence?

## Argument

I. No, education is a state subject and it should remain with the state.

II. Yes, this is the only way to establish uniformity in growth of education across the states.

## 3. Statement

Should import duty on all the electronic goods be dispensed with?

## Argument

I. No, this will considerably reduce the income of government and will adversely affect the development activities.

II. No, the local manufactures will not be able to compete with the foreign manufactures who are technologically far superior.

## 4. Statement

Should there be reservation of jobs in the organization in the private sector also as in the public sector undertakings in India?

## Argument

I. Yes, this will help reduce the gap between the affluent and the down-trodden in India

II. No, the private sector does not get any government assistance and therefore they should not be saddled with such policies.



## 5. Statement

Should be opinion polls predicting outcome of elections before the elections be banned in India?

## Argument

I. Yes, this may affect the voter's mind and may affect the outcome

II. No, such polls are conducted all over the world

## 6. Statement

Should there be only avoid creating public system in all the big cities in India?

## Argument

I. Yes, this will avoid creating confusion in people's mind for selection of their mode of transport.

II. No, such people should be given enough choices for their mode of transport

## 7. Statement

Should the fees of all the private professional colleges be made equal to those of the government professional colleges?

## Arguments

I. No, the private colleges need additional funds to maintain quality of education

II. Yes, otherwise a large number of meritorious students will not be able to study in these colleges for exorbitant high fees.

## 8. Statement

Should those who manufacture spurious life saving drugs be given capital punishment?

## Argument

I. No, nobody has the right to take people's life as we cannot give life anybody

II. Yes, those people are more dangerous than those who are convicted for homicide as the extent of damage to human life is incalculable.

## 9. Statement

Should there be a restriction on number of ministers in each cabinet in India?

## Argument

I. Yes, as a result of this a lot of money will be saved and the same can be used in developmental programmes.

II. No, there should not be such restriction on democratically elected representatives and it should be left to the judgments of the leader of the council of ministers.

## 10. Statement

Should all the slum dwellers in the big cities in India be relocated in restricted places outside the city limits?

## Arguments

I. Yes, this is the only way to make our big-cities neat and clean and of international standards.

II. No, this will put a lot of hardship to the slum dwellers as they will need to spend lot of time and money to come to the cities for earning their livelihood.

## 11. Statement

Should the press in India be given full freedom?

## Arguments

I. Yes, because only then people will become politically enlightened.

II. No, because full freedom to press will create problems

## 12. Statement

Should strikes be banned in essential services?

## Arguments

I. Yes, because strikes disrupt the normal life

II. No, because it is good source of revenue

## 13. Statement

In India should income tax be abolished?

## Arguments

I. Yes, because it is an unnecessary burden on the wage earners

II. No, because it is good source of revenue.

## 14. Statement

It pen mightier then is word?

## Arguments

I. Yes, because writers influence the thinking of the people

II. No, because with the help of physical force one can conquer all

## 15. Statement

Should banks be compelled to keep a definite rate of interest on savings and shouldn't they give interest at a rate lower than that?

## Argument

I. No, banks will not agree to it

II. Yes, it will be beneficial to pensioners and other depositors.

## 16. Statement

Should there be complete restriction on more advanced computerization of banks?

## Argument

I. No, this is the only way of increasing the efficiency of banks

II. Yes, it has reached its optimum and therefore it cannot be advanced further

## 17. Statement

Should people with educational qualification much higher the optimum requirement be debarred from seeking jobs?

## Argument

I. No, it will further aggravation the problems of education unemployment

II. Yes, it creates complexes among employees and affects the work adversely

## 18. Statement

Should English be the medium of instruction in most of primary schools of India?

## Argument

I. Yes, it easily opens the windows of knowledge and also helps build self-confidence in the young age to face competition in the world market.

II. No, the elementary education is most effective when taught in mother-tongue.

## 19. Statement

Should the Health Department of Municipal Councils of big cities be closed-down?

## Argument

I. Yes, they are not performing satisfactorily

II. No, it is one of the primary responsibilities to take care of the health of the citizens

## 20. Statement

Should there be a limited and judicious restriction on the freedom of press in our country?

## Arguments

- I. No, restrictions may lead to suppression of truth
- II. Yes, press personnel have a tendency to lead public astray

## 21. Statement

Should physical fitness be kept as the only criteria for recruitment in the defence forces?

## Arguments

- I. No, person's antecedents are very important for such sensitive jobs
- II. No, other mental attributes are also very important

## 22. Statement

Should politicians against whom complaints are lodged with the police be disallowed to contest any elections?

## Arguments

- I. Yes, people having criminal background should not represent common public
- II. No, bad people can lodge false complaints even against people with good moral character

## 23. Statement

Should our country extend generous behavior and goodwill to our erring and nagging neighbors?

## Arguments

- I. Yes, goodwill always pays dividend
- II. No, our generous behavior and goodwill will be considered as our weakness

## 24. Statement

Should the entire medical profession be nationalized in our country?

## Arguments

- I. No, how can any country do such an undemocratic thing?
- II. Yes, it will certainly eradicate unethical medical practices.

## 25. Statement

Should all the school teachers be barred from giving private tuitions?

## Argument

- I. No, the needy students will be deprived of the expertise of these teachers
- II. Yes, this is an injustice to unemployed and educated people who can earn their living by giving tuitions.

## 26. Statement

Should there be a maximum limit for the number of ministers in the Central Govt.?

## Argument

- I. No, the political party in power should have the freedom to decide the number of ministers to be appointed.
- II. Yes, the number of ministers should be restricted to a certain percentage of total number of seats in the Parliament to avoid unnecessary expenditure.

## 27. Statement

Should all the annual examinations upto Std. V be abolished

## Arguments

- I. Yes, the young students should not be burdened with such examination which hampers their natural growth.
- II. No, the students will not study seriously as they will get automatic promotion to the next class and this will affect them in future.

## 28. Statement

Should the railways immediately stop issuing free passes to all its employees?

## Arguments

- I. No, the employees have right to travel free
- II. Yes, this will help railways to provide better facility

## 29. Statement

Should the qualified engineers be debarred from seeking admissions to post graduate management courses in India?

## Argument

- I. Yes, the entire money spent on such students gets wasted as they do not take up jobs which need their technical knowledge.
- II. No, all the students should have the freedom to select their courses and no other country has such stipulation

## 30. Statement

Should strong nations attack comparatively weaker ones who could prove to be a threat to world peace?

## Arguments

- I. Yes, with a view to establishing world peace, one can support war.
- II. No, violence should never be resorted to.

## KEY:

01. 2   02. 1   03. 2   04. 4   05. 1   06. 2   07. 3   08. 2   09. 1   10. 3   11. 1   12. 5  
 13. 2   14. 1   15. 3   16. 1   17. 4   18. 2   19. 5   20. 1   21. 2   22. 1   23. 5   24. 4  
 25. 2   26. 2   27. 2   28. 4   29. 4   30. 5

## STATEMENT – ASSUMPTION TYPE

## EXERCISE

**Directions (1-25):** In each question below is given a statement followed by two assumptions numbered I and II. An assumption is something supposed or taken for granted. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Give answer (1) if only Assumption I is implicit

Give answer (2) if only Assumption II is implicit

Give answer (3) if either Assumption I or II is implicit

Give answer (4) if neither Assumption I nor II is implicit

Give answer (5) if both Assumption I and II are implicit

## 01. Statement

"All the employees are cordially invited to attend the cultural function to be held this weekend at the institute's premises." A notice issued by staff club.

## Assumptions

- I. Employees have not attended such program in the past
- II. Employees of the employees may attend the cultural function

**02. Statement**

"Use of cell phones and pagers is not allowed inside the auditorium. Please switch off such devices while you are inside the auditorium." A notice.

**Assumption**

- I. All those who have such devices will switch them off before they take their seat in the auditorium.
- II. Generally people do not bring such devices when they come to attend functions in the auditorium

**03. Statement**

In spite of less than normal rainfall in the catchment areas during the first two months of monsoon of the lakes supplying water to the city the authority has not yet affected any cut in the water supply to the city

**Assumption**

- I. The rainfall during the remaining part of the monsoon may be adequate for normal water supply
- II. The present water level of the lakes supplying water to the city may be adequate for normal supply

**04. Statement**

"Fly X airways whenever you decide to go places. Our fares are less than train fares".  
An advertisement

**Assumption**

- I. People prefer to travel by air when the fares are reasonable
- II. The fares of other airlines are costlier than those of X airways

**05. Statement**

In view of the violent situation due to student's agitation the state government has decided to close down all the educational institutions in the state for two weeks with immediate effect.

**Assumption**

- I. The student's agitation may subside after two weeks
- II. The students may not find a place to come further and continue agitation after the closure of the educational institutions.

**06. Statement**

The railway authority has decided to introduce two additional super-fast trains between Cities 'A' and 'B' during the vacation time

**Assumption**

- I. All the passengers who desire to travel during vacation time will get a train ticket.
- II. All other modes of transport between cities 'A' and 'B' are already overstretched

**07. Statement**

The district administration has issued a circular to all the farmers under its jurisdiction advising them for not using pesticides indiscriminately as it may pollute the ground water.

**Assumption**

- I. People may stop using ground water if the farmers continue to use pesticide indiscriminately
- II. Farmers may refrain from using pesticides indiscriminately

**08. Statement**

The government has decided to disinvest large chunk of its equity in select public sector undertaking for a better discal management

**Assumption**

- I. The amount generated out of the disinvestment process may reduce substantially the mounting fiscal deficits
- II. There will be enough demand in the market for the shares of these undertakings

**09. Statements**

'X' multinational consumer products manufacturing company has reduced price of all its products by ten percent to augment its total profit

**Assumption**

- I. There may be a huge rise in the sale of all its products
- II. The competitor companies may not reduce price of their products

**10. Statement**

The government has decided to reduce its subsidy on LPG, however the subsidy on kerosene remains unchanged.

**Assumption**

- I. Those people who buy LPG can afford to purchase LPG for a higher price
- II. Many people may stop buying LPG and instead use kerosene

**11. Statement**

The government has decided to reduce excise duty on many consumer durables and computer hardware's

**Assumption**

- I. The scale of these consumer durables and computer hardwares may substantially increase in the coming months
- II. The government may be able to maintain the expected level of tax receipts even after the deductions

**12. Statement**

"If you want hassle free personal loans give us a call, we will be at your door-step." An advertisement issued by 'X' finance company

**Assumption**

- I. No other financial company provides service at the doorstep of the customer
- II. People may prefer 'X' finance company as they may be attracted by the advertisement

**13. Statement**

The government has withdrawn 12 percent tax levied on air tickets in the domestic sector with immediate effect.

**Assumption**

- I. There may not be significant change in the number of air passengers in the domestic sector.
- II. People may still prefer to travel by train as it is more safe.

**14. Statement**

The government has instructed all the premier institutes offering professional courses the fees by 50 percent and increase the number of students.

**Assumption**

- I. These institutes may be able to continue providing quality education with less fees and more students
- II. The institutes may continue charging more fees to provide quality education

**15. Statement**

The city corporation had decided to restrict entry of vehicles from the suburban areas to main city on the major routes during peak hours to reduce traffic congestion.

**Assumption**

- I. People living in the suburban areas may refrain from taking their vehicles to the main city during peak hours.  
 II. The number of vehicles owned by people living in the main city may not create congestion on the major routes.

**16. Statement**

'Use' 'X' brand shoes. These are durable and available in all sizes

**Assumption**

- I. Some people do not know about 'X' brand shoes  
 II. Normally, people like durable shoes

**17. Statement**

'Give this packet to Mr. "X" at his residence and return immediately. In case you are likely to be late inform me.

**Assumption**

- I. The clerk may not obey Mr. A's instructions  
 II. The clerk may not inform his late coming unless instructed

**18. Statement**

'Use 'X' brand shoes. They are available in all sizes and last longer' \_\_\_\_\_ an advertisement in the newspaper 'A'.

**Assumption**

- I. Very few people read advertisement in a newspaper  
 II. Very few people read the newspaper 'A'

**19. Statement**

'Please do not wait for me, I may be late, start taking lunch as soon as the guests arrive'. \_\_\_\_\_ a message from a Director of a Company to his Office managers.

**Assumption**

- I. Keeping guests waiting is not desirable  
 II. Lunch may not be ready in time

**20. Statement**

Each and every citizen should be completely dedicated to his/her motherland, otherwise his/her citizenship should be rejected.

**Assumption**

- I. It is possible to know whether a citizen is dedicated to his Motherland or not  
 II. If one's citizenship is rejected, it should not be seen as punishment

**21. Statement**

Dengue cannot be eradicated from our city unless we create a special 'Health-squared' for it

**Assumption**

- I. Dengue is harmful  
 II. Creating Health-squad is impossible

**22. Statement**

An advertisement: Now you can realize your dream of owning a car in just Rs.999/- per month

**Assumption**

- I. People aspire for owning a car  
 II. Rs.999/- per month is easily affordable for many people

**23. Statement**

Warning : "Do not smoke in public places as it is a cognizable offence in our country".

**Assumption**

- I. People often neglect such warnings  
 II. People do not understand the implications of committing a cognizable offence

**24. Statement**

An advertisement: "Our garments are only for the wealthy people."

**Assumption**

- I. One can't become rich unless one wears those particular garments  
 II. Many people like to be labeled as wealthy

**Directions (25 - 40) :** In each question below is given a statement followed by two assumptions numbered I and II. An assumption is something supposed or taken for granted. You have to consider the statement and the following assumptions are decide, which of the assumptions is implicit in the statement.

Give answer (1) if only Assumption I is Implicit

Give answer (2) if only Assumption II is Implicit

Give answer (3) if only Assumption I or II is either Implicit

Give answer (4) if only Assumption I nor II is either Implicit

Give answer (5) if both neither Assumption I and II are Implicit

**25. Statement**

Weapon inspectors of country 'X' could not detect the presence of chemical weapons in the custody of country 'Y'.

**Assumption**

- I. Country 'Y' allowed the weapon inspector of country 'X' to inspect weapons  
 II. Presence of chemical weapons cannot be detected

**26. Statement**

Because of the large number of potholes in the road 'X' reaching airport in time has become difficult

**Assumption**

- I. Reaching airport in time may not be always necessary  
 II. There is no other convenient road to the airport

**27. Statement**

Government need not spend even a pie to provide water tankers to the drought-stricken localities in the state.

**Assumption**

- I. There are certain drought-affected localities in the state  
 II. Providing water tankers incurs some money

**28. Statement**

Government need not spend even a pie to provide water tankers to the drought-stricken localities in the state.

**Assumption**

- I. Some non-government organization also need not spend money on providing water tankers  
 II. Water tankers cannot overcome the water shortage of the drought-stricken localities

**29. Statement**

Why don't you go to the court if the employer does not pay you the Provident Fund contribution?

**Assumption**

- I. Courts can intervene in matters of dispute between employer and employees
- II. It is obligatory for the employer to pay the Provident Fund contribution to the Employees

**30. Statement**

The government has decided to pay compensation to the tune of Rs.1 lakh to the family members of those who are killed in railway accidents.

**Assumption**

- I. The government has enough funds to meet the expenses due to compensation
- II. There may be reduction in incidents of railway accidents in near future.

**31. Statement**

The X-Airlines has temporarily suspended flights to few destinations for the next four days due to the strike call given by the Pilot 'Association'.

**Assumption**

- I. The airlines may be able to restore all the flights after four days
- II. The Pilots 'Association' may withdraw the strike call within four days

**32. Statement**

The Parent Teacher Association (PTA) of a school has informed the Principal that they will not send their children to the school unless the school authority reduces the fees with immediate effect.

**Assumptions**

- I. Majority of the parents may agree with the PTA and may not send their wards to the school
- II. The school authority may accede to the demand of the PTA and reduce the fees.

**33. Statement**

"If you are first class graduate, our organization is the best place for you to work"

**Assumption**

- I. No other organization may require first class graduates as they may not get adequate number of application
- II. First class graduates may get attracted and apply to this organization

**34. Statement**

The civic authority has appealed to the citizens to cooperate in curbing rampant power theft in the locality

**Assumption**

- I. The local citizens group may respond to the request and form groups of people to detect such case of power theft.
- II. Those who are engaged in stealing power may stop doing so far fear of social Castigation

**35. Statement**

In the recently imposed war, global public opinion was dishonored by the economically strong and scientifically advanced superpower

**Assumption**

- I. Superpowers need not take any heed of global public opinion
- II. Global public opinion should have been against the imposition of war

**36. Statement**

Wars must be discouraged vehemently even though majority of the victims might have been a nuisance to peace-loving people

**Assumption**

- I. Some people create problems to peace-loving people
- II. Wars kill majority of wicked people

**37. Statement**

Wars must be discouraged vehemently even though majority of the victims might have been a nuisance to peace-loving people

**Assumptions**

- I. Innocent people are also killed in wars
- II. Vehement opposition to wars may have some desirable impact

**38. Statement**

Nobody can predict as to how long our country would take to contain the unfortunate and disastrous terrorist activities

**Assumption**

- I. It is impossible to put an end to terrorist activities
- II. Efforts to control the terrorist activities are on

**39. Statement**

It is not true that the mightiest superpower always wins wars and gets accolades from other countries

**Assumption**

- I. Winners are sometimes admired and appreciated
- II. Winners are occasionally criticised.

**40. Statement**

"Our bank provides all your banking requirements in one location" — an advertisement of a bank

**Assumption**

- I. Customers prefer to carry out all banking transactions at one place.
- II. People may get attached by the advertisement and carry out their transactions with this bank

**KEY:**

- 01.2 02.1 03.5 04.2 05.5 06.2 07.2 08.1 09.1 10.2 11.3 12.2  
 13.4 14.5 15.1 16.5 17.2 18.4 19.1 20.1 21.1 22.5 23.3 24.2  
 25.1 26.2 27.1 28.4 29.5 30.1 31.4 32.1 33.2 34.5 35.4 36.1  
 37.2 38.2 39.1 40.5

Information is provided that requires you to interpret it and then apply the appropriate logic to answer the questions. In other words, you need to work out how to get the answer rather than what calculations to apply. Sometimes the questions are designed to approximate the type of reasoning required in the workplace.

Numerical Reasoning		Operatives	Supervisory	Management
Craft & Technical				Y
Clerical & Administrative				Y
Police, Fire, Military etc.	Y			
Management Trainee	Y			
Graduate & Professional	Y			

The questions will often use number series questions which represent the most popular type of numerical reasoning questions. Numerical reasoning questions are very commonly used in graduate and managerial selection.

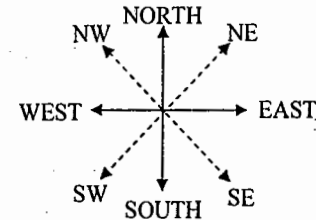
Numerical reasoning is an increasingly popular way of assessing candidates during the job selection process. Many people who have been out of the education system for a while or who don't use math's on a day-to-day basis feel intimidated by these types of test. The important thing to remember is that you don't need to have studied mathematics to a high level to do well in these tests. They are primarily tests of reasoning ability and the math needed is invariably straightforward. Although you may need to get back up to speed with percentages, ratios, proportions, fractions and decimals.

You will usually be allowed to use a calculator of these types of question and investing in one which can handle fractions and percentages is a good idea.

(1) Directions & Distances

In this test, the questions consist of a sort of directions puzzle. A successive follow up of directions is formulated and the candidate is required to ascertain the final direction (or) the distance between two points. The test is meant to judge the candidate's ability to trace and follow currently and sense the directions correctly.

The following figure which help to the candidate for finding the directions (NEWS).



While solving the questions in this chapter the candidate reading the question and draw a rough diagram keeping the above figure in mind. From this rough diagram, we can easily tell the answer to the questions as well as accuracy.

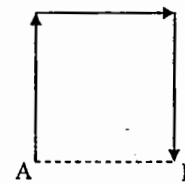
Ex: 1

Shyam travels 7 km to north, then again he turns to the right and walks 3 km. Then again he turns to his right and moves 7 km forward. How many kilometers away is he from the starting point?

- (a) 10 km (b) 20 km (c) 13 km (d) 6 km (e) 3 km

Sol:

You have to keep in mind the directions and turns given in the question and the distances covered. The situation should be quickly sketched as follows.

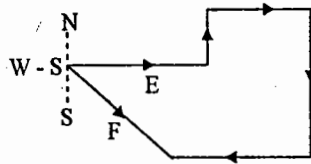


A = starting point  
 B = finishing point  
 Distance between A and B = 3 km

Ex: 2

Kailash faces towards north. Turning to his right, he walks 25 meters. He then turns to his left and walks 30 meters. Next, he moves 25 meters to his right. He then turns to his right again and walks 55 meters. Finally, he turns to the right and moves 4 meters. In which direction is he now from is starting point?

- (a) South – West (b) South (c) North – West (d) South – East



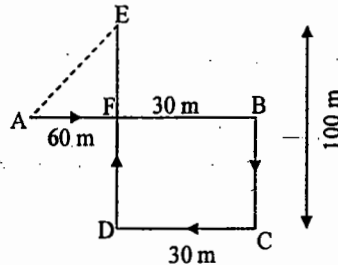
S = Starting point  
F = Final position  
Hence, South = East direction

Ex: 3

A Child is looking for his father. He went 90 meters in the east before turning to his right. He went 20 meters before turning to his right again to look for his father at his uncle's place 30 meters from this point. His father was not there. From there, he went 100 meters to his north before meeting his father in a street. How far did the son meet his father from starting point?

Sol:

Clearly, the child moves from A 90 m east upto B, then turns right and moves 20 m upto C, then turns right and moves 30 m upto D. Finally he turns right and moves 100 m upto E.



Clearly,  $AB = 90$  m,  $BF = CD = 30$  m

$$AF = AB - BF = 60 \text{ m}$$

Also  $DE = 100$  m,  $DF = BC = 20$  m

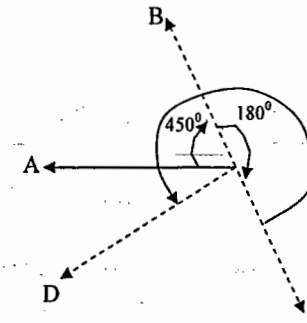
$$EF = DE - DF = 80 \text{ m}$$

$$\begin{aligned} \therefore \text{His distance from starting point A} &= AE = \sqrt{AF^2 + EF^2} \\ &= \sqrt{(60)^2 + (80)^2} \\ &= \sqrt{3600 + 6400} = \sqrt{10000} = 100 \text{ m.} \end{aligned}$$

Ex: 4

A man is facing west. He turns  $45^\circ$  in the clock wise direction and then another  $180^\circ$  in the same direction and then  $270^\circ$  in the anticlock wise direction which direction is he facing now?

- (a) South (b) north - West (c) West (d) South - West



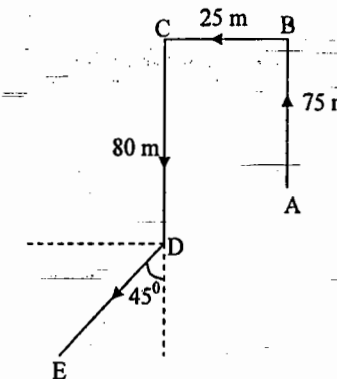
Clearly, the man initially faces in the direction OA on moving  $45^\circ$  clockwise; he faces in the direction OB. On further moving  $180^\circ$  clockwise, he faces in the direction OC. Finally, on moving  $270^\circ$  anticlockwise, he faces in the direction OD, which is south-west. Hence, the answer is (D).

Ex: 5

Deepa moved a distance of 75 meters towards the north. She then turned to the left and walking for about 25 meters, turned left again and walked 80 meters. Finally, she turned to the right at an angle of  $45^\circ$ . In which direction was she moving finally?

- (a) North - East (b) North - West (c) South - East (d) South - West

Sol:



Deepa started from A, moved 75 m upto B, turned left and walked 25 m upto C. She then turned left again and moved 80 m upto D. Turning to the right - at an angle of  $45^\circ$ , She was finally moving in the direction DE. i.e., South - West. Hence the answer is (E).



## EXERCISE

01. A person walks towards West after a while he turns to his left and little further to his right. In which direction is he moving now?  
(a) north (b) South (c) East (d) West
02. Rama walks North words after a while he turns to his right and a little further to his left, Finally after walking a distance of one Km he turns to his left again. In which direction is he moving now?  
(a) North (b) 3 Km (c) East (d) West
03. A person walks 4 km towards east and takes a right turn and walks 3 km. how far is he from the starting point?  
(a) 4 km (b) 3 km (c) 7 km (d) 5 km
04. Ganguly went 15 km to the West from my house then turns left and walked 20 km. He then turned East and walked 25 km and finally turning covered 20 km. How far was he from my house?  
(a) 5 Kms (b) 10 Kms (c) 40 Kms (d) 80 Kms
05. Rekha who is facing South turns to her left and walks 15 meters then she turns to her left and walks 7 meters, then facing west she walks 15 ms. How far she from her original position.  
(a) 22 mts (b) 37 mts (c) 7 mts (d) 44 mts
06. From his house Lokesh went 15 Km to the North. Then he turned West and covered 10 Kms. Then he turned South and covered 5 Km. Finally turning to east, he covered 10 Kms. In which is he from his house?  
(a) West (b) East (c) North (d) None
07. Venkat walks 10 Kms towards North. From there he walks 6 Kms towards south, then he walks 3 Kms towards East. How far and in which direction is he with reference to his starting point?  
(a) 7 Kms East (b) 5 Kms West (c) 5 Kms N-E (d) 7 Kms West
08. Ravi walks 10 mts towards the South turning to the left he walks 20 mts and then moves to his right. After moving distance of 20 mts he turns to the right and walks 20 mts. Finally he turns to right and moves an distance of 10 mts. How far and in which direction is he from the starting point?  
(a) 10 mts North (b) 20 mts South (c) 20 mts North (d) 10 mts South
09. Going 50 m to the South of her house. Radhika turns left and goes another 20 m. Turning to the North she goes 30 m and then starts walking to her house. In which direction is she walking now?  
(a) North - West (b) North (c) South - East (d) East
10. A boy leaves his home he first walks 30 mts in North - West direction and then 30 mts in South - West direction next he walks 30 mts in South - East direction. Finally he turns towards his house in which direction is he moving.  
(a) North - West (b) North - East (c) South - East (d) South - West

11. A man looking for his child he went 90 mts in the East before turning to his right. He went 20 mts before turning to his right again to look for his child at his uncle's place 30 mts from this point. His child was not there. From there he went 100 mts to his North before meeting his child in a street How far did the father meet his son from the starting Point?  
(a) 80 mts (b) 100 mts (c) 140 mts (d) 260 mts
12. Facing the East Mr. U.V. Rao turned left and walked 10 mts then turned to his left again and walked 10 mts. He then turned  $45^\circ$  towards his right and went straight to cover 25 mts. In which direction from his starting point is he?  
(a) South - West (b) South - East (c) North - West (d) North - East
13. If South - East is called 'East' North - West is called 'West' South - West is called South and so on what will north be called?  
(a) East (b) North - East (c) North - West (d) South
14. If South - East becomes North, North - East becomes West and so on, what will West becomes?  
(a) North - East (b) North - West (c) South - East (d) South - West
15. Preeti wants to go to the market. She starts from her home which is in the North and comes to the crossing, the road to her left ends in a park and straight ahead is the office complex. In which direction is the market?  
(a) East (b) West (c) North (d) South
16. If A is to the South of B and C is to the East of B. In what direction is A with respect to C?  
(a) North - East (b) North - West (c) South - East (d) South - West
17. There are four towns P, Q, R and T. Q is to the South - West of P, R is to the East of Q and South - East of P, and T is the North of R in the with QP. In which direction of P, T located?  
(a) South - East (b) North (c) North - East (d) East
18. I start from my home and go 2 km straight. Then if turn to words my right and go 1 Km. I turn again towards my right and go 1 Km again. If I am North - West from my house, then in which direction did I go in beginning?  
(a) North (b) South (c) East (d) West
19. P, Q, R and S are playing cards, P and Q are partners, S faces to wards North. If P faces to wards West. Then who faces to wards South?  
(a) Q (b) R (c) P (d) S
20. A watch reads 4.30. If the minute hand points East in what direction will the hour hand point?  
(a) North (b) South (c) East (d) West
21. A, B, C and D are playing a game of caroms. A, C and B, D are partners. D is to the right of C who is facing West. There B is facing in  
(a) North (b) South (c) East (d) West

22. Lokesh's school bus is facing North when it reaches his school. After starting from Lokesh house, it turns right twice and then left before reaching the school. What direction was the bus facing when it left the bus stop in front of Lokesh's house.  
(a) North (b) South (c) East (d) West
23. A walk towards North 4 Kms and turns right and walks 5 Kms. Then he turns towards South and walks 2 Kms. Again he takes a turn towards West walks 3 Kms and stops a while. Then we further walk 3 Kms. What is the distance of A from his starting point?  
(a) 16 Kms (b) 12 Kms (c) 2 Kms (d) 4 Kms
24. If a man on the moped starts from a point and rides 4 Kms South then turns left and rides 2 Kms. To turn again to the right to ride 4 Km more. Towards which direction is he moving?  
(a) North (b) West (c) East (d) South
25. Ashok went 8 Kms South and turned West and walked 3 Kms. Again he turned North and walked 5 Kms. He took a final turn to East and Walked 3 kms. In which direction was Ashok from the starting point?  
(a) East (b) North (c) West (d) South
26. Rita drives to the North of her place of stay at A and after traveling 25 km, finds that she has driven in the wrong direction she then turns to her right and travels 2 km and then she again turns to the right and drives straight another 25 km. How much distance has she now to cover to go back to the starting point?  
(a) 25 km (b) 2 km (c) 4 km (d) 40 km
27. Rana travels 10 km to the North, turns left and travels 4 km, and then again turns right and covers another 5 km, and then turns right, and travels another 4 km. How far is he from the right starting point.  
(a) 15 km (b) 4 km (c) 5 km (d) 10 km.
28. A taxi driver commenced his journey from a point, and drove 10 km towards North, and turned to his left and drove another 5 km. After waiting to meet a friend here, he turned to his right and continued to drive another 10 km. He has covered a distance of 25 km so far, but in which direction would he be now  
(a) North (b) East (c) South (d) West
29. A tourist drives 10 km towards east and turns to the right hand drives 3 Km. Then he drives towards west (turning to his right) 3 km. He then turns to his left and drive 2 km. Finally he turns to his right and travel's 7 km. how far is he from his starting point and in which direction would he be?  
(a) 10 km, East (b) 9 km, North (c) 8 km, West (d) 5 km, West
30. Ruchi's house is to the right of vani's house at a distance of 20 meters in the same row facing north, shabin's house is in the north east direction of vani's house at a distance of 25 m. Determine Ruch's house is in which direction with respect to shabina's house  
(a) East (b) South (c) North - East (d) West

## Direction:

Shallo driver 10 kms towards south from her house and turns left and driver another 25 kms. She again turns left and drive 40 kms straight then turns right and driver for another 5 kms to reach her Bank where she works.

31. how much far is her bank for her house?  
(a) 33 kms (b) 40 kms (c) 30 kms (d) 39 kms.
32. In which direction is the bank from her house?  
(a) North (b) East (c) North - East (d) None of these
33. Sunita stands with her face pointing to the South - East direction. She walks 15 m and then turns North wards and walks another 12 m. How far is she from the starting point?  
(a) 3 meters (b) 27 meters (c) 9 meters (d) None of these
34. Karan starts walking towards south. After walking 15 meters he turns towards north. After walking 20 meters, he turns towards east and walks 10 meters. He then turns towards south and walks 5 meters. How far is he from his original position and in which direction?  
(a) 10 meters, East (b) 10 meters, South - East  
(c) 10 meters, West (d) 10 meters, North - East
35. Bhavika and Sunaina starts simultaneously towards each other from two places 100 m apart. After walking 30m, Bhavika turns left and goes 10m, then she turns right and goes and comes back to the road on which she had started walking. If both Bhavika and sunaina walk with the same speed, what is the distance between them at this point of time?  
(a) 70 meters (b) 40 meters (c) 10 meters (d) 20 meters
36. 'Barin' village is 20 kilometers to the north of village 'Khan of' village 'Banoha' is 18 kilometers to the east of village 'Khanof' village 'Palasi' is 12 kilometers to the west of 'Barin'. If Amitabh starts from village Banoha and goes to village palasi in which direction is he from his starting point?  
(a) North - East (b) North - West (c) South - East (d) North
37. A man is facing north - west. He turns  $90^\circ$  in the clock wise direction and then  $135^\circ$  in the anticlock wise direction. Which direction is he facing now?  
(a) East (b) West (c) North (d) South
38. A man is facing north - west. He turns  $90^\circ$  in the clockwise direction, then  $180^\circ$  in the anticlockwise direction and then another  $90^\circ$  in the same direction which direction is he facing now?  
(a) South (b) South - West (c) West (d) South - East
39. I am facing east. I turn  $100^\circ$  in the clock wise direction and then  $45^\circ$  in the anticlock wise direction. Which direction am I facing now?  
(a) East (b) North - east (c) North (d) South - west

40. One morning after sunrise, vikram and shailesh were standing in a lawn with their backs towards each other, vikram's shadow fell exactly left hand side. Which direction was shailesh facing?  
 (a) East (b) West (c) North (d) South

41. One evening before sunset two friends sumit and mohit were talking to each other face to face. If mohit's shadow was exactly to his right side, which direction was sumit facing.  
 (a) North (b) South (c) Data inadequate (d) West

## ANSWERS

01. d 02. d 03. d 04. b 05. c 06. c 07. c 08. d 09. a 10. b 11. b 12. c  
 13. c 14. c 15. b 16. d 17. c 18. d 19. b 20. d 21. a 22. d 23. c 24. d  
 25. d 26. b 27. a 28. a 29. d 30. b 31. a 32. c 33. c 34. a 35. d 36. b  
 37. b 38. d 39. b 40. d 41. b

## TYPE 3: SENSE OF DIRECTION

These are questions pertaining to movement of a person or a vehicle in a given direction. Using sense of direction, you are required to determine the location of the person or vehicle, after the person or vehicle has covered a certain distance, taking turns towards right to left.

## Example

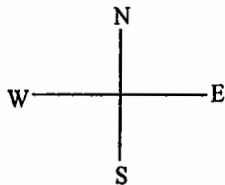
A man starts from a point and moves 3 km north, then turns to west and goes 2 km. He turns north and walks 1 km and then moves 5 km towards east. How far is he from the starting point?

- (a) 11 km (b) 5 km (c) 10 km (d) 8 km

ANSWER: (b)

## How to Tackle Such Questions?

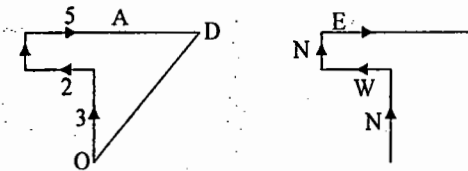
1. Keep in mind the directions as given in maps.



2. Keep in mind the change in direction when a person or vehicle takes a right or a left turn.

Direction before taking the turn	Direction in which the person or vehicle Will be moving after taking the turn	
	Right	Left
North	East	West
South	West	East
East	South	North
West	North	South

Now to solve the question given in the above example, the following picture emerges on visualizing the movement of the person.



It may be seen that OAD forms a right angled triangle, whose dimensions can easily be derived. Thus the distance OD may be determined by applying Pythagoras theorem as follows:

$$(OD)^2 = (OA)^2 + (AD)^2 = [(3+1)^2 + (5-2)^2] = 4^2 + 3^2 = 16 + 9 = 25$$

Therefore,  $(OD)^2 = 25$  or  $OD = 5$  km.

Let us now look at another example

A vehicle starts from point A and runs 10 km towards north, turns to its right and runs 15 km. It then turns to its right again and runs another 10 km to reach point B.

01. After reaching point B, how far is the vehicle from the starting point A?  
 (a) 25 km (b) 15 km (c) 10 km (d) 35 km
02. After taking the second turn, in which direction will the vehicle be moving?  
 (a) North (b) East (c) South (d) West

## ANSWERS

01. b 02. c

## Illustrations

01. Sham travels 7 km North, then turns right and walks 3 km. He again turns to his righthand side and moves 7 km forward. How many km is Sham away from the place of his starting the journey?  
 (a) 7 km (b) 3 km (c) 6 km (d) 14 km

02. Reeta drives to North of her place of stay at A and finds after traveling 25 km that she has driven in the wrong direction. She then turns to the right and travels 2 km and then again turns right and drives straight another 25 km. How much distance she has now to cover to go back to the point from where she started?  
(a) 25 km (b) 2 km (c) 4 km (d) 50 km
03. Rana travels 10 km North turns left and travels 4 km and then again turns right and covers another 5 km. He then turns to righthand side and travels another 4 km. How far is he from the point of starting his journey?  
(a) 15 km (b) 4 km (c) 5 km (d) 10 km
04. Seeta and Ram both start from a point towards North. Seeta turns to left after walking 10 km. Ram turns to right after walking the same distance. Seeta waits for some time and then walks another 5 km, whereas Ram walks only 3 km. They both return to their respective South and walk 15 km forward. How far is Seeta from Ram?  
(a) 15 km (b) 10 km (c) 8 km (d) 12 km
05. A taxi driver commenced his journey from a point and drove 10 km towards North and turned to his left and drove another 5 km. After waiting to meet one of his friends, he turned to his right and continued to drive another 10 km. He has covered a distance of 25 km so far but in which direction he now may be?  
(a) North (b) East (c) West (d) South
06. There is a ring road connecting points A, B, C and D. The road is in a complete circular form but having several approach roads leading to the centre. Exactly in the centre of the ringroad there is a tree which is 20 km from point A on the circular road. You have taken a round of circular road starting from point A and finish at the same point A and from there reach somewhere in between B and C on the ring road. How much distance you have to travel from the tree to reach the point between B and C on the ring road.  
(a) 20 km (b) 15 km (c) 80 km (d) 40 km
07. A tourist drives 10 km towards East and turns to righthand side and takes a drive of another 3 km. He then drives towards West (turning to his right) another 3 km. He then turns to his left and walks another 2 km. Afterwards, he turns to his right and travels 7 km. How far is he from his starting point and in which direction?  
(a) 10 km East (b) 9 km North (c) 8 km West (d) 5 km South
08. Rahul walks 30 meters towards south. Then turns to his right and starts walking straight till he completes another 30 meters. Then again turning to his left he walks for 20 meters. He then turns to his left and walks for 30 meters. How far is from his initial position?  
(a) 50 meters (b) 30 meters (c) 10 meters (d) 60 meters
09. Vandana drove her car for 30 kms due North. Then she turned left and drove for 40 kms. She then turned left again and drove yet another 30 kms. Again she turned left and drove her car 50 kms. How far do you think she actually drove her car from the initial position?  
(a) 10 kms (b) 50 kms (c) 30 kms (d) None
10. Shaloo ran 20 m to the east, then he turned left and walked for 15 m, then turned right and went 25 m and then turned right again and went 15 m. How far was shaloo from the starting point?  
(a) 45 m (b) 35 m (c) 25 m (d) 15 m

## ANSWERS

01. b 02. b 03. a 04. c 05. a 06. a 07. d 08. a 09. d 10. a

## EXERCISE 1 (DIRECTION PROBLEMS)

01. Santosh goes first 7 km North then turns left and moves 10 km, again he turns left and moves 7 km, how far is he from the starting point?  
(a) 7 km (b) 10 km (c) 17 km (d) 24 km
02. Mohan travels 7 km to the north direction from where he is standing and turns to his right. He then walks straight for another 3 km. Turning to his right he moves 7 km. How many kilometers away is he actually from his starting point?  
(a) 1 km (b) 2 km (c) 3 km (d) 5 km
03. Ranuka started walking from her house, she first walked for 3 km towards west, then turned towards north and moved 4 km in that direction. How far Renuka is from her house?  
(a) 3 km South (b) 3 km South (c) 5 km West (d) 5 km N-W
04. Sambhav started on Monday morning for his office from his home in Mumbai suburbs. He first drove 4 km towards east and then turned right and moved for another 2 km and again he turned right and drove for another 2 km. From that very point he drive 1 km north and moved 2 km towards west. Then he is how far from the starting point and in which direction?  
(a) 2 km east (b) 2 km west (c) 1 km south (d) 1 km north

Directions (5 – 9): Study the following information to answer these questions:

All the roads of a city are either perpendicular or parallel to each other. The roads are all straight. Roads A, B, C, D and E are parallel to one another. Roads G, H, I, J, K and M are parallel to one another.

- I. Road A is 1 km east of Road B.  
II. Road B is  $\frac{1}{2}$  km west of road C.  
III. Road D is 1 km west of Road E.  
IV. Road G is  $\frac{1}{2}$  km south of Road H.  
V. Road I is 1 km north of Road L.  
VI. Road K is  $\frac{1}{2}$  km north of Road L.  
VII. Road K is 1 km south of Road M.

05. Which is essentially true?  
(a) E and B intersect (b) D is 2 km west of B  
(c) D is at least 2 km west of A (d) M is 1.5 km north of L
06. If E is between B and C, then which of the following is false?  
(a) D is 2 km west of A (b) C is less than 1.5 km from D  
(c) E is less than 1 km from A (d) D is less than 1 km from B
07. If road E is between B and C, then distance between A and D is  
(a)  $\frac{1}{2}$  km (b) 1 km (c) 1.5 km (d) 1.5 – 2 km

08. Which of the following possibilities would make two roads coincide?

- (a) L is  $\frac{1}{2}$  km north of I. (b) C is 1 km west of D.  
(c) D is  $\frac{1}{2}$  km east of A. (d) E and B are  $\frac{1}{2}$  km apart.

09. If K is parallel to I and K is  $\frac{1}{2}$  km south of J and 1 km north of G, then which two roads would be  $\frac{1}{2}$  km apart?

- (a) I and K (b) J and K (c) J and H (d) G and J

**Directions Q 10 – 12:** Seven villages A, B, C, D, E, F, G are situated as follows:

E is 2 km to the west of B

F is 2 km to the north of A

C is 1 km to the west of A

D is 2 km to the south of G

Q is 2 km to the east of C

D is exactly in the middle of B and E

10. Which two villages are the farther from one another?

- (a) F and E (b) G and E (c) D and C (d) F and B

11. How far is E and F (in km) as the crow flies?

- (a) 5 (b)  $\sqrt{26}$  (c) 4 (d)  $\sqrt{20}$

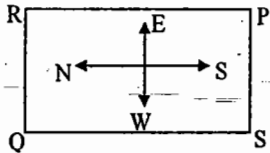
12. A is the middle of

- (a) E and G (b) E and C (c) G and C (d) F and G

13. A school going student starts from his house every morning and first travels 3 km to his left, then turns right and travels 4 km. His school from his house is

- (a) 1 km (b) 5 km (c) 4 km (d) None of these

**Direction Q 14 – 17:** Answer the following questions on the basis of the information given below.



Four security guards P, Q, R and S have been posted at the four corners of a huge cashew plantations farm as shown in the above figure.

14. Given the condition that none of the corners should be unmanned and both P and R start moving towards diagonally opposite corners, in which direction should S start moving so that he occupies a corner by traveling the minimum possible distance?

- (a) Clockwise (b) Anti – clockwise  
(c) Either clockwise or Anti – clockwise (d) None of these

15. From the original position, P and Q none one arm length clockwise and then cross over to the corner diagonally opposite, R and S move one arm length anti – clockwise and cross over the corner diagonally opposite. The original setting PSQR has now changed to

- (a) RSPQ (b) SRPQ (c) RQSP (d) None of these

16. From the original position, P and R more diagonally to opposite corners and then one side each in the clockwise direction. Which of the corners is unmanned at the moment?

- (a) South – West (b) South – East (c) North – East (d) North – West

17. After the movement in 69, who is at the North – West corner?

- I. P II. Q III. R  
(a) I only (b) I and II only (c) II and III only (d) I and III only

18. Sunil was facing east. He turns  $150^\circ$  in the clockwise direction and then  $145^\circ$  in the anticlockwise direction. Which direction is he facing now?

- (a) East (b) North (c) South – West (d) North – East

19. Sam started walking from a point 'P' towards south. After walking 40 meters, he took a left turn. He then walked 30 meters and reached a point a point Q. What is the straight line distance between P and Q, and Q is towards which direction of P?

- (a) 60 meters, south east (b) 50 meters, south west  
(c) 50 meters, south east (d) None of these

20. Gautam was facing North. He walked 40 meters and turned left to cover 20 mts. He again turned left and walked 40 mts. How far is he from his original position?

- (a) 20 mt (b) 40 mt (c) 60 mt (d) 80 mt

21. Charanjit walked southwest for 30 mts. Then she walked east for 60 mt and turned left and walked straight for 60 mts. In which direction is he from one original point?

- (a) South east (b) North west (c) North east (d) South

22. Shally traveled 9 km to the west, then turned right and traveled 7 km, then turned left and traveled 8 km, then turned back and traveled 11 km, then turned right and traveled 7 km. How far is he from the starting point?

- (a) 3 km (b) 6 km (c) 7 km (d) 9 km

23. Inspector Jatin traveled from his police station for 400 meters. He then turned left and traveled 500 meters straight after which he turned left again and traveled for 400 meters straight. He then turned right and walked for another 600 meters straight. How far is he from the Police post?

- (a) 1.0 km (b) 1.1 km (c) 1.4 km (d) 1.8 km

24. A puppy was trying to find its mother. It was facing east and walked for 10 mt. It turned south then and walked another 10 mt. Then it started walking Northwards it walked for 20 mt and turned west. It walked 10 mt and moved south for 2 mt. In which direction is it from the original position and how far?

- (a) 60 mt ne (b) 10 m ne (c) 8 mt north (d) can't determined

25. Mr vivek walks 6 mt North East and then 6 mt South East. Then she moves 2 mt South and 4 mt West. What is the straight distance between the point she started and finally reached?

- (a) 12 mt (b) 14 mt (c) 4 mt (d) 2 mt

**KEYS:**

01. b 02. c 03. d 04. -- 05. d 06. a 07. d 08. d 09. b 10. a 11. c 12. c  
13. b 14. b 15. c 16. b 17. c 18. d 19. c 20. a 21. c 22. b 23. b 24. c  
25. d

**(2) Logical Venn Diagrams**

In these tests a relationship is to be established between two (or) more items represented by diagrams. The items represented by the diagrams may be individuals, a particular group class of people (items) etc.

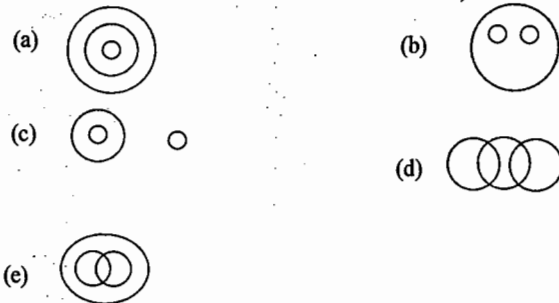
From these two types of problems.

1. Type 1: From statements (items) to Diagram
2. Type 2: From Diagrams to statements

Type 1

Example

You are required to choose from the five diagrams the one that best illustrates the relationship among the three given classes in the questions that follows. (The size of the circles does not indicate relative sizes of classes).



Questions:

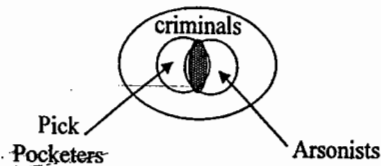
1. Criminals, Pick – Pocketers, Arsonists
2. Dogs, Friendly animals, cats
3. Potato, Vegetables, Eatables
4. Liquids, milk, River water
5. Food, curd, spoons

Ans:

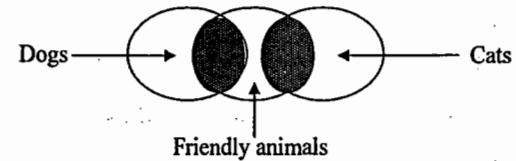
- |      |      |
|------|------|
| 1) e | 2) d |
| 3) a | 4) b |
| 5) c |      |

Explanations

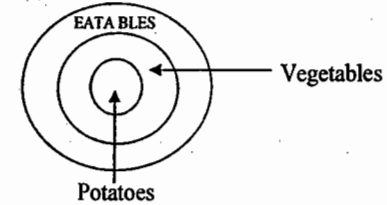
1. Both arsonists and pick – pocketers come under the class of criminals. However, some pick – pocketers can be Arsonists and vice versa.



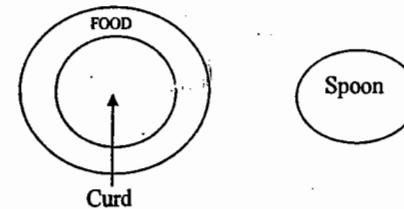
2. Dogs and cats represent separate classes, However, both can be friendly animals.



3. All Potatoes are covered under the class of vegetables. Vegetables are covered under the class of Eatables.



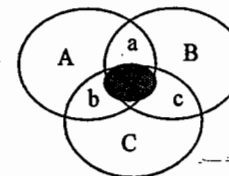
4. Curd is covered under the class of food Spoons, however, belong to a separate class.



Type 2  
Sample

The diagram below depicts BSC (Hons) students, studying chemistry, physics and mathematics, what does the shaded portion depict?

- A = Students studying chemistry
- B = Students studying physics
- C = Students studying mathematics



- (a) Students who study chemistry and physics
- (b) Students who study physics and mathematics
- (c) Students who study chemistry, Physics and Mathematics
- (d) Students who study chemistry and Mathematics.

Answer

- c) The shaded portion is common to all the three circles. Therefore it represents those students who are studying all the three subjects.

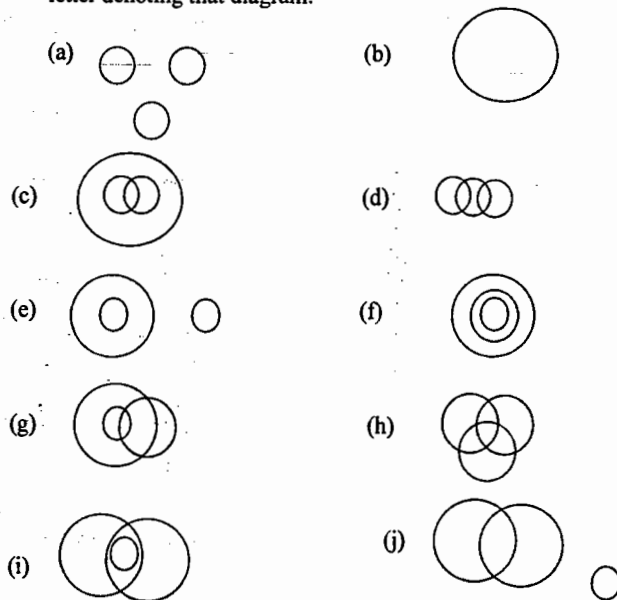
## LOGICAL VENN DIAGRAMS

1. Statements to diagrams
2. Diagrams to Statements

## 1. Statements to Diagrams

## Directions

Each one of the following questions contains three items. Using the relationship between these items, match each question with the most suitable diagrams. Your answer is the letter denoting that diagram.

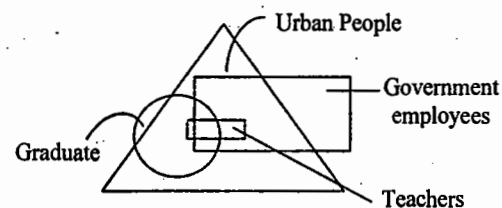


1. Doctors, Engineers, lawyers (Ans: a)
2. Table, Chair, Furniture (Ans: b)
3. Males, Fathers, Brothers (Ans: c)
4. Females, mothers, Doctors (Ans: g)
5. Elephants, Cats, Animals (Ans: b)
6. Carrot, food, vegetable (Ans: a)
7. Women, Mothers, Widows (Ans: g)
8. Authors, Teachers, men (Ans: h)
9. Boys, Students, Athlets (Ans: h)
10. Tennis fans, cricket players, students (Ans: h)
11. Mountains, Forests, Earth (Ans: c)
12. Dactors, Mothers, fathers (Ans: d)
13. Fathers, Males, Books (Ans: e)
14. Atmosphere, Air, Oxygen (Ans: a)
15. Protons, Electrons, Atoms (Ans: b)
16. Blackmen, Tallmen, Indians (Ans: h)
17. Match fixers, cricket players, Indian (Ans: h)

18. Mothrs, Females, pens (Ans: e)
19. Dactors, mothrs, papers (Ans: j)
20. Colours, Red, Blue (Ans: b)
21. Machine, lathe, Mathematics (Ans: e)
22. Science, Physics, Chemistry (Ans: a)
23. Boy, Girl, student (Ans: d)
24. Doctors, Human beings married people (Ans: c)
25. Tea, coffee, Beverages (Ans: b)
26. Mothers, Females, Married people (Ans: i)

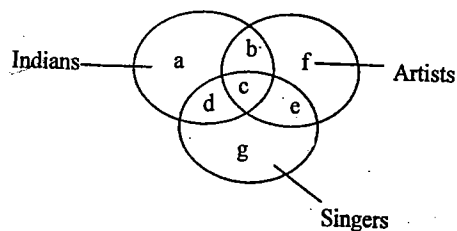
Venn diagrams - II  
(Diagrams to statements)

Study the following diagram carefully and answer the questions that follow.



01. Which of the following statements is true
  - (a) All urbans are graduates
  - (b) All graduates are urban
  - (c) All the urban government employees are graduates.
  - (d) All teachers are urban people
02. Choose the correct statements?
  - (a) There are some urban teachers who are government employees as well as graduate.
  - (b) No teacher is a government employee
  - (c) All government employees are urbanpeople
  - (d) All government employees are graduates.
03. Mark the correct statement?
  - (a) All nonurban teachers are government employees
  - (b) All urban government employees are teachers
  - (c) There are some non urban graduates who are neither teachers nor government employees.
  - (d) All urban government - employees are graduates.
04. Which of the following statements is not true
  - (a) Some government employees are rural.
  - (b) All teachers are urban
  - (c) Teachers who are government employees are urban.
  - (d) All govt. Employees are urban people.

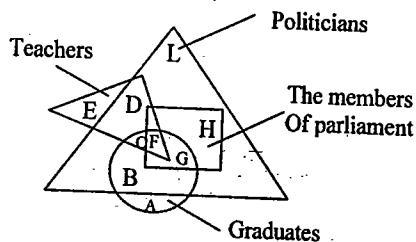




05. Indians who are Artists but not singers are represented by  
(a) a (b) b (c) c (d) d
06. Artists who are neither Indians nor singers are represented by  
(a) b (b) c (c) f (d) g
07. Indians who are singers but not Artists represented by  
(a) d (b) f (c) e (d) b
08. Indians who are Artists as well as singers are represented by  
(a) d (b) b (c) e (d) c

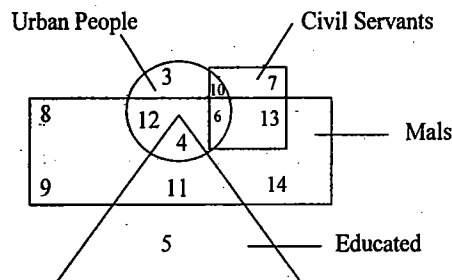
Directions:

Read the following diagram carefully and the questions that follows.



09. Who among the following are teachers graduates (or) teachers but not politicians  
(a) B, G (b) G, H (c) A, E (d) E, F
10. Who among the following politicians are graduates but not the members of parliament?  
(a) B, C (b) L, B (c) D, L (d) A, H, L
11. Who among the following politicians are neither teachers nor graduates?  
(a) E, F (b) D, E (c) C, D (d) L, H
12. Who among the following members of parliament is a graduate as well as a teacher?  
(a) G (b) F (c) C (d) H

The following questions are based on the diagram given below

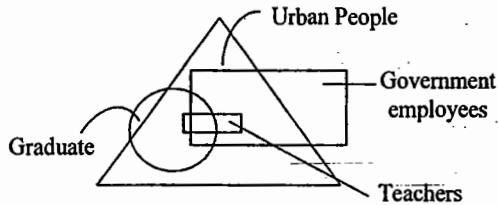


13. Who among the following is an educated male who is not an urban resident?  
(a) 4 (b) 5 (c) 9 (d) 11
14. Who among the following is neither a civil servant nor educated but is urban and not a male?  
(a) 2 (b) 3 (c) 6 (d) 10
15. Who among the following is a female, urban resident and also a civil servant?  
(a) 6 (b) 7 (c) 10 (d) 13
16. Who among the following is an educated male who hails from urban area?  
(a) 4 (b) 2 (c) 11 (d) 5
17. Who among following is an educated and also an urban male?  
(a) 2 (b) 3 (c) 11 (d) 12
18. Who among the following is only a civil servant but not a male nor urban oriented and uneducated?  
(a) 7 (b) 8 (c) 9 (d) 14
19. Who among the following is a male, urban oriented and also a civil servant but not educated?  
(a) 13 (b) 12 (c) 6 (d) 10
20. Who among the following is a male civil servant, who is neither educated nor belongs to urban area?  
(a) 7 (b) 13 (c) 4 (d) 1

LOGICAL VENN DIAGRAMS

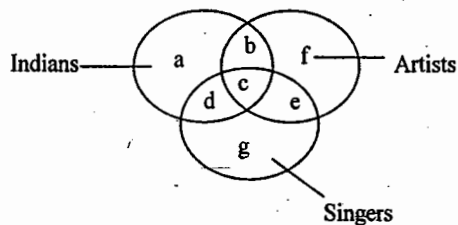
From Diagrams to statements

Read the following diagram carefully and answer the question that follows.



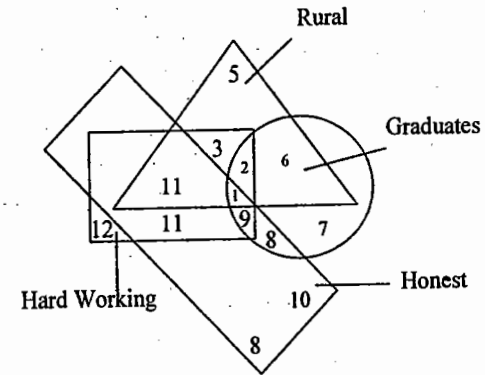
21. Which of the following statements is true
  - (a) All urban peoples are graduates
  - (b) All Graduates are urban people.
  - (c) All urban Government employees are graduates.
  - (d) All teachers are urban people.
22. Choose the correct statements
  - (a) There are some urban teachers who are Govt. employees as well as graduates.
  - (b) No teacher is a govt Employee.
  - (c) All Govt employees are urban people.
  - (d) All Govt employees are Graduates.
23. Marks the correct statement?
  - (a) All Urban teachers who are Govt. Employees.
  - (b) All Urban Govt. employees are teachers.
  - (c) There are some non – urban Graduates who are neither teacher nor Government employees.
  - (d) All Urbans are Teachers.
24. Which of the following statement is not true?
  - (a) Some Government employees are Rural.
  - (b) All teachers are Urbans.
  - (c) Teachers who are Government employees are urban.
  - (d) All Govt. Employees are urban people.

II. Study the following diagram carefully answer the questions that follows.



25. Indians who are Artists but not singers represented by
  - (a) a
  - (b) b
  - (c) c
  - (d) d
26. Artists who are neither Indians nor singers are represented by
  - (a) b
  - (b) c
  - (c) f
  - (d) g
27. Indians who are singers but not Artists represented by
  - (a) d
  - (b) f
  - (c) e
  - (d) b
28. Indians who are Artists as well as singers are represented by
  - (a) d
  - (b) b
  - (c) e
  - (d) c

III. Study the following diagram carefully and Answer the questions that follows.



29. Graduates, Hard working and Honest rural people.
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 9
30. Rural people, who are hard working and Graduates but not Honest are by
  - (a) 1
  - (b) 2
  - (c) 1
  - (d) 9
31. Urban Graduates, who are Hard working nor Honest
  - (a) 7
  - (b) 11
  - (c) 5
  - (d) 12
32. Rural Graduates who are neither Hard working nor Honest
  - (a) 7
  - (b) 11
  - (c) 6
  - (d) 8

ANSWERS

01. d 02. a 03. c 04. d 05. b 06. c 07. a 08. d 09. c 10. a 11. d 12. b  
 13. d 14. b 15. c 16. a 17. d 18. a 19. c 20. b 21. d 22. a 23. c 24. d  
 25. b 26. c 27. a 28. d 29. a 30. b 31. a 32. c

**(3) BLOOD RELATIONS**

In these tests, the success of a candidate depends upon the knowledge of the blood relations, some of which are summarized below to help solve these tests.

- |  |                             |
|--|-----------------------------|
| 1. Mother's (or) father's son  | <b>Brother</b>              |
| 2. Mother's (or) father's daughter                                   | <b>Sister</b>               |
| 3. Mother's (or) father's Brother<br>Meternal uncle – Peternal uncle | <b>Uncle</b>                |
| 4. Mother's (or) father's sister                                     | <b>Aunt</b>                 |
| 5. Mother's (or) father's father                                     | <b>Grand Father</b>         |
| 6. Mother's (or) father's mother                                     | <b>Grand Mother</b>         |
| 7. Son's wife –  | <b>Daughter-in-law</b>      |
| 8. Daughter's Husband –  | <b>Son-in-law</b>           |
| 9. Husband's (or) wife's Father                                      | <b>Father-in-law</b>        |
| 10. Husband's (or) wife's Mother                                     | <b>Mother-in-law</b>        |
| 11. Husband's (or) wife's sister                                     | <b>Sister-in-law</b>        |
| 12. Husband's (or) wife's Brother                                    | <b>Brother-in-law</b>       |
| 13. Sister's Husband   | <b>Brother-in-law</b>       |
| 14. Brother's (or) Sister's Son                                      | <b>Brother-in-law</b>       |
| 15. Brother's (or) Sister's Daughter                                 | <b>Nephew</b>               |
| 16. Uncle's (or) Aunt's son (or) Daughter                            | <b>Niece</b>                |
| 17. Uncle's (or) Aunt's son (or) Daughter                            | <b>Cousin</b>               |
| 18. Uncle's (or) Aunt's Grand son                                    | <b>Nephew</b>               |
| 19. Grand son's (or) Grand daughter's                                | <b>Great grand daughter</b> |

**Type of problems**

1. Single person Blood Relation
2. Mixed Blood Relations
3. Coded Blood Relations

**1. Single person Blood Relation**

If any relations between two persons' only is called single person blood relation.

Ex:1- Pointing to a photograph, a man said, "I have no brother (or) sister but that man's father is my father's son". Whose photograph was it

- |                 |                  |                 |
|-----------------|------------------|-----------------|
| a) His own      | b) His son's     | c) His father's |
| d) His nephew's | e) None of these |                 |

**Sol:** Since the narrator has no brother, his father's son is he himself. So, the man who is talking is the father of the man in the photograph (or) the man in the photograph is his son. Hence, the answer is (B).

Ex:2 – Pointing towards a person in a photograph, Anjali said, He is the only son of the father of my sister's brother". How is that person related to Anjali?

- |             |           |           |
|-------------|-----------|-----------|
| a) Daughter | b) Cousin | c) Mother |
| d) Sister   | e) Niece  |           |

**Sol:** The relations may be analysed as follows. Sister's brother – Brother, Brother's father – Father, Father's son – Brother. So, the person in the photograph is Anjali's brother. Hence, the answer is (E).

Ex:3 – X introduces 'y' saying, He is the husband of the grand daughter of the father of my father" How is Y related to x ?

- |            |               |                   |
|------------|---------------|-------------------|
| a) Brother | b) Son        | c) Brother-in-law |
| d) Nephew  | e) Son-in-law |                   |

**Sol:** The relations may be analysed as follows Father's father – Grand father ; Grand father's Grand daughter – Sister ; Sister's husband – Brother-in-law. So, Y is 'x' brother-in-law. Hence, the answer is (C).

Ex:4 – Pointing out to a lady, Rajan said, "She is the daughter of the woman who is the mother of the husband of my mother" who is the lady to Rajan?

- |           |                   |             |
|-----------|-------------------|-------------|
| a) Aunt   | b) Grand Daughter | c) Daughter |
| d) Sister | e) Sister-in-law  |             |

**Sol:** The relations may be analysed as follows. Mother's husband – Father's; Father's mothers – Grand mother; Grand mother's daughter – Father's Sister; Father's Sister- Aunt, so, the lady is Rajan's. Aunt. Hence the answer is (A).

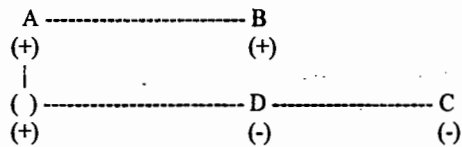
## MIXED BLOOD RELATIONS

In this type, mutual blood relations on other information's of more than two persons are mentioned and information about any two mentioned.

Ex:1 - A and B are brothers. C and D are sisters. A's son is D's brother. How is B related to C?

- a) Father                      b) Brother                      c) Grand father  
d) Uncle                      e) none of these

Sol: The above problem can be solved from following blood relation tree.



Clearly, A is the C's father. So, the Father's Brother is uncle, Hence, the answer (D).

## CODED BLOOD RELATIONS

In such questions, the relationships are represented by certain codes (or) symbols such as +, -, x, ÷, \*, etc. The relationships between certain persons given in the form of these codes, are to be analysed.

Ex:1 - If A + B means A is the sister of B, A - B means A is the brother of B. A x B means A is the daughter of B which of the following shows the relation that E is the maternal uncle of D.

- a) D + F + E                      b) D - F x E                      c) D x F x E  
d) D x F - E                      e) None of these

Sol: Clearly, E is the maternal uncle of D means D is the daughter of the sister (Say F) of E i.e, D x F Hence, the answer is (C).

## BLOOD RELATIONS

## 1. Single Person B.R. (Direct)

1. Anil introduces Rohit as the son of the only brother of his father's wife. How is Rohit related to Anil?

- a) Cousin                      b) Son                      c) Uncle  
d) Son-in-law                      e) Brother

2. Pointing towards a person in a photograph, Anjali said, "He is the only son of father of my sister's brother". How is that person related to Anjali?

- a) Mother                      b) Father                      c) Maternal uncle  
d) Cousin                      e) None of these

3. Pointing out to a photograph a man tells his friend. "She is the daughter of the only son of my father's wife". How is the girl in the photograph related to the man?  
a) Daughter                      b) Cousin                      c) Mother  
d) Sister                      e) Niece
4. Pointing out to a lady, Rajan said, "She is the daughter of the woman who is the mother of the husband of my mother". Who is the lady to Rajan?  
a) Aunt                      b) Grand daughter                      c) Daughter  
d) Sister                      e) Sister-in-law
5. Pointing to a man on the stage, Rita said, "He is the brother of the daughter of the wife of my husband". How is the man on the stage related to Rita?  
a) Son                      b) Husband                      c) Cousin  
d) Nephew                      e) Brother-in-law
6. Showing the man receiving the prize, Saroja said, "He is the brother of my uncle's daughter". Who is the man to saroja?  
a) Son                      b) Brother-in-law                      c) Nephew  
d) Uncle                      e) Cousin
7. Pointing to a photograph, a person tells his friend, "She is the grand daughter of the elder brother of my father". How is the girl in the photograph related to his man.  
a) Niece                      b) Sister                      c) Aunt  
d) Sister-in-law                      e) Maternal aunt
8. A woman introduces a man as the son of the brother of her mother. How is the man related to the woman?  
a) Nephew                      b) Son                      c) Cousin  
d) Uncle                      e) Grandson
9. Pointing out to a lady, a girl said, she is the daughter-in-law of the grand mother of my father's only son. How is the lady related to the girl?  
a) Sister-in-law                      b) Mother                      c) Aunt  
d) Mother-in-law                      e) Cousin
10. Introducing a man, a woman said. "He is the only son of my mother's mother". How is the woman related to the man?  
a) Mother                      b) Aunt                      c) Sister                      d) Niece
11. Deepak said to Nitin, "That boy playing football is the younger of the two brother of the daughter of my father's wife". How is the boy playing football related to Deepak?  
a) Son                      b) Brother                      c) Cousin                      d) Nephew
12. Pointing to the lady on the platform Manju said, "She is the sister of the father of my Mother's son". Who's is the lady to Manju.  
a) Mother                      b) Sister                      c) Aunt  
d) Niece                      e) None of these

**b. Single Person B.R. (In Direct)**

13. Pointing to a man, a woman said, "His mother is the only daughter of my mother". How is the woman related to the man ?  
 a) Mother                      b) Daughter                      c) Sister  
 d) Grand mother              e) None of these
14. A man said to a lady your mother's husband's sister is my aunt". How is the lady related to the man.  
 a) Daughter                      b) Grand daughter                      c) Mother  
 d) Sister                      e) Aunt
15. Pointing to a gentleman, Deepak said, "His only brother is the father of my daughter's father". How is the gentlemen related to Deepak ?  
 a) Grand father                      b) Father                      c) Brother-in-law  
 d) Uncle                      e) None of these
16. If Kamal says, Ravi's mother is the only daughter of my mother". How is kamal related to Ravi ?  
 a) Grand father                      b) Father                      c) Brother  
 d) Cannot be determined              e) None of these
17. Pointing to a man in a photograph, Asha, said, "His mother's only daughter is my mother". How is Asha related to that man ?  
 a) Nephew                      b) Sister                      c) Wife  
 d) Niece                      e) Grand daughter
18. Pointing to a photograph, a woman says, "This Man's son's sister is my mother-in-law". How is the woman's husband related to the man in the photograph ?  
 a) Grand son                      b) Son                      c) Son-in-law  
 d) Nephew                      e) None of these
19. Introducing a man, a woman said. "His wife is the only daughter of my father". How is that man related to the woman ?  
 a) Brother                      b) Father-in-law                      c) Meternal Uncle  
 d) Husband                      e) None of these
20. Pointing to a man in a photograph, a woman said, "His brother's father is the only son of my grand father". How is the woman related to the man in the photograph ?  
 a) Mother                      b) Aunt                      c) Sister  
 d) Daughter                      e) Grand mother
21. Pointing to a boy a man said, "His only brother's Mother is my father's wife". How is the boy related to the man ?  
 a) Brother                      b) Nephew                      c) Uncle  
 d) Father                      e) None
22. Introducing Kiran, Manoj said, Her father is the only, son of my father". How is manoj-related to Kiran ?  
 a) Brother                      b) Father                      c) Son                      d) Uncle

23. A man said to a woman "Your mother's husband's sister is my aunt". How is the woman related to the man ?  
 a) Sister                      b) Daughter                      c) Grand daughter                      d) Aunt
24. Navin says to Asha that "Namrata is the only daughter of my father's only daughter-in-law ; How is Namrata related to Navin.  
 a) Niece                      b) Sister                      c) Daughter                      d) Cannot determine

**MIXED BLOOD RELATIONS**

25. A and B are brothers. C and D are sister's A's son is D's brother. How is B related to C ?  
 a) Father                      b) Brother                      c) Grand father  
 d) Uncle                      e) None of these
26. A party consists of grandmother, Father, four sons and their wives and one son and two daughters to each of the sons. How many females are there is all ?  
 a) 14                      b) 16                      c) 18  
 d) 24                      e) None of these
27. Daya has a brother of Anil. Daya is the son of Chandra. Bimal is chandra's father. In terms of relationship, what is anil of Bimal ?  
 a) Son                      b) Grand son                      c) Brother                      d) Grand father
28. Rahul's mother is the only only daughter of Monika's Father. How is monika's husband related to Rahul ?  
 a) Uncle                      b) Father                      c) Grand father  
 d) Brother                      e) Data inadequate
29. If (i) M is brother of N (ii) B is brother of N, and iii M is brother of D, then which of the following statements is definitely true ?  
 a) N is brother of B                      b) N is brother of D                      c) M is brother of B  
 d) D is brother of M                      e) None of these
30. Deepak is brother of Ravi, Rekha is sister of Anil, Ravi is son of Rekha. How is Deepak related to Rekha ?  
 a) Son                      b) Brother                      c) Nephew                      d) Father
31. A is B's sister, C is B's Mother. D is C's Father E mother. Then, how is A related to D ?  
 a) Grand mother                      b) Grand father  
 c) Daughter                      d) Grand daughter
32. Given that :  
 1. A is Brother of B  
 2. C is Father of A  
 3. D is Brother of E  
 4. E is Daughter of B  
 Then uncle of D is  
 a) A                      b) B                      c) C                      d) E

33. Lakshmi and Meena are Rohan's wives Shalini is Meena's step - daughter. How is lakshmi related to shalini ?

- a) Sister                      b) Mother-in-law                      c) Mother  
d). Step-mother                      e) None of these

Read the following information carefully and answer the questions given below.

There are six children playing. Foot ball namely A, B, C, D, E, and F. A and E are brother. F is the sister of E, C is the only son of A's. Uncle B and D are the daughter of the brother of C's father.

#### Questions.

34. How is C related to F?

- a) Cousin                      b) Brother                      c) Son  
d) Uncle                      e) None of these

35. How many male players are there

- a) One                      b) Three                      c) Five  
d) Six                      e) Four

36. How many Female players are there ?

- a) Two                      b) Three                      c) Five                      d) Four

37. How is D related to A ?

- a) Uncle                      b) Sister                      c) Niece  
d) Cousin                      e) None of these

Read the information given below and answer the questions that follow.

- i) In a family of six persons A, B, C, D, E and F there are two married couples.  
ii) D is grand mother of A and mother B.  
iii) C is wife of B and mother of F.  
iv) F is the grand daughter of E.

#### Questions

38. What is C to A ?

- a) Daughter                      b) Grand mother                      c) Can not be determined                      d) None of these

39. How many male members are there in the family.

- a) Two                      b) Three                      c) Four  
d) Cannot be determined                      e) None of these

40. Which of the following is true ?

- a) A is brother of F                      b) A is sister of F                      c) D has two daughters  
d) B has two daughters                      e) None of these

41. Who among the following is one of the couples ?

- a) CD                      b) DE                      c) EB  
d) Cannot be determined                      e) None of these

#### Directions

Study the following information carefully and answer the questions given below it.

All the six members of a family A, B, C, D, E and F are traveling together. B is the son of C but is not the mother of B, A and C are a married couple.

E is the brother of C, D is the daughter of A, F is the Brother of B.

42. How many male members are there is in the family ?

- a) 1                      b) 2                      c) 3                      d) 4

43. Who is the mother of B.

- a) D                      b) F                      c) E                      d) A

44. How many children does A have ?

- a) One                      b) Two                      c) Three                      d) Four

45. Who is the wife of E ?

- a) A                      b) F                      c) B                      d) Cannot be determining

46. Which of the following is a pair of females ?

- a) AE                      b) BD                      c) DF                      d) AD

47. How is E related to D ?

- a) Father                      b) Brother                      c) Uncle                      d) Cannot be determined

#### Directions

Read the following information carefully answer the quotations given below.

- I. A, B, C, D, E and F are six members of a family.  
II. One couple has parents and their children in the family.  
III. A is the son of C and E is the daughter of A.  
IV. D is the daughter of F who is the mother of E.  
V. B is mother of F.

#### Quotations

48. Who are the male members in the family

- a) A and C                      b) C and F                      c) A, B and D  
d) Cannot be determined                      e) None of these

49. Which of the following pairs of is the parents of the children ?

- a) BC                      b) CF                      c) BF  
d) Cannot be determined                      e) None of these

50. Which of following pairs is the parents of the couple ?

- a) AB                      b) BC                      c) AF                      d) CF                      e) None of these

51. How many female members are there in the family ?  
 a) Two                      b) Three                      c) Four  
 d) Cannot be determined    e) None of these
52. What relationship D and E bear to each other ?  
 a) Sister and Brother    b) Mother and son    c) General mother and grand daughter  
 d) Sister                      e) None of these

**Directions**

Study the following information carefully and answer the question given below it.

There are six persons, A, B, C, D, E and F. C is the sister of F, B, is the brother of E's Husband. D is the father of A and grandfather of F. There are two fathers, three brothers and a mother in the group.

**Quotations**

53. Who is the mother?  
 a) A                      b) B                      c) C                      d) E
54. Who is E's husband ?  
 a) B                      b) C                      c) A                      d) F
55. How many male members are there in the group ?  
 a) One                      b) Two                      c) Three                      d) Four
56. How is F related to E ?  
 a) Uncle                      b) Husband                      c) Son                      d) Daughter
57. Which of the following is a group of brother  
 a) ABF                      b) ABD                      c) BFC                      d) BDF

**Directions**

Read the following information carefully and answer the questions given below it.

A family consists of six members P, Q, R, X, Y and Z. Q is the son of R but R is not mother of Q, P and R are a married couple. Y is the brother of R, X is the daughter of P. Z is the brother of P.

**Quotations :**

58. Who is the brother-in-law of R ?  
 a) P                      b) Z                      c) Y                      d) X
59. Who is the father of Q ?  
 a) R                      b) P                      c) Z                      d) None of these
60. How many female members are there in the family?  
 a) One                      b) Two                      c) Three                      d) Four

61. How is Q related to x ?  
 a) Husband    b) Father    c) Brother    d) Uncle
62. Which is a pair of brothers ?  
 a) P and X    b) P and Z    c) Q and X    d) R and Y
63. How many children does P have ?  
 a) One    b) Two    c) Three    d) Four

**CODED BLOOD RELATIONS**

64. P x Q means P is the sister of Q, P + Q means P is the father of P-Q means P is the mother of Q. Which of the following means S is the A aunt of T ?  
 a) T x M + S    b) S + T x M    c) S x M + R - T    d) None of these
65. If A + B means A is the son of B, A means A is the husband of B, A x B means A is the sister of B, then which of the following shows the relation Q is the maternal uncle of P.  
 a) P + B - R x Q    b) P - B + R x Q    c) P + B x R - Q  
 d) P x B - R + Q    e) None of these
66. If P + Q means P is the brother of Q, P x Q means P is the father Q, P means P is the sister of Q. Which of the following represents S is the niece of T.  
 a) T x M + S - K    b) K - S x M + T    c) T + M x S - K  
 d) T x S + M - K    e) None of these
67. If P + Q means P is the husband of Q, P ÷ Q means P is the sister of Q an P x Q means P is the son of Q which of the following shows A is the daughter of B ?  
 a) C x B ÷ A    b) B + C x A    c) D x B + C ÷ A  
 d) A ÷ D x B    e) None of these
68. X - Z means x is the mother of Z, x x<sub>z</sub> means x is the father of Z and z + z means x is the daughter of Z. Now, if M - N x T + Q. Then which of the following is not true ?  
 a) T is N's daughter    b) N is wife of Q    c) M is mother-in-law of Q  
 d) Q is wife of n    e) T is grand daughter of M.
69. A + B means A is the father of B, A - B means A is the wife of A x B means A is the brother of B, A ÷ B means A is the daughter.  
 If P ÷ R + S + Q, which of the following is true ?  
 a) P is the daughter of Q    b) Q is the aunt of P  
 c) P is the aunt of Q    d) P is the mother of Q
70. If P - R + Q, Which of the following statements is true ?  
 a) P is the mother of Q    b) Q is the daughter of P  
 c) P is the aunt of Q    d) P is the sister of Q
71. If P x R ÷ Q which of the following statement is true ?  
 a) P is the uncle of Q    b) P is the father of Q  
 c) P is the brother of Q    d) P is the son of Q

72. If  $P \times R \times Q$ , which of the following is true ?

- a) P is the brother-in-law of Q      b) P is the brother of Q  
c) P is the uncle of Q                  d) P is the father of Q

73. If  $P + R \div Q$ , which of the following is true ?

- a) P is the brother of Q                  b) P is the son of Q  
c) P is the brother of Q                  d) P is the father of Q

74. If  $P \div R + Q$ , which of the following is true ?

- a) P is the father of Q                  b) P is the brother of Q  
c) P is the mother of Q                  d) P is the sister of Q

75. If  $P \times R \times Q$ , which of the following is true ?

- a) P is the uncle of Q                  b) P is the father of Q  
c) P is the brother-in-law of Q        d) P is the grand father of Q

1. Read the following information carefully and answer the questions that follow :  $A + B$  means A is the son of B,  $A - B$  means A is the wife of B,  $A \times B$  means A is brother of B,  $A \div B$  means A is the mother of B and  $A = B$  means A is the sister of B.

76. What does  $P + R - Q$  mean ?

- a) Q is the father of P                  b) Q is the son of P  
c) Q is the uncle of P                  d) Q is the brother of P

77. What does  $P \times R \div Q$  mean ?

- a) P is the brother of Q                  b) P is the father of Q  
c) P is the uncle of Q                  d) P is the nephew of Q

78. What does  $P = R + Q$  mean ?

- a) P is the aunt of Q                  b) P is the daughter of Q  
c) P is the niece of Q                  d) P is the sister of Q

79. What does  $P = R \div Q$  mean ?

- a) P is the aunt of Q                  b) P is the sister of Q  
c) Q is the niece of P                  d) Q is the daughter of P

2. Read the following information carefully and answer the questions given below.  $A + B$  means A is the daughter of B,  $A \times B$  means A is the son of B and  $A - B$  means A is the wife of B.

80. If  $P \times Q - S$ , which of the following is true ?

- a) S is wife of Q                  b) S is father of P                  c) P is daughter of Q  
d) Q is father of P                  e) None of these

81. If  $T - S \times B - M$ , Which of the following is not true ?

- a) B is mother of S                  b) M is husband of B                  c) T is wife of S  
d) S is daughter of B                  e) S is son of B

82. If  $Z + T - S \times U + P$ , What is U to Z.

- a) Mother                  b) Grand mother                  c) Father  
d) Cannot be determined              e) None of these

83.  $P + Q$  means P is the brother of Q,  $P - Q$  means P is the mother of Q and  $P \times Q$  means P is the sister of Q. Which of the following means M is the maternal uncle of R.

- a)  $M + K + R$                   b)  $M - R + K$                   c)  $M + K - R$   
d)  $M + K \times R$                   e) None of these

84. If  $A + B$  means A is the brother of B,  $A \div B$  means A is the father of B and  $A \times B$  means A is the sister of B, which of following means M is the uncle of P

- a)  $N \times P \div M$                   b)  $M + S \div R \div P$                   c)  $M \div N \times P$   
d)  $M + K \div T \times P$                   e) None of these

85. If  $A + B$  means A is the sister of B,  $A - B$  means A is the brother of B,  $A \times B$  means A is the daughter of B, which of the following shows the relation that E is the maternal uncle of D ?

- a)  $D + F \times E$                   b)  $D - F \times E$                   c)  $D \times F + E$   
d)  $D \times F - E$                   e) None of these

## ANSWERS

01. a	02. e	03. a	04. a	05. a	06. e
07. a	08. c	09. b	10. d	11. b	12. b
13. a	14. d	15. d	16. e	17. d	18. a
19. d	20. c	21. a	22. b	23. a	24. c
25. d	26. e	27. b	28. b	29. c	30. a
31. d	32. a	33. c	34. a	35. b	36. b
37. d	38. d	39. d	40. e	41. b	42. d
43. d	44. c	45. d	46. d	47. c	48. d
49. e	50. b	51. c	52. d	53. d	54. c
55. d	56. c	57. a	58. b	59. a	60. b
61. c	62. d	63. b	64. c	65. a	66. c
67. d	68. b	69. c	70. a	71. d	72. a
73. c	74. d	75. a	76. a	77. c	78. b
79. a	80. b	81. d	82. b	83. c	84. d
85. c					

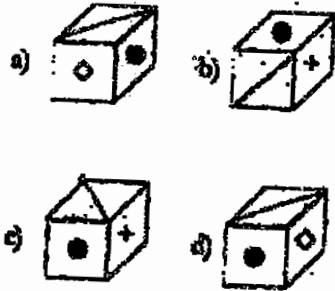
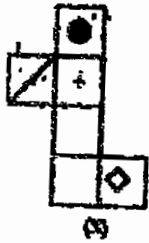
\*\*\*\* ALL THE BEST \*\*\*\*



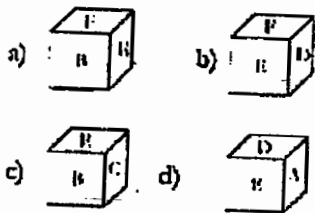
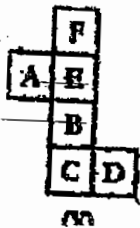
**(4) CUBES & DICES**

ASSIGNMENTS

01.

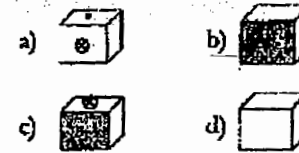
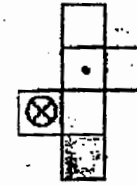


02.



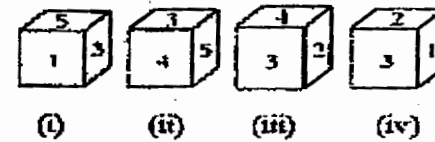
- (a) A only      (b) B only      (c) A and C only      (d) A, B, C and D

03.



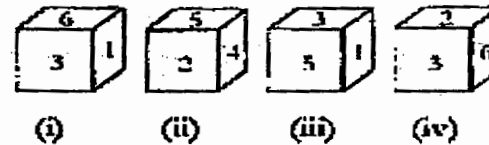
- (a) A only      (b) A and C only      (c) A, C and D only      (d) A, B, C and D

04. What number is opposite 4?



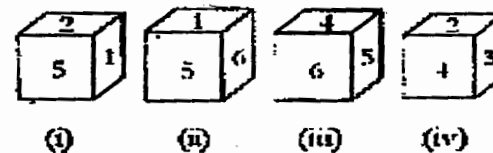
- (a) 1      (b) 2      (c) 5      (d) 6

05. What number is opposite 3?



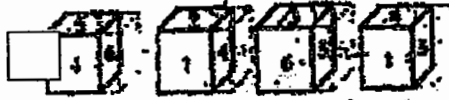
- (a) 2      (b) 3      (c) 4      (d) 6

06. Which number is on the face opposite 4



- (a) 1      (b) 2      (c) 3      (d) 6

07. Which number is opposite 3?



- (a) 1
- (b) 2
- (c) 4
- (d) 6

08. What should be the number opposite 3?



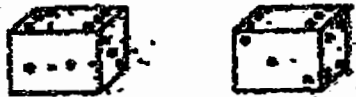
- (a) 1
- (b) 6
- (c) 5
- (d) 4

09. Two positions of a dice are shown below. If 1 is at the bottom, which number will be on the top?



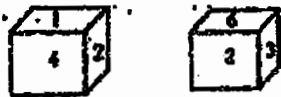
- (a) 2
- (b) 3
- (c) 4
- (d) 5

10. Two positions of a dice with 1 to 6 dots on its sides are shown below. If the dice is resting on the side with the dots what will be the number of dots on the side at the top?



- (a) 1 or 5
- (b) 2
- (c) 3
- (d) 5

11. What will be the number at the bottom if 5 is at the top, two positions of the dice being as given below?

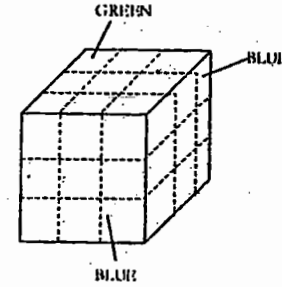


- (a) 1
- (b) 2
- (c) 3
- (d) 6

PAINTING A STACK OF CUBES

Directions:

A wooden cube is painted blue on all the four adjoining sides and green on two opposite sides (i.e.,) top and bottom. It is then cut at equal distances at right angles four times vertically and two times horizontally as shown in the figure, where dotted lines represent the cuts made.



12. How many cubes will have one face painted only in Blue?

- (a) 2
- (b) 2
- (c) 3
- (d) 4

13. How many cubes will have one face painted only in Green?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

14. How many cubes are formed in all?

- (a) 16
- (b) 24
- (c) 27
- (d) 32

15. How many cubes will have at least three sides painted?

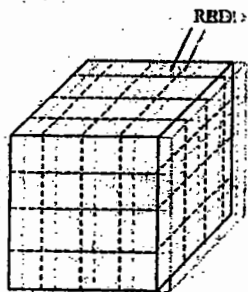
- (a) 8
- (b) 6
- (c) 3
- (d) 2

16. How many cubes will have no face painted at all?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

## Directions

A solid cube of each side 5 cms, has been painted red, blue and green on pairs of opposite faces it is then cut into cubical blocks of each side 1 cm

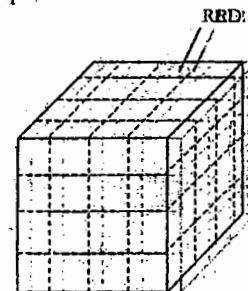


17. How many cubes have to face painted?  
(a) 14 (b) 21 (c) 27 (d) 35
18. How many cubes have only one face painted?  
(a) 27 (b) 49 (c) 54 (d) 84
19. How many cubes have only two faces painted?  
(a) 24 (b) 36 (c) 48 (d) 60
20. How many cubes have only three faces painted?  
(a) 8 (b) 12 (c) 16 (d) 20
21. How many cubes have three faces painted with different colours?  
(a) 0 (b) 6 (c) 8 (d) 10
22. How many cubes has two faces painted who red and green and all other faces unpainted?  
(a) 8 (b) 12 (c) 16 (d) 20
23. How many have only one face painted red all other faces unpainted?  
(a) 9 (b) 12 (c) 15 (d) 18
24. How many cubes have two faces painted Green?  
(a) 6 (b) 12 (c) 16 (d) None
25. How many cubes have one face painted red and one face painted blue and other faces may be painted or unpainted?  
(a) 8 (b) 12 (c) 16 (d) 20

26. How many cubes are there in all  
(a) 25 (b) 75 (c) 125 (d) 150

## Directions

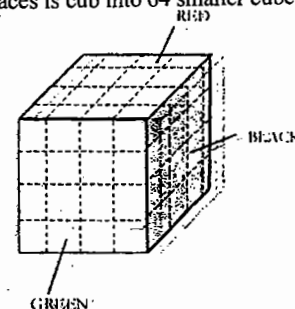
A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal sizes, now answer the following questions based on this statement



27. How many cubes have no face coloured  
(a) 24 (b) 16  
(c) 8 (d) 0
28. How many cubes are there which have only one face coloured?  
(a) 4 (b) 8  
(c) 16 (d) 24
29. How many cubes have two red opposite faces?  
(a) 0 (b) 8  
(c) 16 (d) 24
30. How many cubes have three faces coloured  
(a) 24 (b) 16  
(c) 8 (d) 14

## Directions

A cube painted red on two adjacent faces and black on the faces opposite to the red faces and green on the remaining faces is cut into 64 smaller cubes of equal size



31. How many cubes are there which have no face painted ?

- (a) 0 (b) 4  
(c) 8 (d) 16

32. How many cubes have only one face painted ?

- (a) 8 (b) 16  
(c) 24 (d) 32

33. How many cubes have less than three faces painted ?

- (a) 8 (b) 24  
(c) 28 (d) 48

34. How many cubes are there with three faces painted ?

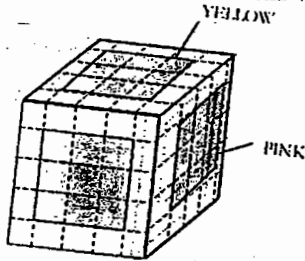
- (a) 4 (b) 8  
(c) 16 (d) 24

35. How many cubes have one face green and one of the adjacent faces black or red?

- (a) 8 (b) 16  
(c) 24 (d) 28

**Direction :**

The length of each side of a cube is 5 cms. The outer border of the width of 1 cm is painted yellow on each side and the remaining space enclosed by this 1 cm. path, is painted pink. This cube is cut into 125 smaller cubes of each side 1 cm. When these smaller cubes are separated



36. How many cubes have all the faces uncoloured?

- (a) 0 (b) 1 (c) 18 (d) 27

37. How many cubes have three faces coloured yellow?

- (a) 2 (b) 4 (c) 8 (d) 10

38. How many cubes have at least two faces coloured yellow?

- (a) 24 (b) 44 (c) 48 (d) 96

39. How many cubes have one face pink and an adjacent face yellow?

- (a) 0 (b) 1 (c) 2 (d) 4

40. How many cubes have at least one face colored?

- (a) 27 (b) 48 (c) 98 (d) 121

**KEY:**

01.b 02.b 03.a 04.c 05.c 06.a 07.c 08.b 09.b 10.a 11.b 12.d

13.b 14.c 15.a 16.a 17.c 18.c 19.b 20.a 21.c 22.b 23.d 24.d

25.d 26.c 27.c 28.d 29.a 30.c 31.c 32.c 33.d 34.b 35.c 36.d

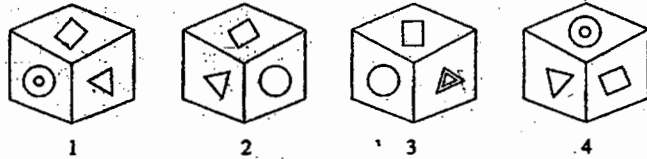
37.c 38.b 39.a 40.c

**E. QUESTIONS DEALING WITH CUBES AND DICES**

A cube or dice is a small cubical solid piece with six faces, which are either serially numbered 1 to 6 or otherwise distinguished using various symbols. Several types of questions on cubes/dices appear in competitive examinations. Some examples are given below.

**Illustration I**

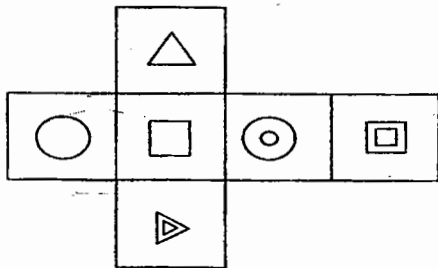
1. **Directions:** Given below are four views of a cube. Each face is marked with certain symbols. The different views of the cubes are numbered 1 to 4. Carefully examine each view and answer the questions that follow.



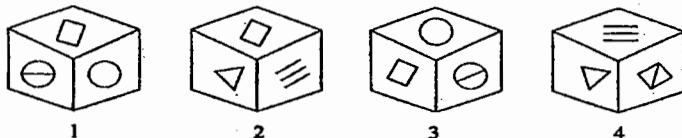
- In figure 1, which symbol will appear opposite to the square ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 2, which symbol will appear on the face opposite to the face containing a circle ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 3, which symbol will appear on the face opposite to the face containing a double square ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 4, which symbol will appear on the face opposite to the face containing a triangle ?
  - (a)
  - (b)
  - (c)
  - (d)

ANSWER: 1. (c) 2. (c) 3. (d) 4. (b)

The open view of the cube shown below explains the various views of the above questions.



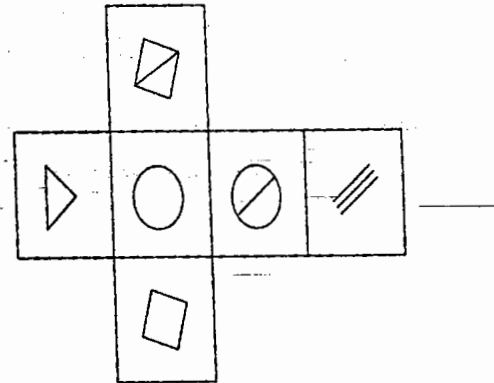
2. **Directions:** Four views of a cube are given below. Study each view and answer the questions given below them.



- In figure 1, which symbol is below the square ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 2, which symbol is opposite the triangle ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 3, which symbol will be opposite to the circle ?
  - (a)
  - (b)
  - (c)
  - (d)
- In figure 4, which symbol will appear opposite to the crossed circle ?
  - (a)
  - (b)
  - (c)
  - (d)

ANSWER: 1. (b) 2. (d) 3. (a) 4. (c)

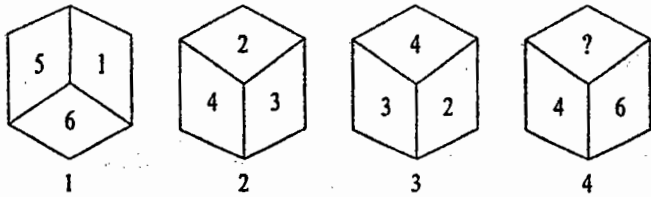
The unfolded view of the cube is given below, to explain the answers.



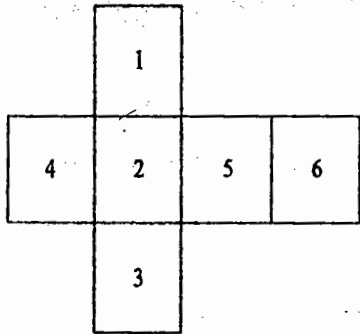
**Illustration II**

In some reasoning questions on cubes and dices, various views of a cube/dice are given. On each face a number is given. In one cube, one face is left blank. You have to decide which number should come in the blank face.

1. **Directions:** The following diagram depicts various views of a cube. Each face has some number, whereas in cube 4, one face is blank. From the answer choices, select the number that should come in the blank space.



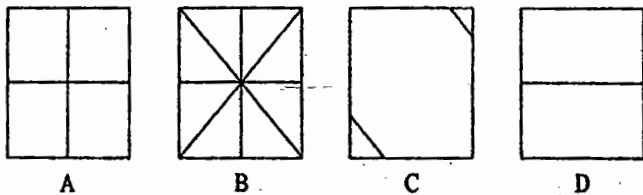
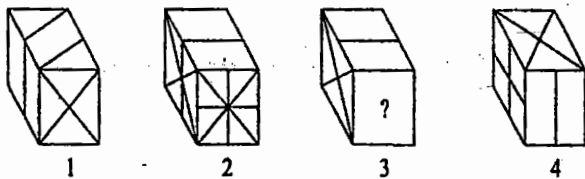
- (a) 2      (b) 5      (c) 3      (d) 1



ANSWER: C

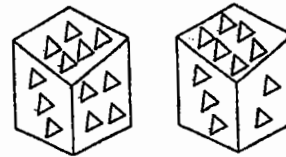
By correlating the figures on various faces, the number on the blank face can be determined. The unfolded view of the cube will also help in explaining the answer.

2. Direction: Given below is a cubical block with designs on its faces viewed from different directions. From the answer choices given below, find the design on the blank face of the cube numbered 3.



ANSWER: A

3. Directions: Two positions of a cubical block are given below, each face having a number of small triangles. In another position of the cube, if there is one triangle at the bottom, how many triangles will be there on the top face?



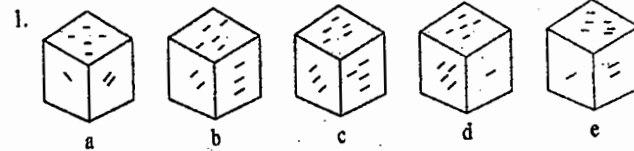
- (A) 4      (B) 3      (C) 2      (D) 5

Illustration IV

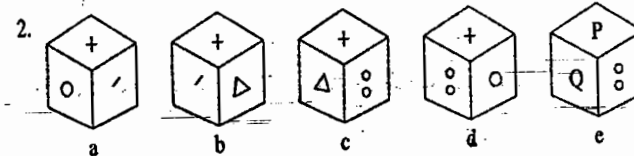
Another set of questions deals with cubes displaying various views. You have to answer questions based on the types of cubes involved in the set.

Directions: The cubes shown here have different symbols/markings on their faces. Each question has five views of cubes. You have to determine how many different cubes are involved in each case. Answers have to be marked as follows:

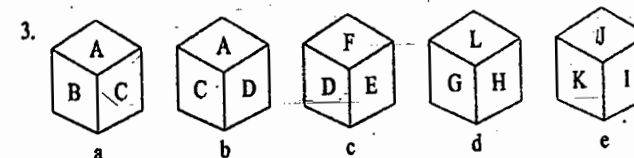
- (A) In case only one cube is involved.
- (B) In case two cubes are involved.
- (C) In case three cubes are involved.
- (D) In case four cubes are involved.
- (E) In case five or more cubes are involved.



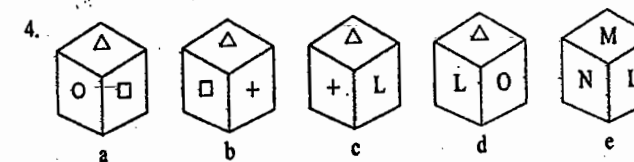
ANSWER: A



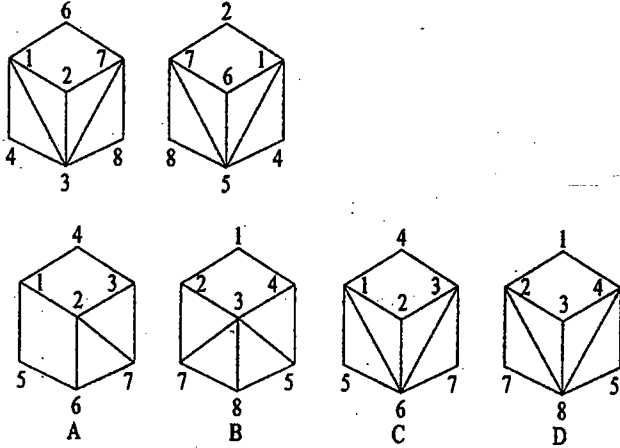
ANSWER: B



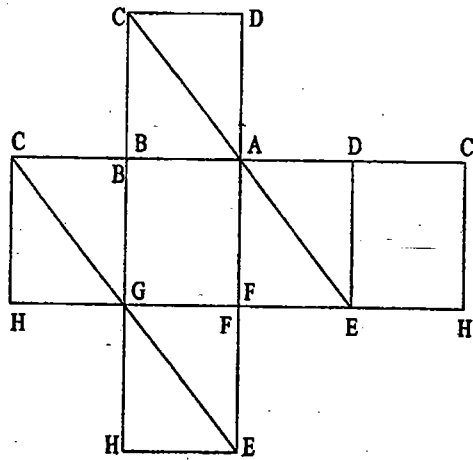
ANSWER: B



Select the correct one from the answer figures A, B, C and D.



ANSWER: B  
 Explanation: The development of the block is shown below.



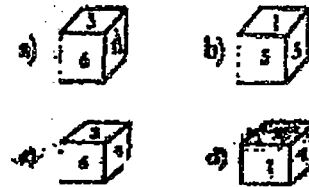
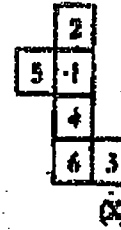
Only response B can have the development matching the above one. In the rest of the blocks, point 2 is linked to point 6 or 8. This is not so in the original cube.

CLASSWORK

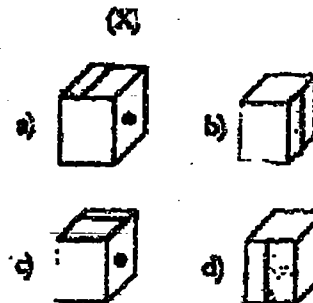
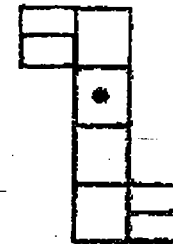
Directions:

The cure (x) given on the left in each problem, is folded to form a box, choose foot amongst the alternatives (a), (b), (c), and (d) the boxes that are similar to the box formed.

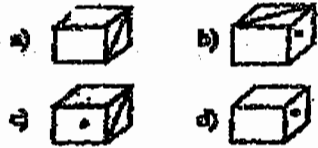
01.



02.

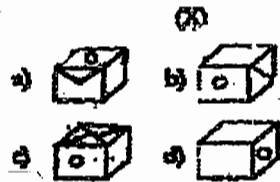
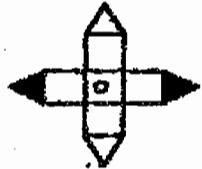


03.



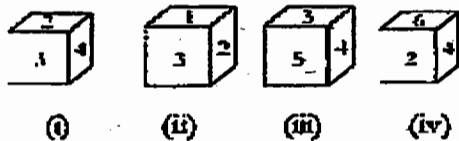
- (a) A and C only
- (b) B, C and D only
- (c) B and D only
- (d) C and D only

04.



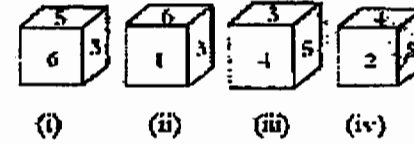
PROBLEMS ON DICE

05. A die is thrown four times and its four different positions are given below. Find the number on the face opposite the face showing 2.



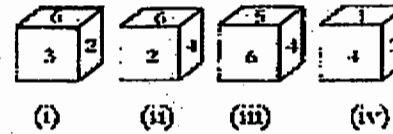
- (a) 3
- (b) 4
- (c) 5
- (d) 6

06. Shown below are, four different positions the dice. Find the number on the face opposite the face showing 6.



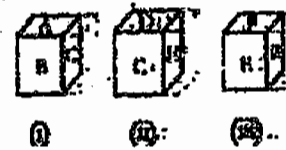
- (a) 1
- (b) 2
- (c) 4
- (d) 5

07. What number is on the face opposite 6



- (a) 1
- (b) 2
- (c) 3
- (d) 4

08. Find the alphabet opposite A



- (a) B
- (b) C
- (c) D
- (d) E

09. How many dots lie opposite 2 dots?

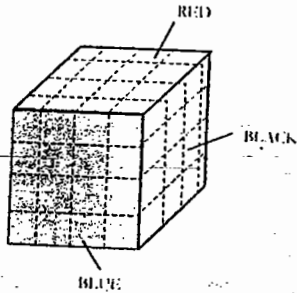


- (a) 1
- (b) 3
- (c) 5
- (d) 6



## Directions

A solid cube of each side 8 cms has been painted re, blue and black on pairs of opposite faces. It is then cut into cubical blocks of each side 2 cm.



10. How many cubes have no face painted  
(a) 0 (b) 4 (c) 8 (d) 12
11. How many cubes have only one face painted?  
(a) 8 (b) 16 (c) 24 (d) 28
12. How many cubes have only two faces painted?  
(a) 8 (b) 16 (c) 20 (d) 24
13. How many cubes have three faces painted?  
(a) 0 (b) 4 (c) 6 (d) 12
14. How many cubes have three faces painted with different colours?  
(a) 0 (b) 4 (c) 8 (d) 8
15. How many cubes have two faces painted red and black and all other faces unpainted  
(a) 4 (b) 8 (c) 16 (d) 32
16. How many cubes have only one face painted red and all other faces unpainted  
(a) 4 (b) 8 (c) 12 (d) 16
17. How many cubes have two faces painted black?  
(a) 2 (b) 4 (c) 8 (d) None
18. How many cubes are there in all?  
(a) 64 (b) 56 (c) 40 (d) 32
19. How many cubes have one face painted blue and one face painted red? (The other faces may be painted unpainted)  
(a) 16 (b) 12 (c) 8 (d) 0

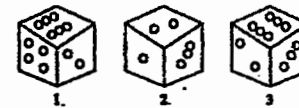
## KEY:

- 01.d 02.d 03.b 04.d 05.c 06.c 07.a 08.d 09.c 10.c 11.c/ 12.d  
13.d 14.c 15.b 16.b 17.d 18.a 19.a

## Illustration III

In the questions given so far, the cubes usually have numbers 1 to 6 or some distinguishing symbols on each face. These cubes are known as regular cubes. In some cases, questions are based on 'curious' types of cube. An example is given below.

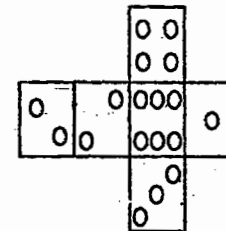
Directions: The illustration below shown three views of the same (but rather 'curious') cube. Find out how many spots there are on the face directly opposite to the face of the third cube having six spots.



- (A) Three (B) Two (c) One (d) Four

Answer: B

The face directly opposite to the face with six spots has two spots. The cube is not a regular cube but a curious one.



The answer is explained by unfolding the cube as shown above.

**(5) CODING AND DECODING TESTS**

Codes are used for conveying secret messages from one place to another, especially in the defence services. The codes are based on various principle/patterns, which are required to be deciphered by the receiver, so as to get the correct message.

Coding and decoding tests are becoming very popular in competitive examinations. They call for careful observation and analytical aptitude. These tests can be broadly classified into several categories.

1. Alphabetical coding (or) Letter coding
2. Number coding
3. Substitution coding
4. Mixed coding
  - i. Word mixed coding
  - ii. Number mixed coding

**1. Alphabetical (or) letter coding**

The letters of the alphabet may be used in the coding scheme, the letters to be coded are allotted other letters to stand for them. Questions on letter coding can be of different types. Examples of the important ones are given below:

**Ex 1:**

If 'SPTEA' stands for BLADE, how will you code BALE

Ans: SPTA

**Explanation**

'BLADE' has been coded as 'SPTEA'. You will see that all the letters in the word 'BALE', which have to be coded, are also there in the word 'BLADE'. Hence all that needs to be done is to choose the relevant code letters from the code word 'SPTEA'. Thus, B becomes Abecemest, L becomes P, and E becomes A. Therefore 'BALE' will be coded as 'SPTA'.

**Ex 2:**

If in a certain code, TEACHER is written as VGCEJGT, how would DULLARD be written in the same code?

- (a) FWMNCTF (b) FWNNBTE (c) FWNNCSF (d) FWNNCTF (e) None of these

T	E	A	C	H	E	R	
↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2
V	G	C	E	J	G	T	

In same way

D	U	L	L	A	R	D	
↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2	↓+2
F	W	N	N	C	T	F	

Ans: D

## NUMBER CODING

In this coding scheme, the letters of the alphabet are allotted a numerical value. There are several methods of allotting numerical values to letters of alphabet. These will be discussed in this section.

**Ex: 1**

If 'LODES' is coded as '46321', how will you code the word 'DOES'.

**Explanation**

You must first recognize that all the letters of 'DOES' are included in the letters of 'LODES' for which you have the code D = 3, O = 6, E = 2, S = 1, Therefore DOES = 3621.

**Ex: 2**

If 'DATE' is coded as '23-26-7-22' how will you code 'ZEAL'.

**Explanation**

A look at the numbered alphabet will reveal the code. The letters are allotted numbers from end to beginning (Z-A), maintaining normal alphabetic sequence in the reverse direction, (i.e.) A = 26, B = 25, C = 24 and so on; and X = 3, Y = 2, Z = 1

## SUBSTITUTION

In this type of questions, some particular objects are assigned code names. Then a question is asked that is to be answered in the code language.

**Ex: 1**

If cook is called Butter, butter is called manager, Manager is called teacher, teacher is called clerk and clerk is called principle, who will teach in a class?

- (a) Cook (b) Butter (c) Manager (d) Teacher (e) Clerk

**Sol:** Clearly, 'teacher' teacher in class and as given teacher is called 'clerk' So, a clerk will teach in the class. Hence, the answer is (E).

## MIXED LETTER CODING

In this type of questions, three (or) four complete messages are given in the coded language and the code for a particular word is asked. To analyse such codes, any two message bearing a common word are picked up. The common coded word will mean that word. Preceding similarly by picking up all possible combinations of two, the entire message can be analysed.

**Ex: 1**

If 'nso ptr kli chn' stands for 'Sharma gets marriage gift, ptr lnm wop chn' stands for wife gives marriage gift, 'tti wop nhi' stands for 'he gives nothing' what would mean 'gives'.

- (a) Chn (b) nhi (c) ptr (d) wop

**Sol:**

In the second and third statements, the common word is 'gives' and the common code word is 'wop'. So, wop means 'gives'.

Hence, the answer is (D)

01. If in a certain language MYSTIFY is coded as NZTUJGZ, how is NEMISES coded in that code?

- (a) OFNJTTFT (b) MDLHRDR (c) ODNHTDR (d) PGOKUGU

02. If in certain language, NATURE is coded as OCUWSG, how is FAMINE coded in that code?

- (a) GCNKOF (b) GCNJOF (c) GCNKOG (d) HCNKOG

03. In a certain code, COMPUTER is written as FPSOVUHS. How is MEDICINE written in the same code?  
(a) PFFDJOF (b) NFFDJOF (c) LFFDJOF (d) PFFLDKQF
04. If in a certain language DELHI is coded as FIRPS, how is MUMBAI coded in that code?  
(a) OVNFDL (b) OYOCBT (c) OYSJKU (d) PYSJKU
05. If POND is coded as RRSK, how is HEAR written in that code?  
(a) JGCT (b) JHEF (c) JGCT (d) JHCT
06. In a certain code, MENTION is written as LNETTNO. How is PATTERN written.  
(a) APPTREM (b) PTAETNR (c) OTAETNR (d) OTAETRN
07. In a certain code, MONEKY is written as XDJMNL. How is TIGER written in that code?  
(a) QDFHS (b) SDFHS (c) SHFDQ (d) UJHFS
08. In a certain code, COMPUTER is written as RFUVQNPC. How is MEDICINE written in the same code?  
(a) EOJDJEFM (b) EOJDEJFM (c) MFEJDJOE (d) MFEDJJOE
09. If in a certain language, GAMBLE is coded as FBLCKF, how is FLOWER coded in that code?  
(a) GKPVFQ (b) EMNXDS (c) GMPVDS (d) HNQYGT
10. If in a certain language FASHION is coded as FOISHAN, how is PROBLEM coded in that code?  
(a) ROBLEMP (b) PELBORM (c) PRBDELM (d) RPBOELM
11. In a certain code IMTITJU is written as TMIIUJT. How is TEMREMP written in that code?  
(a) METERPM (b) METRPME (c) ETRMMEP (d) MTERPME
12. In a certain code language INACTIVE is written as VITCANIE. How will COMPUTER be written in that code language?  
(a) UTEPMOCR (b) MOCPETUR (c) ETUPMOCR (d) PMOCRETU
13. In a certain code language STUDENT is written as TUTDNES. How will SOURCES be written in that code language?  
(a) SOURCÉS (b) SUORECS (c) SRUOCES (d) SOURSEC
14. In a certain code language LEARNING is written as LGNINRAE. How will SURPRISE be written in that code language?  
(a) ESRI PRUS (b) RUSEPSIR (c) SESIRPRU (d) ESIRPRSU
15. In a certain code MTUXTRVN is written as NUVXTQUM. How ASUMNJKL written in that code?  
(a) BTVMNIJK (b) BTVMNKLM (c) BTVNMIJK (d) ZRTMNIJK
16. In a certain code language COMPUTER is written as RFUVQNPC. How will MEDICINE be written in that code Language?  
(a) MFEDJJOE (b) EOJDEJFM (c) MFEJDJOE (d) EOJDJEFM

17. In a certain code HANGER is written as TDIMCG, How is KURESH written in that code?  
(a) JRGQWJ (b) LVSFTI (c) MSTGUT (d) MVTFUI
18. If PEOPLE is coded as PLPOEE, how is TREND coded?  
(a) TREDN (b) DNERT (c) NDETR (d) TRDNE (e) TNERD
19. In a certain code HUMIDITY is written as UHIMIDTY. How is POLITICS written in that code?  
(a) OPILITCS (b) OPILITCS (c) POLITISE (d) POLITISE
20. In a certain code, GIGANTIC is written as GIGTANCL. How is MIRACLES written in that code?  
(a) RIMLACSE (b) RMLACISE (c) RIMLASCE (d) RMLIASCE

## DECODING

21. If in a certain language CARROM is coded as BZQQNL. Which word will be coded as HOUSE?  
(a) IPVTF (b) GNTRD (c) INVRF (d) GPTID
22. If in a certain language, POPULAR is coded as QPQVMBS, which word would be coded as GBNPVT  
(a) FAMOSU (b) FAMOUS (c) FASOUM (d) FOSAUM
23. If in a certain code, SWITCH is written as TVJSDG, which word would be written as CQFZE?  
(a) BARED (b) BARED (c) BREAD (d) BRADE
24. In a certain code, REFRIGERATOR is coded as ROTAREGIRFER, which word would be coded as NOITINUMMA?  
(a) ANMMIUTNI (b) AMNFOMUIIN (c) AMMUNITION (d) NMMUNITIOA
25. If in a certain language, REMOTE is coded as ROTEME, which word would be coded as PNIICC?  
(a) NPIICC (b) PICCIN (c) PINCIC (d) PICNIC
26. If in a certain language, SHIFT is coded as RFFBO, which word would be coded as LKUMB?  
(a) MMXQG (b) MLVNC (c) KJVLA (d) MJVLC
27. If in a certain language, TRIANGLE is coded as SQHZMFKD, which word would be coded as DWZLOKD?  
(a) EXAMPL (b) FIGMENT (c) DISMISS (d) DISJOIN
28. If in a certain language, CALCUTTA is coded as GEPGYXXE, which word would be coded as FSQFCE?  
(a) BOMBAY (b) BOMBAY (c) BOMYAB (d) BOBAYD

## PRACTICE TESTS – LETTER CODING

29. If 'TEACHER' and 'HIGHLY' are written as 'XWPBRWM' and 'QSNRDZ' respectively. How will you code the word 'CHARITY'?
- (a) BPRNSBZ (b) BRPMSZB (c) BRPMSDZ (d) BRPMSXZ
30. 'SCHOOL' = PNIKKB' and ME = ZY, how will you write 'COOL HOME'?
- (a) NKKBIKZY (b) NKKLIKZY (c) PKKNIKYZ (d) NKKBPKZY
31. If 'CLIPOE' stands for 'MTDFBE'. How will you code POLICE?
- (a) FBTDMF (b) FBTDME (c) FBTDEM (d) FTBDMF
32. 'XYMNO PQ' is coded as 'RHOUGHT' cod 'OUTRIGHT'
- (a) MNQOXNQ (b) MNOQXYNQ (c) MNQXOPYQ (d) MNIOXYPQ
33. 'LOAD' is coded as 'MPBE' and 'DRIVE' as 'ESJWF', how will you code 'LADDER'?
- (a) MDEEFS (b) MBEEFS (c) NCEFGT (d) MBEEPS
34. 'GO AT ONCE' is a coded message received as 'JB SM BQZY' and you are required to relay the answer in a coded message 'GO TO GATE'. Select the code you will be using based on the scheme applied in the example here.
- (a) HP BU PMDF (b) JB MK JSMY (c) IMCS QMDF  
(d) JBMK JMSY (e) JB MB JSMY
35. 'START = WALKA' and BUDPI = XZFMQ', what would be 'STUPID' =
- (a) BAZMOF (b) WANOF (c) WAZMMF (d) BAZMQF (e) WAZMQF

## Directions:

'GO AHEAD' is coded as 'JRDKHDG' and STOP is coded as 'VWRS' how will you code/decode the correct answer from the answer choices.

36. FIRE
- (a) URIV (b) IUJG (c) LUIH (d) ILUH
37. SHOOT
- (a) VKRRW (b) UMSSX (c) TJPPR (d) VKSSW
38. RETURN
- (a) UHWXUQ (b) VIXUQM (c) UHWXUR (d) UHWXVR
39. VWDUW
- (a) STAIN (b) STEPS (c) SPORT (d) START
40. HEAD
- (a) OHDG (b) NUEG (c) KHDG (d) KHGD
41. GRZQ
- (a) OWNS (b) DOWN (c) DONE (d) COME (e) SHUT

42. If 'HJSM' means 'GIRL', what does 'RNES' mean?
- (a) BOYS (b) COWS (c) TOYS (d) SOFT
43. If 'DBMDVUUB' stands for 'CALCUTTA' how will you write 'BOMBAY'?
- (a) DQODDX (b) CPNCBZ (c) DPNCBX (d) CPMCBZ
44. If 'OVER' is coded as 'QYIW' and 'UP' as 'WS' then 'STAR' will be coded as
- (a) UWEV (b) UMDV (c) UVBS (d) UWEW
45. In a certain code 'DELHI' is written 'CDKGH', 'MADRAS' as 'IZCQZR' how will PATNA be coded?
- (a) OZTMZ (b) OZSMZ (c) QBUMB (d) OZTSM
46. If FIRE is coded for a secret message tope teleprinted as 'EHQD'. How should the answer 'DONE' be relayed
- (a) DMOE (b) CNMD (c) DLNC (d) DNPE
47. If A = E, B = F, C = G and H = L, how will you code GOAHEAD?
- (a) KSFLIFH (b) HPBIFBE (c) KSLIGH (d) KSELIEH
48. 'NPWF' is a secret code for 'MOVE' you have to telex 'DIFFICULT' using the code based on the scheme used to code MOVE.
- (a) EJGGJVMU (b) FKHHKEWNY (c) EKGKKEVMU (d) EJCCJVMU
49. If 'WHILE' is coded as, how will you code 'HOTEL'?
- (a) JQVGN (b) IPUFM (c) KRVHO (d) LSWIP

## NUMBER CODING

50. If PAINT is coded as 74128 and EXCEL is coded as 935396, then how would you coded ACCEPT?
- (a) 455978 (b) 547978 (c) 554978 (d) 735961
51. If DELHI is coded as 73541 and CALCUTTA as 82589662, how can CALICUT be coded?
- (a) 5279431 (b) 5978213 (c) 8251896 (d) 8543691
52. In a certain code, RIPPLE is written as 613382 and LIFE is written as 8192. How is PILLER written in that code?
- (a) 318826 (b) 318286 (c) 618826 (d) 338816
53. If ROSE is coded as 6821, CHAIR is coded as 73456 and PREACH is coded as 961473, What will be the code for SEARCH?
- (a) 246173 (b) 214673 (c) 214763 (d) 216473
54. If PALE is coded as 2134, EARTH is coded as 41590, how is PEARL coded in that codes
- (a) 29530 (b) 24153 (c) 25413 (d) 25430
55. In a certain code GARIMA is coded as 725432 and TINA as 6482. How is MARTINA written in that code?
- (a) 3256482 (b) 3265842 (c) 3645862 (d) 3658426

## Directions

If in a certain language, ENTRY is coded as 12345 and 'STEADY' is coded as 931785, Then state which is the correct code for each of the given words.

56. TENANT  
(a) 956169 (b) 196247 (c) 352123 (d) 312723
57. NEATNESS  
(a) 25196577 (b) 21732199 (c) 21362199 (d) 21823698
58. SEDATE  
(a) 918731 (b) 954185 (c) 814195 (d) 614781
59. ARREST  
(a) 744589 (b) 744193 (c) 166479 (d) 745194
60. ENDEAR  
(a) 524519 (b) 174189 (c) 128174 (d) 124179
61. If D = 4 and COVER = 63, Then BASIS = ?  
(a) 49 (b) 50 (c) 54 (d) 55
62. If REASON is coded as '5' and BELIEVED as 7, What is the code number for GOVERNMENT?  
(a) 6 (b) 8 (c) 9 (d) 10
63. If PALAM could be given the code number 43, what code number can be given to SANTACRUZ?  
(a) 75 (b) 85 (c) 120 (d) 123
64. If Z = 52 and ACT = 48, Then BAT will be equal to  
(a) 89 (b) 41 (c) 44 (d) 46
65. If GO = 32, SHE = 49, Then SOME will be equal to  
(a) 56 (b) 58 (c) 62 (d) 64
66. If AT = 20, BAT = 40, Then CAT will be equal to  
(a) 30 (b) 50 (c) 60 (d) 70
67. If MACHINE is coded as 19-7-9-14-15-20-11, how will you code DANGER?  
(a) 10-7-20-13-11-24 (b) 11-7-20-16-11-24  
(c) 13-7-20-9-11-25 (d) 13-7-20-10-11-25
68. DRIVER = 8, PILOT = 7, CHARIOTER = ?  
(a) 5 (b) 8 (c) 9 (d) 11 (e) None
69. LUNCH = 6, DINNER = 8, SUPPER = 8, Then BREAKFAST = ?  
(a) 8 (b) 12 (c) 14 (d) 16 (e) None

70. BOOK - PEN = 8, PEN - NIB = ?  
(a) 6 (b) 8 (c) 10 (d) 12 (e) None
71. CAT + DOG = 50, BAT + HEN = ?  
(a) 25 (b) 30 (c) 40 (d) 50 (e) None
72. AT x EAT = 5, SAT x SEAT = 5, GO x GOAT = 21, then EAR x TEAR = ?  
(a) 15 (b) 20 (c) 22 (d) 25 (e) None
73. AUEOI = 15, UOIEA = 15, AEIOU = 15, Then UAIEO = ?  
(a) 10 (b) 15 (c) 20 (d) 25 (e) None
- EXERCISE**
74. If CAR is 22, SCOOTER ?  
(a) 33 (b) 44 (c) 11 (d) 95
75. BOOK = 43 and PEN = 35, COPY = ?  
(a) 48 (b) 60 (c) 59 (d) 79
76. PENCIL = 59 and PEN = 35, SCALE = ?  
(a) 80 (b) 45 (c) 40 (d) 35
77. DRAMA is coded as 37 and STAGE as 52. How will you code ACTOR?  
(a) 56 (b) 50 (c) 57 (d) 67
78. If AROMA = 24, GRAND = 22, KWALITY = ?  
(a) 40 (b) 62 (c) 55.5 (d) 50.5
79. If DISTEMPER is coded as 52.5 and WALLS as 33.5, how will you code PLASTER using the same coding scheme?  
(a) 40.5 (b) 45.5 (c) 48.5 (d) 55.5
80. SUPER = 79, SUPREME = 97, LABOUR = ?  
(a) 79 (b) 69 (c) 89 (d) 49
81. If ROTARY and ROTARIAN are coded as 97 and 96, how will you code ROTARACT?  
(a) 98 (b) 96 (c) 89 (d) 59
82. LIM = 39, WHITE = ?  
(a) 66 (b) 56 (c) 65 (d) 75
83. If DRIVER = 76 and TRUCK = 73, what would be MOPAD?  
(a) 45 (b) 55 (c) 49 (d) 59
84. If OPTICAL and OPTICIAN are coded as 76 and 87 respectively GLASSES will be  
(a) 80 (b) 82 (c) 84 (d) 86
85. If PLANT is coded as 12.60, what will be the code for LEAVES?  
(a) 11 (b) 10 (c) 10.5 (d) 10.66
86. If in a certain code DEMOCRATIC is coded as 9.10 how will you code AGITATION?  
(a) 11.50 (b) 10.60 (c) 10.66 (d) 11.8

## SUBSTITUTION CODING

87. If cook is called butler, butler is called manager, Manager is called teacher, teacher is called clerk and clerk is called principal, who will teach in a class  
(a) cook (b) Butler (c) manager (d) Clerk
88. If white is called blue, blue is called red, red is called yellow, is called green, green is called black, black is called violet and violet is called orange, what would be the colour of human blood.  
(a) Red (b) Green (c) Yellow (d) Violet
89. If room is called bed, bed is called window, window is called flower and flower is called cooler, on what would a man sleep?  
(a) Window (b) Bed (c) Flower (d) Cooler
90. If Orange is called butler, butler is called soap, soap is called ink, ink is called hen and hen is called orange? Which of the following is used for washing others?  
(a) Hen (b) Butter (c) Orange (d) Ink
91. If Sand is called air, air is called Rock, Rock is called well, well is called Drainage and Drainage is called sky, Then from where will a woman draw water?  
(a) Well (b) Drainage (c) Sky (d) Air
92. If bangle is called cassette, cassette is called table, table is called game and game is called cupboard, then which is played in the tape recorder?  
(a) Bangle (b) Cassette (c) Table (d) Cupboard
93. If cloud is called white, white is called rain, rain is called green, green is called air, is called blue and blue is called water, where will the birds fly?  
(a) Air (b) Cloud (c) White (d) Blue
94. If book is called watch, watch is called bag, bag is called dictionary and dictionary is called window, which is used to carry the books?  
(a) Dictionary (b) Bag (c) Book (d) Watch
95. If rain is water, water is road, road is cloud, cloud is sky, sky is seq and seq is path, where do aeroplanes fly?  
(a) Road (b) Sea (c) Cloud (d) Water
96. If water is called food, food is called tree, tree is called ska, ska is called wall, on which of the following grows a fruit  
(a) Water (b) Food (c) Sky (d) Tree
97. If pen is table, table is fan, fan is chair and chair is roof, on which of the following will a person sit?  
(a) Fan (b) Chair (c) Roof (d) Table
98. If air is called green, green is called blue, blue is called sky, sky is called yellow, yellow is called water and water is called pink, then what is the colour of clear sky?  
(a) Blue (b) Sky (c) Yellow (d) Water

99. If eraser is called box, box is called pencil, pencil is called sharpener and sharpener is called Bag, what will a child write with  
(a) Eraser (b) Box (c) Pencil (d) Sharpener
100. If man is called girl, girl is called woman, woman is called boy, boy is called butler and butler is called dog who will serve in a restaurant?  
(a) Butler (b) Girl (c) Man (d) Dog
101. If cook is called television, television is called radio, radio is called oven, oven is called Grinder and Grinder is called iron, in what will a lady bake.  
(a) Radio (b) Oven (c) Grinder (d) Iron

## MIXED LETTER CODING

102. If 'nso ptr kli chn' stands for sharma gets marriage gift, 'ptr lnm wop chn' stands for wife gives marriage gift, 'tti wop nhi' stands for he, given nothing what would mean 'gives'  
(a) Chn (b) nhi (c) Ptr (d) Wop
103. If tee see pee means drink fruit juice, see kee lee means juice is sweet and lee ree mee means. He is intelligent, which word in that language means sweet?  
(a) see (b) kee (c) lee (d) pee
104. In a certain code, nee time see means how are you ble nee see means where are your, what is the code for where?  
(a) nee (b) time (c) see (d) Can't be determined
105. If 'Ski rps tri' stands for nice sunday morning', 'the sti rps' stands for every tuesday morning and 'ski ptr qln; stands for nice market place, what would sunday stand for?  
(a) ski (b) rps (c) tri (d) qlm
106. In a certain code 'bi' nie pie means 'some good Jokes' in nie bat lik means 'some real stories and pie lik to means many good stories' which word in that code for means Jokes?  
(a) bi (b) nie (c) pie (d) Can not be determined
107. In a certain language 'oka peru' means fine cloth' meta liser' means clear water 'dona lisa pery' means fine clear weather which word in that language means 'Weather'  
(a) peru (b) oka (c) meta (d) dona
108. In a certain code language 'Tom kun sud' means Dogs are barking 'Kun jo mop means dogs and horses, and 'mut Tom ko' means Donkeys are mad' which word in that language means barking  
(a) sud (b) kun (c) jo (d) tom
109. In a certain language 'pre not bis' means smoking is harmful: 'vog dor not' means avoid harmful habit and 'dor bis yel' means please avoid smoking. Which of the following means 'habit' in that language?  
(a) Vog (b) not (c) dor (d) bis

## Direction

In a certain code language

- (a) 'Pic vic.nic' means winter is hot  
 (b) 'to nic re' means summer is cold  
 (c) 're pic boo' means winter and summer  
 (d) 'vic the pa' means hights are cold

110. Which word is that language means 'summer'?

- (a) nic (b) re (c) to (d) pic

111. Which of the given statements is superfluous?

- (a) only A (b) only D (c) Both A and D (d) Neither A nor D

## Directions

In a certain code.

'il be pee' means 'roses are blue'  
 'sik hee' means 'red flowers' and  
 'pee mit hee' means flowers are vegetables

112. How is 'red' written in that code?

- (a) hee (b) sik (c) be (d) cannot be determined

113. How is 'roser' written in that code?

- (a) il (b) pee (c) be (d) cannot be determined

114. How is 'vegetables' are ned flowers' written is this code?

- (a) pee sik mit hee (b) sik pee hee be (c) il sik mi thee (d) cannot be determined

## MIXED NUMBER CODING

115. In a certain code, 786 means 'study very hard' '958' means 'hard work pays' and 645 means 'study and work' which of the following is the code for 'very'?

- (a) 8 (b) 6 (c) 7 (d) can not be determined

116. If in a certain code language '324' means 'Light is bright', 629 means 'Girl is beautiful' and 4758 means I prefer bright clothes, which digit means 'Light' in that language?

- (a) 3 (b) 2 (c) 4 (d) 7

117. In a certain code '256' means your are good 637 means we are bad and '358' means 'good and bad'. Which of the following represents 'and' in that code

- (a) 2 (b) 5 (c) 8 (d) 3

118. In a certain code '37' means 'which class' and '583' means 'caseteand class' what is the code for caste?

- (a) 3 (b) 7 (c) 8 (d) Either 5 or 8

119. In a certain code language '479' means fruit is sweet '248' means 'very' sweet voice and '637' means 'eat fruit daily' which digit stands for 'is' in that code?

- (a) 7 (b) 9 (c) 4 (d) Cannot be determined

120. In a certain code '253' means books are old; '546' means man is old and '378' means buy good books what stands for 'are' in that code?

- (a) 2 (b) 4 (c) 5 (d) 6

121. In a certain code language '381' means 'Hari is honest' 162 means suji is inteligent' and 948 means 'Hari should go'. Which digit in that language means 'honest'?

- (a) 3 (b) 8 (c) 1 (d) 9

122. In a certain code language '123' means 'hot filtered coffee' 356 means very hot day and 589 means ' day and night', which digit stands for 'very'.

- (a) 9 (b) 5 (c) 8 (d) 6

## Directions:

(A) '134' means 'you are well'

(B) '758' means 'they go home'

(C) '839' means ' we are home'

123. Which of the following represents 'they' in that code language?

- (a) 5 (b) 7 (c) 3 (d) Dates inadequate

124. Which of the statements can be dispensed with while answering the above question?

- (a) A only (b) B only (c) A (or) C only (d) B and C only

## Key: -

01.b 02.c 03.d 04.c 05.b 06.c 07.a 08.a 09.b 10.b 11.b 12.c

13.b 14.c 15.a 16.d 17.a 18.e 19.a 20.a 21.a 22.b 23.c 24.c

25.d 26.a 27.a 28.b 29.d 30.c 31.b 32.c 33.b 34.e 35.e 36.d

37.a 38.a 39.d 40.c 41.b 42.d 43.b 44.b 45.b 46.b 47.d 48.a

49.b 50.a 51.c 52.a 53.b 54.b 55.a 56.d 57.b 58.a 59.b 60.c

61.b 62.c 63.d 64.d 65.a 66.c 67.a 68.d 69.c 70.c 71.d 72.b

73.b 74.d 75.c 76.c 77.c 78.d 79.b 80.b 81.a 82.c 83.c 84.b

85.d 86.c 87.d 88.c 89.a 90.d 91.b 92.c 93.d 94.a 95.b 96.c

97.c 98.b 99.d 100.d 101.c 102.d 103.b 104.d 105.c 106.a 107.d 108.a

109.a 110.b 111.c 112.b 113.d 114.a 115.c 116.a 117.c 118.d 119.b 120.a

121.a 122.d 123.d 124.a



**(6) NUMBER SERIES**

Directions : in the following questions the mathematical numbers follow according to a pattern. Discover that pattern and tick the choice which gives the missing number.

1. 7 10 9 12 11 ?  
 (a) 14, 13 (b) 13, 12  
 (c) 12, 11 (d) 15, 14
2. 6 9 18 21 42 45 ?  
 (a) 90, 91 (b) 90, 92  
 (c) 90, 93 (d) 90, 94
3. 25 20 15 10 ?  
 (a) 50 (b) 75  
 (c) 100 (d) 5
4. 3 7 16 35 ?  
 (a) 70 (b) 71  
 (c) 73 (d) 74
5. 2 5 9 19 37 ?  
 (a) 77 (b) 76  
 (c) 75 (d) 73
6. 3 7 15 31 ?  
 (a) 63 (b) 53  
 (c) 43 (d) 73
7. 8 12 10 16 12 ?  
 (a) 5 (b) 10  
 (c) 15 (d) 20
8. 7 15 32 ? 138 281  
 (a) 65 (b) 67  
 (c) 66 (d) 57
9. 17 19 ? 20 15  
 (a) 14 (b) 15  
 (c) 16 (d) 17
10. 4 6 9 14 ?  
 (a) 20 (b) 71  
 (c) 22 (d) 23
11. 28 33 31 36 34 ?  
 (a) 39 (b) 49  
 (c) 29 (d) 19
12. 36 28 24 22 ?  
 (a) 20 (b) 22  
 (c) 21 (d) 23
13. 5 6 7 8 9 10 11 14 ?  
 (a) 13 (b) 14  
 (c) 15 (d) 16
14. 0 2 6 12 20 30 ?  
 (a) 42 (b) 44  
 (c) 46 (d) 48
15. 3 8 15 24 35 48 ?  
 (a) 53 (b) 63  
 (c) 73 (d) 62
16. 45 15 18 6 9 ?  
 (a) 3 (b) 5  
 (c) 7 (d) 9
17. 1 2 4 7 11 16 ?  
 (a) 22 (b) 21  
 (c) 20 (d) 23
18. 64 32 16 8 4 ?  
 (a) 2 (b) 4  
 (c) 6 (d) 8
19. 12 21 23 32 34 ?  
 (a) 40 (b) 43  
 (c) 47 (d) 45
20. 15 51 105 ?  
 (a) 501 (b) 505  
 (c) 15 (d) 51
21. 22 33 44 ?  
 (a) 11 (b) 55  
 (c) 66 (d) 77
22. 18 10 6 4 ?  
 (a) 3 (b) 5  
 (c) 7 (d) 9
23. 6 11 ? 27  
 (a) 16 (b) 17  
 (c) 18 (d) 19
24. 6 10 18 34 ?  
 (a) 62 (b) 66  
 (c) 64 (d) 65
25. 2 8 5 6 8 ? 11  
 (a) 2 (b) 4  
 (c) 6 (d) 8
26. 5 6 ? 87 412 2185  
 (a) 18 (b) 13  
 (c) 20 (d) 14  
 (e) None of these

27. 783 159 376 852 617 ?  
 (a) 783 (b) 159  
 (c) 376 (d) 852  
 (e) 617
28. 1 2 6 ? 31 56  
 (a) 19 (b) 18  
 (c) 17 (d) 15  
 (e) None of these
29. 6 ? 12 8 18 11  
 (a) 4 (b) 3  
 (c) 2 (d) 1  
 (e) None of the above
30. 3 9 21 ? 93 189  
 (a) 56 (b) 51  
 (c) 47 (d) 45  
 (e) None of the above
31. 5 12 17 15 8 18 10 ? 21  
 (a) 14 (b) 26  
 (c) 24 (d) 21
32. 9 18 10 217 11 ? 12  
 (a) 434 (b) 2605  
 (c) 435 (d) 356
33. 2 6 12 20 ?  
 (a) 30 (b) 32  
 (c) 38 (d) 40
34. 81 192 375 ? 1029  
 (a) 684 (b) 486  
 (c) 648 (d) 468
35. 2 + 2, 6 + 3, 12 + 4, 20 + 5, 30 + 6, ?  
 (a) 40 + 7 (b) 40 + 8  
 (c) 42 + 7 (d) 45 + 7
36. 0 ? 8 27 64 125  
 (a) 1 (b) 2  
 (c) 3 (d) 4
37. 0 7 26 63 ?  
 (a) 125 (b) 126  
 (c) 124 (d) 98
38. 4 6 9 13  $\frac{1}{2}$  ?  
 (a) 19 (b)  $17\frac{1}{2}$   
 (c)  $20\frac{1}{4}$  (d)  $22\frac{3}{4}$
39.  $1\frac{1}{8} - \frac{3}{4}$  ?  
 (a)  $-\frac{4}{7}$  (b)  $\frac{1}{3}$   
 (c)  $-\frac{13}{8}$  (d) -1
40. 7 9 5 11  
 4 15 12 7  
 13 8 11 ?  
 (a) 5 (b) 10  
 (c) 15 (d) 20
41. 7 16 9  
 5 21 16  
 9 ? 4  
 (a) 13 (b) 15  
 (c) 17 (d) 19
42. 8 17 5  
 12 ? 16  
 10 11 9  
 (a) 1 (b) 2  
 (c) 3 (d) 4
43. 14 9 5  
 21 8 13  
 28 9 ?  
 (a) 17 (b) 18  
 (c) 19 (d) 23
44. 9 4 20  
 8 5 12  
 7 6 ?  
 (a) 4 (b) 6  
 (c) 8 (d) 10
45. 4 12 10 6  
 10 3 6 7  
 6 8 ? 5  
 (a) 4 (b) 9  
 (c) 11 (d) 15
46. 4 6 3 8  
 2 8 4 4  
 6 5 ? 10  
 (a) 7 (b) 5  
 (c) 1 (d) 3
47. 6 8 7  
 36 64 49  
 24 48 ?  
 (a) 35 (b) 30  
 (c) 45 (d) 40
48. 6 10 14  
 12 ? 22  
 19 25 31  
 (a) 9 (b) 17  
 (c) 11 (d) 13
49. 8 3 21  
 6 5 25  
 12 2 ?  
 (a) 24 (b) 19  
 (c) 22 (d) 20
50. 6 4 5  
 3 2 1  
 8 5 ?  
 (a) 11 (b) 9  
 (c) 7 (d) 5
51. 17 33 8  
 5 29 12  
 13 ? 10  
 (a) 33 (b) 30  
 (c) 35 (d) 37
52. 4 8 20  
 9 3 15  
 6 6 ?  
 (a) 20 (b) 24  
 (c) 22 (d) 34
53. 8 6 4  
 4 1 9  
 6 4 ?  
 (a) 3 (b) 5  
 (c) 4 (d) 9



54. 

2	10	4
3	17	5
3	?	4

  
(a) 9 (b) 6  
(c) 12 (d) 14
55. 

5	8	13
6	9	15
7	10	?

  
(a) 6 (b) 11  
(c) 14 (d) 17  
(e) 19
56. 

3	4	?
7	6	22
13	9	13

  
(a) 10 (b) 12  
(c) 28 (d) 32  
(e) 36
57. 

1	27	8
125	216	64
343	?	512

  
(a) 9 (b) 36  
(c) 316 (d) 512  
(e) 729
58. 

2	3	5
13	11	7
?	19	23

  
(a) 2 (b) 6  
(c) 16 (d) 17  
(e) 22
59. 

17	62	44
35	?	71
26	53	80

  
(a) 16 (b) 29  
(c) 31 (d) 65  
(e) 71
60. 

4	6	9	13
7	10	15	?

  
(a) 20 (b) 22  
(c) 24 (d) 26
61. 

84	81	88	
14	12	?	11

  
(a) 10 (b) 12  
(c) 14 (d) 16
62. 

2	4	?	11	16
3	7	?	21	31

  
(a) 3/5 (b) 7/9  
(c) 7/13 (d) 9/13

63. 

4	6	3	8
2	8	4	4
6	5	?	10

  
(a) 3 (b) 6  
(c) 8 (d) 10
64. 

1	2	3
4	5	6
7	8	9
27	38	?

  
(a) 49 (b) 50  
(c) 51 (d) 52
65. 

7	9	5	11
4	15	12	7
13	8	11	?

  
(a) 20 (b) 10  
(c) 30 (d) 70
66. 

9	36	25
4	16	9
1	9	4
6	13	?

  
(a) 5 (b) 11  
(c) 10 (d) 15
67. 

31	17	58	87
68	19	61	56
91	22	70	50
10	142	11	?

  
(a) 6 (b) 7  
(c) 3 (d) 9
68. 

6	6	8
5	7	5
4	3	?
120	126	320

  
(a) 12 (b) 16  
(c) 8 (d) 4
69. 

1	4	9	?
1	2	3	4
2	4	6	?

  
(a) 16 and 8 (b) 36 and 4  
(c) 25 and 5 (d) 49 and 7
70. 

8	5	12	9
3	10	7	?

  
(a) 10 (b) 12  
(c) 14 (d) 16

71. 

1	3	7	19	?
2	2	4	24	?

  
(a) 25/30 (b) 79/97  
(c) 115/200 (d) 115/576
72. 

16	28	41	58
37	49	62	?

  
(a) 69 (b) 79  
(c) 75 (d) 70
73. 

6	8	?			
12	2	9	3	4	5

  
(a) 11 (b) 12  
(c) 13 (d) 14
74. 

3	4	5
552	992	?

  
(a) 1000 (b) 1530  
(c) 1500 (d) 1560
75. 

6	10	14
12	7	22
19	25	31

  
(a) 15 (b) 17  
(c) 19 (d) 21
76. 

9	3	6
18		

8	?	12
24		

  
(a) 2 (b) 6  
(c) 4 (d) 8
77. 

?	1
8	2
4	2

  
(a) 32 (b) 34  
(c) 30 (d) 42
78. 

?	3
22	5
13	8

  
(a) 29 (b) 39  
(c) 37 (d) 49

79. 

?	2
17	3
9	5

  
(a) 23 (b) 30  
(c) 33 (d) 29
80. 

4	
?	?

13	49
25	

  
(a) 23 (b) 33  
(c) 80 (d) 97
81. 

32	26
48	?

13	24
16	?

96	64
?	?

  
(a) 52 (b) 54  
(c) 50 (d) 56
82. 

?	2
6	36
4	8

  
(a) 54 (b) 64  
(c) 60 (d) 74
83. 

2	1
4	6
3	7
2	4

  
(a) 2 (b) 4  
(c) 6 (d) 8
84. 

16	11
9	?

25	14
13	?

16	5
?	?

  
(a) 3 (b) 5  
(c) 7 (d) 9
85. 

36	25
?	27
33	23
21	30

  
(a) 35 (b) 32  
(c) 22 (d) 19



KEY:

- 01.a 02.c 03.d 04.d 05.c 06.a 07.d 08.b 09.c 10.d  
 11.a 12.c 13.c 14.a 15.b 16.a 17.a 18.a 19.b 20.a  
 21.b 22.a 23.c 24.b 25.b 26.c 27.c 28.d 29.e 30.d  
 31.d 32.b 33.a 34.c 35.c 36.a 37.c 38.c 39.c 40.b  
 41.a 42.b 43.c 44.a 45.b 46.d 47.a 48.b 49.c 50.d  
 51.a 52.b 53.c 54.d 55.d 56.c 57.e 58.d 59.e 60.b  
 61.d 62.c 63.a 64.a 65.b 66.b 67.b 68.c 69.a 70.c  
 71.d 72.b 73.a 74.d 75.b 76.c 77.a 78.b 79.c 80.d  
 81.a 82.b 83.d 84.c 85.d 86.a 87.b 88.a 89.b 90.c  
 91.b 92.a 93.c 94.b 95.a 96.b 97.c 98.b 99.a 100.a  
 101.b 102.c 103.d 104.b 105.c 106.b 107.a 108.a 109.c 110.c  
 111.b 112.d 113.d 114.b 115.a 116.c 117.c 118.d 119.a 120.b  
 121.c 122.b 123.c

111. (a) 100 (b) 177  
 (c) 253 (d) 355

112. (a) 6 (b) 7  
 (c) 8 (d) 9

113. (a) 6 (b) 7  
 (c) 8 (d) 9

114. (a) 2 (b) 3  
 (c) 4 (d) 6

115. (a) 15 (b) 16  
 (c) 9 (d) 20  
 (e) 14

116. (a) 5 (b) 6  
 (c) 7 (d) 8  
 (e) 9

117.

7	9	8	2	48
7	8	9	?	72

118. (a) 4 (b) 16  
 (c) 3 (d) 24  
 (e) 8

119. (a) 2 (b) 3  
 (c) 4 (d) 5  
 (e) 6

120. (a) 216 (b) 226  
 (c) 236 (d) 196  
 (e) 206

121. (a) 142 (b) 144  
 (c) 164 (d) 158  
 (e) 216

122. (a) 7 (b) 6  
 (c) 5 (d) 4  
 (e) 3

123. (a) 223 (b) 243  
 (c) 263 (d) 323  
 (e) 343

(a) 44 (b) 45  
 (c) 46 (d) 47  
 (e) 48

**(7) INSERTING THE MISSING CHARACTER**

Directions: Find the missing character from among the given alternatives

01. (a) 625 (b) 25 (c) 125 (d) 156

02. (a) 10 (b) 11 (c) 12 (d) 13

03. (a) 100 (b) 81 (c) 64 (d) 121

04. (a) 0 (b) 8 (c) 125 (d) 216

05. (a) 4 (b) 305 (c) 343 (d) 729

06. (a) 78 (b) 82 (c) 94 (d) 86

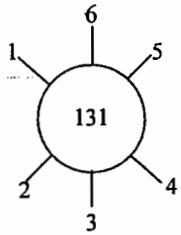
07. (a) 13 (b) 15 (c) 17 (d) 19

08. (a) 117 (b) 36 (c) 32 (d) 26

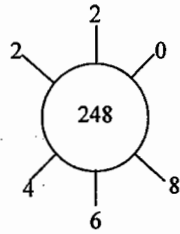
09. (a) 262 (b) 622 (c) 631 (d) 824

10. (a) 937 (b) 824 (c) 769 (d) 678

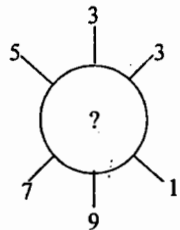
11.



(a) 320



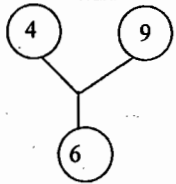
(b) 274



(c) 262

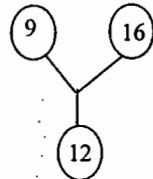
(d) 132

12.

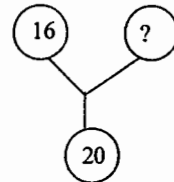


(a) 60

(b) 50

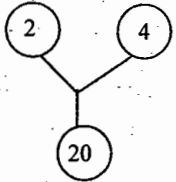


(c) 25



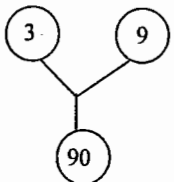
(d) 21

13.

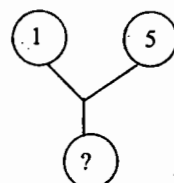


(a) 75

(b) 26

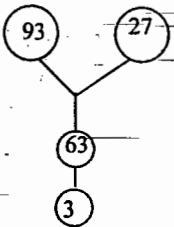


(c) 25



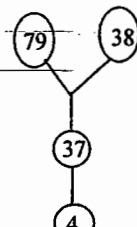
(d) 20

14.

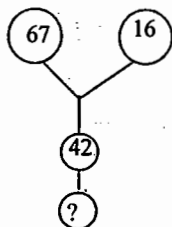


(a) 5

(b) 6

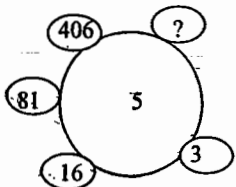


(c) 8



(d) 9

15.



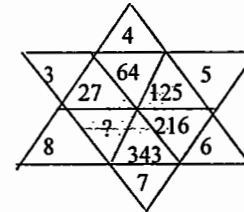
(a) 1

(b) 731

(c) 1625

(d) 2031

16.



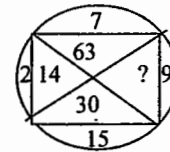
(a) 512

(b) 216

(c) 513

(d) 613

17.



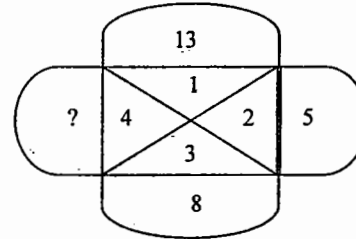
(a) 33

(b) 145

(c) 135

(d) 18

18.



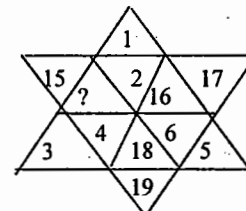
(a) 10

(b) 11

(c) 12

(d) 13

19.



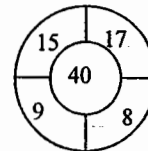
(a) 13

(b) 14

(c) 20

(d) 21

20.

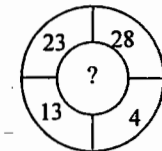
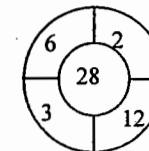


(a) 52

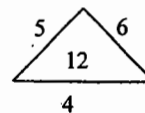
(b) 51

(c) 1

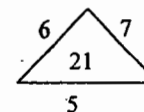
(d) 2



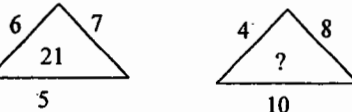
21.



(a) 14



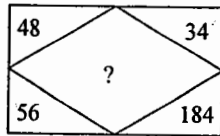
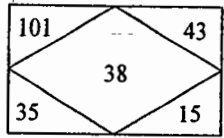
(b) 22



(c) 32

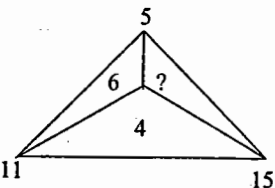
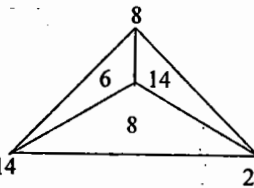
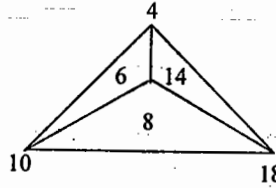
(d) 320

22.



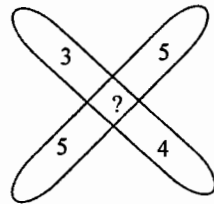
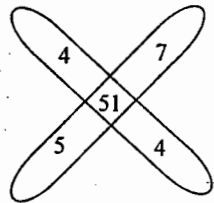
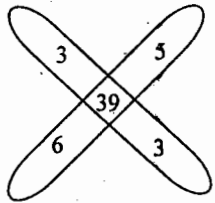
- (a) 127 (b) 142 (c) 158 (d) 198

23.



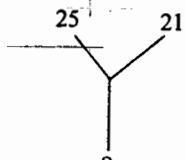
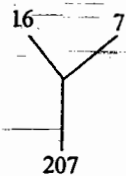
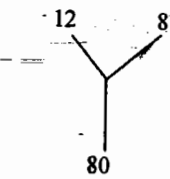
- (a) 6 (b) 8 (c) 10 (d) 14

24.



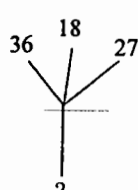
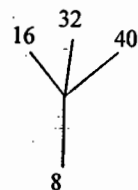
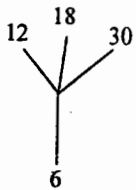
- (a) 47 (b) 45 (c) 37 (d) 35

25.



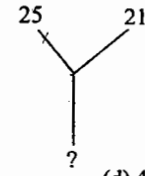
- (a) 184 (b) 210 (c) 241 (d) 425

26.



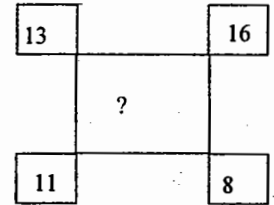
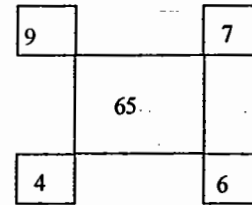
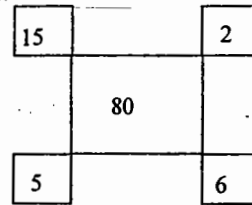
- (a) 18 (b) 12 (c) 9 (d) 6

27.



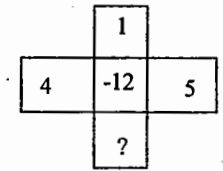
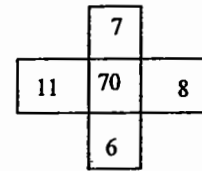
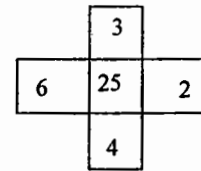
- (a) 184 (b) 210 (c) 241 (d) 425

28.



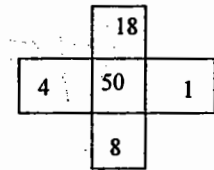
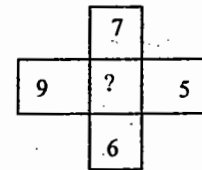
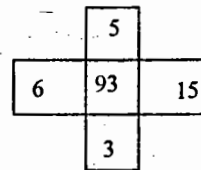
- (a) 48 (b) 72 (c) 35 (d) 120

29.



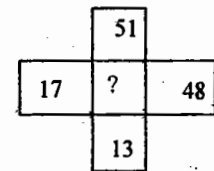
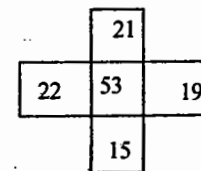
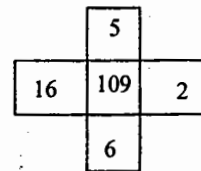
- (a) 10 (b) 6 (c) 2 (d) 1

30.



- (a) 5 (b) 9 (c) 27 (d) 89

31.



- (a) 7 (b) 25 (c) 49 (d) 129

32.

6	18	15
3	2	5
4	3	?
8	27	9

- (a) 3      (b) 4      (c) 6      (d) 8

33.

4	5	6
2	3	7
1	8	3
21	98	?

- (a) 98      (b) 96  
(c) 94      (d) 80

34.

8	3	4
7	6	1
2	4	?
13	5	4

- (a) 1      (b) 2      (c) 3      (d) 4

35.

4C	2B	3A
28A	?	45B
7C	5A	15B

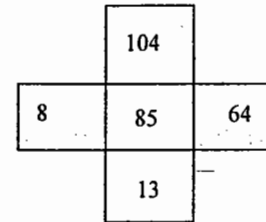
- (a) 10c      (b) 12c  
(c) 13      (d) 7c

36.

BD <sub>3</sub>	CE <sub>5</sub>	DF <sub>15</sub>
EG <sub>2</sub>	FH <sub>4</sub>	GI <sub>8</sub>
HJ <sub>4</sub>	IK <sub>6</sub>	?

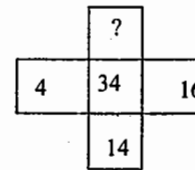
- (a) JL<sub>24</sub>      (b) JJ<sub>18</sub>  
(c) JK<sub>18</sub>      (d) JL<sub>12</sub>

37. In each of the following questions, the numbers have been arranged according to the pattern shown in the sample figure given below, find the missing number.



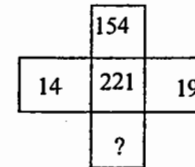
Sample figure

(1)



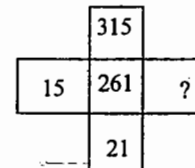
- (a) 56      (b) 52      (c) 58      (d) 60

(2)



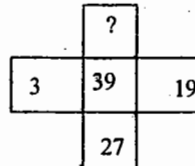
- (a) 11      (b) 13      (c) 15      (d) 17

(3)



- (a) 125      (b) 90      (c) 105      (d) 1225

(4)



- (a) 33      (b) 81      (c) 343      (d) 42

## KEY:

01.a 02.b 03.a 04.d 05.c 06.d 07.b 08.b 09.b 10.d 11.c 12.c

13.b 14.d 15.d 16.a 17.c 18.c 19.b 20.c 21.c 22.b 23.c 24.c

25.a 26.a 27.a 28.a 29.c 30.d 31.b 32.a 33.c 34.a 35.a 36.a

37. (1) a (2) a (3) d (4) b

**(8) ANALYTICAL REASONING****CLASS WORK****Directions: Questions No. 1 to 5**

I. Read the following information carefully and answer the questions given below.

Six persons A, B, C, D, E and F are sitting in two rows, three in each.

E is not at the end of any row

D is not to the left of F

C, the neighbour of E, is sitting diagonally opposite to D

B is the neighbour of F.

01. Which of the following are sitting diagonally opposite to each other ?

- (a) F and C (b) D and A (c) A and C (d) A and F  
(e) A and B

02. Who is facing B ?

- (a) A (b) C (c) D (d) E (e) F

03. Which of the following are in the same row ?

- (a) A and E (b) E and D (c) C and B (d) A and B  
(e) C and F

04. Which of the following are in one of the two rows ?

- (a) FBC (b) CEB (c) DBF (d) AEF (e) ABF

05. After interchanging seat with E, who will be the neighbours of D in the new position ?

- (a) C and A (b) F and B (c) only B (d) only A  
(e) only C

**Directions: Questions No. 6 to 10**

(1). A, B, C, D, E, F and G are sitting on a wall and all of them are facing east.

(2). C is on the immediate right of D

(3). B is at an extreme end and has E as his neighbour.

(4). G is between E and F

(5) D is sitting third from the south end

06. Who is sitting to the right of E ?

- (a) A (b) C (c) D (d) F  
(e) None of these

07. Which of the following pairs of people are sitting at the extreme ends ?

- (a) AB (b) AE (c) CB (d) FB (e) None

08. Name the person who should change places with C such that he gets the third place from the north end ?

- (a) E (b) F (c) G (d) D (e) None

09. Immediately between which of the following pairs of people is D sitting ?

- (a) AC (b) AF (c) CE (d) CF (e) None



10. Which of the conditions (i) to (v) given is not required to find out the place in which A is sitting ?  
 (a) (i) (b) (ii) (c) (iii) (d) All are required  
 (e) None

**Directions: Questions No. 11 to 15**

A blacksmith has five iron articles A, B, C, D and E, each having a different weight.

- (i). A weights twice as much as B  
 (ii). B weights four and half times as much as C  
 (iii). C weights half as much as D  
 (iv). D weights half as much as E  
 (v). E weights less than A but more than C
11. Which of the following is the lightest in weight ?  
 (a) A (b) B (c) C (d) D (e) E
12. E is lighter in weight than which of the other two articles ?  
 (a) A, B (b) D, C (c) A, C (d) D, B  
 (e) B, E
13. E is heavier than which of the following two articles ?  
 (a) D, B (b) D, C (c) A, C (d) A, B  
 (e) None
14. Which of the following articles is the heaviest in weight ?  
 (a) A (b) B (c) C (d) D (e) E
15. Which of the following represents the descending order of weights of the articles ?  
 (a) A, B, E, D, C (b) B, D, E, A, C (c) E, C, D, A, B (d) C, A, D, B, E  
 (e) A, B, D, E, C

**Directions: Questions No. 16 to 20**

- (i). Six friends P, Q, R, S, T and U are members of a club and play a different game of football Cricket, Tennis, Basketball, Badminton and Volleyball.  
 (ii). 'T' who is taller than P and S plays Tennis  
 (iii). The tallest among them plays Basketball  
 (iv). The shortest among them plays Volleyball  
 (v). Q and S neither plays Volleyball nor Basketball  
 (vi). R plays Volleyball  
 (vii). 'T' is-between Q who plays football and P in order of height.
16. Who among them is taller than R but shorter than P ?  
 (a) Q (b) T (c) U (d) cannot be determined  
 (e) None of these
17. Who will be at the third place if they are arranged in the descending order of height ?  
 (a) Q (b) P (c) S (d) T  
 (e) None of these

18. Which of the following statements is not true ?  
 (a) P is shorter than R (b) Q is taller than S  
 (c) S is taller than R (d) T is taller than R  
 (e) U is taller than Q
19. Who among them plays Basketball ?  
 (a) Q (b) R (c) S (d) U  
 (e) None of these
20. What does S plays ?  
 (a) Cricket (b) Badminton (c) Football (d) Either Cricket (or) Badminton  
 (e) None of these

**Directions: Questions No. 21 to 25**

A training college has to conduct a refresher course for teachers of seven different subject Mechanics, Psychology, Philosophy, Sociology, Economics, Science and Engineering from 22<sup>nd</sup> July to 29<sup>th</sup> July.

- (i). Course should start with psychology  
 (ii). 23<sup>rd</sup> July, being Sunday, should be holiday  
 (iii). Science subject should be on the previous day of the Engineering subject  
 (iv). Course should end with Mechanics subject  
 (v). Philosophy should be immediately after the holiday.  
 (vi). There should be a gap of one day between Economics and Engineering.
21. The refresher course will start with which one of the following subjects ?  
 (a) Psychology (b) Mechanics (c) Philosophy (d) Economics  
 (e) None of these
22. Which subject will be on Tuesday ?  
 (a) Mechanics (b) Engineering (c) Economics (d) Psychology  
 (e) None of these
23. Which subject precedes Mechanics ?  
 (a) Economics (b) Engineering (c) Philosophy (d) Psychology  
 (e) None of these
24. How many days gap is there between science and philosophy ?  
 (a) One (b) Two (c) Three (d) No gap  
 (e) None of these
25. Which subject is followed by science ?  
 (a) Engineering (b) Psychology (c) Philosophy (d) Economics  
 (e) None of these
- Directions: Questions No. 26 to 30**  
 Seven friends Kamala, Manish, Rohit, Amit, Gaurav, Prem and Priya are sitting at equal distances from each other. Rohit is sitting two places right of Prem who is sitting right of Amit but Rohit and Prem are not sitting opposite to each other. Kamala forms an angle of 90° from Gaurav and an angle of 120° from Manish. Manish is just opposite Priya and is sitting on the left of Gaurav.

26. Who is the only person sitting between Rohit and Manish ?  
 (a) Prem (b) Amit (c) Gaurav (d) Kamala
27. Gaurav is not sitting at equal distances from \_\_\_\_\_  
 (a) Rohit and Prem (b) Amit and Kamala  
 (c) Manish and Prem (d) All the above
28. Gaurav is sitting \_\_\_\_\_ of Priya  
 (a) to the left (b) to the right (c) two places right (d) None of these
29. The angle between Gaurav and Manish in the clockwise direction is \_\_\_\_\_  
 (a)  $150^\circ$  (b)  $180^\circ$  (c)  $210^\circ$  (d) None of these
30. Which of the following statements is not correct ?  
 (a) Prem is between Manish Kamala (b) Manish is two places away from Priya  
 (c) Gaurav is sitting opposite Prem (d) All of the above

**Directions: Questions No. 31 to 35**

There are six cities A, B, C, D, E and F.  
 A is not a hill station  
 B and E are no historical places  
 D is not an industrial city  
 A and D are not historical cities  
 A and B are not alike

31. Which two cities are industrial centres ?  
 (a) A and B (b) E and F (c) C and D (d) B and F  
 (e) A and D
32. Which two cities are historical places ?  
 (a) A and C (b) B and F (c) C and F (d) B and E  
 (e) A and D
33. Which two cities are hill stations ?  
 (a) A and B (b) C and A (c) B and D (d) A and F  
 (e) None
34. Which city is a hill station and an industrial but not a historical place ?  
 (a) E (b) F (c) A (d) B (e) C
35. Which two cities are neither historical places nor industrial centres ?  
 (a) A and B (b) D and E (c) F and C (d) B and D  
 (e) None of these

**Directions: Questions No. 36 to 40**

There are Six persons A, B, C, D, E and F in a school. Each of the teachers teaches two subjects one compulsory subject and the other optional subject. D's optional subject was History while three others have it as compulsory subject. E and F have physics as one of their subjects. F's compulsory subject is Mathematics. Which is an optional subject of both C and E. History and English are A's subjects but in terms of compulsory and optional subjects they are just reverse of those of D's. Chemistry is an optional subject of only one of them. The only Female teacher in the school has English as her compulsory subject.

36. What is C's compulsory subject ?  
 (a) History (b) Physics (c) Chemistry (d) English  
 (e) Mathematics
37. Who is a female member in the group ?  
 (a) A (b) B (c) C (d) D (e) E
38. Which of the following has same compulsory and optional subjects as those of F's ?  
 (a) D (b) B (c) A (d) C  
 (e) None of these
39. Disregarding which is the compulsory and which is the optional subjects who has the same two subjects combinations as F's  
 (a) A (b) B (c) E (d) D  
 (e) None
40. Which of the following groups has History as the compulsory subject ?  
 (a) A, C and D (b) B, C and D (c) C and D (d) A, B and C  
 (e) A and D

**Directions: Questions No. 40 to 45**

There is a family of six persons A, B, C, D, e & F. They are lawyer, Doctor, Teacher, Salesman, Engineer and Accountant. There are two married couples in the family. D, the sales man is married to the lady Teacher. The Doctor is married to the lawyer. F, the Accountant is the son of B and brother of E. C, the lawyer is the daughter-in-law of A. E is the unmarried Engineer. A is the grandmother of F.

41. How is E related to F ?  
 (a) Brother (b) Sister (c) Cousin (d) Cannot be determined  
 (e) None of these
42. What is the profession of B ?  
 (a) Teacher (b) Doctor (c) Lawyer (d) Cannot be determined  
 (e) None of these
43. What is the profession of A ?  
 (a) Lawyer (b) Teacher (c) Doctor (d) Cannot be determined  
 (e) None of these
44. Which of the following is one of the couples ?  
 (a) F and D (b) D and B (c) E and A (d) A and C  
 (e) None of these

45. How is D related to F ?

- (a) Grandfather (b) Father (c) Uncle (d) Brother  
(e) None of these

**Directions: Questions No. 46 to 49**

- (i). P, Q, R, S, T and U are six members of a group of which three are male and three are females.  
(ii). There are two engineers, two lawyers one teacher and one doctor in the group.  
(iii). Q, T, P and R are two married couples and no person in this group has same profession  
(iv). T, a teacher with blue dress, married a male lawyer with brown dress.  
(v). Colour of the dresses of both the husbands and that of both the wives is the same.  
(vi). Two persons have blue dress, two have brown and the remaining one each has black and green.  
(vii). P is a male engineer whose sister S is also an engineer.  
(viii). Q is a doctor

46. Who is the wife of P ?

- (a) Q (b) R (c) S (d) T  
(e) None of these

47. Which of the following is a group of female members ?

- (a) QSR (b) QST (c) QSU (d) QTU  
(e) UST

48. Which of the following is a pair of married ladies ?

- (a) PR (b) TS (c) QT (d) Data inadequate  
(e) None of these

49. What is the colour of U's dress ?

- (a) Black (b) Green (c) Black & Green (d) Data inadequate  
(e) None of these

**Directions: Questions No. 50 to 54**

All the roads of a city are either perpendicular (or) parallel to one another. The roads are all straight. Roads A, B, C, D and E are parallel to one another. Roads G, H, I, J, K, L and M are parallel to one another.

- (i). Road A is 1km east of road B  
(ii). Road B is  $\frac{1}{2}$  km west of road C  
(iii). Road D is 1km west of road E  
(iv). Road G is  $\frac{1}{2}$  km south of road H  
(v). Road I is 1km north of road J  
(vi). Road K is  $\frac{1}{2}$  km north of road L  
(vii). Road M is 1km south of road L

50. Which is necessarily true ?

- (a) E and B are intersect (b) D is 2km west of B  
(c) D is at least 2km west of A (d) M is 1.5 km north of L  
(e) I is 1km north of L

51. If E is between B and C, which of the following is false ?

- (a) D is 2km west of A  
(b) C is less than 1.5km from D  
(c) Distance from E to B added to distance of E to C is  $\frac{1}{2}$  km  
(d) E is less than 1km from A  
(e) D is less than 1km from B

52. If road E is between B and C, then distance between A and D is \_\_\_\_\_

- (a)  $\frac{1}{2}$  km (b) 1km (c) 1.5km (d) 1.5 to 2km  
(e) 2 to 2.5km

53. Which of the following possibilities would make two roads coincide ?

- (a) L is  $\frac{1}{2}$  km north of I (b) C is 1km west of D  
(c) I is  $\frac{1}{2}$  km north of K (d) D is  $\frac{1}{2}$  km east of A  
(e) E and B are  $\frac{1}{2}$  km apart

54. If 'X' is parallel to I and X is  $\frac{1}{2}$  km south of J and 1km north of G, which two roads would be  $\frac{1}{2}$  km apart ?

- (a) I and X (b) J and G (c) I and G (d) J and H  
(e) X and J

**Directions: Questions No. 55 to 59**

From amongst six boys A, B, C, D, E and F and five girls P, Q, R, S and T a team of six is to be selected under the following conditions

- (1) A and D have to be together  
(2) C cannot go with S  
(3) S and T have to be together  
(4) B cannot be teamed with E  
(5) D cannot go with P  
(6) B and R have to be together  
(7) C and Q have to be together

55. If there be five boys in the team, the alone girl member is \_\_\_\_\_

- (a) P (b) Q (c) R (d) S

56. If including P, the team have three girls, the members are \_\_\_\_\_

- (a) BCFQR (b) ADEST (c) ADBST (d) BFRST

57. If the team including C consists of four boys, the members of the team other than C are \_\_\_\_\_

- (a) ADEPQ (b) ABDQR (c) DEFAQ (d) BEFRQ

58. If four members including E have to be boys, the members other than E are \_\_\_\_\_

- (a) ABCQR (b) ADFST (c) BCFQR (d) AEDFQ

59. If four members to be girls the members of the team are \_\_\_\_\_

- (a) BCPQRS (b) BFRST (c) BCQRST (d) BCPQRT

## KEY:

01.d 02.d 03.a 04.c 05.a 06.e 07.a 08.c 09.d 10.d 11.c 12.a  
 13.b 14.a 15.a 16.e 17.d 18.a 19.d 20.d 21.a 22.c 23.e 24.a  
 25.a 26.c 27.d 28.d 29.d 30.d 31.b 32.c 33.c 34.a 35.d 36.a  
 37.d 38.e 39.c 40.d 41.d 42.b 43.b 44.e 45.a 46.a 47.b 48.c  
 49.c 50.d 51.a 52.d 53.c 54.e 55.b 56.a 57.b 58.b 59.b

## ASSINGMENT

## Directions: Questions No. 1 to 5

Five persons are sitting in a row. One of the two persons at the extreme ends is intelligent and other one is fair. A fat person is sitting to the right of a weak person. A tall person is to the left of the fair person and weak person is sitting between the intelligent and fat persons.

01. Tall person is at which place counting from right ?  
 (a) First (b) Second (c) Third (d) Fourth  
 (e) None of these
02. Which of the following describes the person to the left of weak person ?  
 (a) Intelligent (b) Fat (c) Fair (d) Tall (e) None
03. Which of the following persons is sitting at the centre ?  
 (a) Fair (b) Weak (c) Intelligent (d) Tall (e) Fat
04. To whose left is the fat person sitting ?  
 (a) Fair (b) Intelligent (c) Tall (d) Weak  
 (e) cannot be determined
05. If the fair and fat persons exchange their positions so also tall and weak, then who will be sitting to the left of the weak person ?  
 (a) Tall (b) Fair (c) Fat (d) Intelligent  
 (e) Cannot be determined

## Directions: Questions No. 6 to 10

Five friends A, B, C, D and E are sitting on a bench.

- (1). A is sitting next to B  
 (2). C is sitting next to D  
 (3). D is not sitting with E  
 (4). E is on the left end of the bench  
 (5). C is on second position from the right  
 (6). A is on the right side of B and to the right side of E  
 (7). A and C are sitting together
06. Where is A sitting ?  
 (a) Between B and D (b) Between D and C  
 (c) Between B and C (d) Between C and E  
 (e) Between B and C
07. Who is sitting in the centre ?  
 (a) A (b) B (c) C (d) D (e) E
08. C is sitting between \_\_\_\_\_  
 (a) B and D (b) A and E (c) D and E (d) A and D  
 (e) A and B

09. What is the position of D ?  
 (a) Extreme left (b) Extreme right (c) Third from left (d) Second from left  
 (e) None
10. What is the position of B ?  
 (a) Second from right (b) centre  
 (c) Extreme left (d) Second from left (e) None of these

**Directions: Questions No. 10 to 15**

In a car exhibition, seven cars of seven different companies viz. Cardilac, Ambassador, Fiat, Maruthi, Mercedes, Bedford and Fargo were displayed in a row, facing east such that

- (i). Cardilac car was to the immediate right of Fargo.  
 (ii). Fargo was fourth to the right of Fiat.  
 (iii) Maruthi car was between Ambassador and Bedford.  
 (iv). Fiat, which was third to the left of Ambassador car at one of the ends.

11. Which of the following was the correct position of the Mercedes ?  
 (a) Immediate right of Ambassador (b) Immediate left of Bedford  
 (c) Between Bedford and Fargo (d) Fourth to the right of Maruthi  
 (e) None
12. Which of the following is definitely true ?  
 (a) Fargo car is between Ambassador and Fiat  
 (b) Cardilac car is to the immediate left of Mercedes.  
 (c) Fargo is to the immediate right of Cardilac  
 (d) Maruthi is to the right of Mercedes  
 (e) None of these
13. Which cars on the immediate either sides of the Cardilac car ?  
 (a) Ambassador and Maruthi (b) Maruthi and Fiat  
 (c) Fiat and Mercedes (d) Ambassador and Fargo  
 (e) None of these
14. Which of the following is definitely true ?  
 (a) Maruthi is to the immediate left of Ambassador  
 (b) Bedford is to the immediate left of Fiat  
 (c) Bedford is at one of the ends.  
 (d) Fiat is second to the right of Maruthi  
 (e) None of these
15. Which of the following groups of cars is to the right of the Ambassador car ?  
 (a) Cardilac, Fargo and Maruthi (b) Maruthi, Bedford and Fiat  
 (c) Mercedes, Cardilac and Fargo (d) Bedford, Cardilac and Fargo

**Directions: Questions No. 16 to 20**

Six plays A, B, C, D, E and F are to be staged one on each day from Monday to Saturday. The schedule of the plays is to be accordance with the following.

- (i). A must be staged a day before E  
 (ii). C must not be staged on Tuesday  
 (iii) B must be staged on the day following the day on which F is staged  
 (iv) D must be staged on Friday only and should not be immediately preceded by B.  
 (v) E must not be staged on the last day of the schedule.

16. Which of the following plays immediately follows B ?  
 (a) A (b) C (c) D (d) E (e) F
17. Which of the following plays is on Monday ?  
 (a) E (b) F (c) C (d) B (e) A
18. Play D is between which of the following pairs of players ?  
 (a) B and E (b) E and F (c) A and E (d) C and E  
 (e) C and F
19. Which of the following is the schedule of plays, with the order of their staging from Monday ?  
 (a) E, A, B, F, D, C (b) A, F, B, E, D, C  
 (c) A, F, B, C, D, E (d) F, A, B, E, D, C (e) None of these
20. Play C cannot definitely be staged on which of the following days in addition to Tuesday?  
 (a) Monday (b) Wednesday (c) Friday (d) Thursday  
 (e) Saturday

**Directions: Questions No. 21 to 25**

- (i). Five friends P, Q, R, S and T traveled to five different cities of Chennai, Calcutta, Delhi, Bangalore and Hyderabad by five different modes of transport of Bus, Train, Car and Boat from Mumbai.
- (ii). The person who traveled to Delhi did not travel by boat.  
 (iii). R went to Bangalore by car and Q went to Calcutta by Aeroplane.  
 (iv). S traveled by boat where as T traveled by Train.  
 (v). Mumbai is not connected by bus to Delhi and Chennai.
21. Which of the following combinations of person and mode is not correct ?  
 (a) P – Bus (b) Q – Aeroplane (c) R – Car (d) S – Boat  
 (e) T – Aeroplane
22. Which of the following combinations is true for S ?  
 (a) Delhi – Bus (b) Chennai – Bus (c) Chennai – Boat (d) Data inadequate  
 (e) None of these
23. Which of the following combinations of place and mode is not correct ?  
 (a) Delhi – Bus (b) Calcutta – Aeroplane  
 (c) Bangalore – Car (d) Chennai – Boat (e) Hyderabad – Bus

24. The person traveling to Delhi went by which of the following modes ?

- (a) Bus (b) Train (c) Aeroplane (d) Car  
(e) Boat

25. Who among the following traveled to Delhi ?

- (a) R (b) S (c) T (d) Data inadequate  
(e) None of these

**Directions: Questions No. 26 to 31**

Eight friends A, B, C, D, E, F, G and H are sitting in a circle facing the centre. B is sitting between G and D. H is third to the left of B and second to the right of A. C is sitting between A and G and B and E are not sitting opposite to each other.

26. Who is third to the left of D ?

- (a) A (b) E (c) F (d) cannot be determined  
(e) None

27. Which of the following statements is not correct ?

- (a) C is third to the right of D  
(b) A is sitting between C and F  
(c) D and A are sitting opposite to each other  
(d) E is sitting between F and D  
(e) E and C are sitting opposite of each other

28. Who is facing A ?

- (a) B (b) C (c) D (d) E  
(e) None

29. Who is between A and C ?

- (a) G (b) F (c) B (d) H  
(e) None

30. How many persons are there in between D and B ?

- (a) One (b) Two (c) Three (d) Nil  
(e) None

31. Who is second to the right of F

- (a) E (b) A (c) B (d) G (e) None

**Directions: Questions No. 32 to 36**

In a group of five persons A, B, C, D and E

- (i). B and C are intelligent in Mathematics and Geography  
(ii). A and C are intelligent in Mathematics and History  
(iii). B and D are intelligent in Political Science and Geography  
(iv). D and E are intelligent in Political Science and Biology.  
(v). E is intelligent in Biology, History and Political Science.

32. Who is intelligent in Political Science, Geography and Biology

- (a) E (b) D (c) C (d) D (e) A

33. Who is intelligent in Mathematics, Political Science and Geography ?

- (a) A (b) B (c) C (d) D (e) E

34. Who is intelligent in Mathematics and History but not in Geography ?

- (a) C (b) E (c) A (d) B (e) D

35. Who is intelligent in Mathematics, Geography and History ?

- (a) E (b) A (c) D (d) C (e) B

36. Who is intelligent in Political Science, History and Biology ?

- (a) A (b) B (c) C (d) D (e) E

**Directions: Questions No. 37 to 41**

- (i). P, Q, R, S, T and U are six students procuring their Masters degree in six different subjects - English, History, Philosophy, Physics, Statistics and Mathematics.  
(ii). Two of them stay in Hostel, two stay as paying guest (PG) and the remaining two stay at their Home  
(iii). R does not stay as paying guest and studies Philosophy.  
(iv). The students studying statistics and History do not stay as paying guest.  
(v). T studies Mathematics and S studies Physics  
(vi). U and S stay in hostel. T stays as paying guest and Q stays at home.

37. Who studies English

- (a) R (b) S (c) T (d) U  
(e) None of these

38. Which of the following combinations of subject and place of stay is not correct ?

- (a) English - Hostel (b) Mathematics - PG  
(c) Philosophy - Home (d) Physics - Hostel (e) None

39. Which of the following pairs of students stay one each at hostel and at home ?

- (a) QR (b) SR (c) US (d) Data inadequate  
(e) None

40. Which subjects does Q study ?

- (a) History (b) Statistics (c) History (or) Statistics  
(d) Data inadequate (e) None of these

41. Which of the following pairs of students stay at home ?

- (a) PQ (b) QR (c) RS (d) ST  
(e) None of these

**Directions: Questions No. 42 to 46**

- (i). P, Q, R, S, T and U are six members in a family in which there are two married couples.  
(ii). T, a teacher is married to the doctor who is mother of R and U  
(iii). Q, the lawyer is married to P  
(iv). P has one son and one grandson  
(v). Of the two married ladies one is a house wife  
(vi). There is also one student and one male engineer in the family ?

42. How is P related to R ?  
 (a) Grand father (b) Mother (c) Sister (d) Grand mother  
 (e) None of these
43. Who among the following is the house wife ?  
 (a) P (b) Q (c) S (d) T  
 (e) None of these
44. How is R related to U ?  
 (a) Brother (b) Sister (c) Brother (or) Sister (d) Data inadequate  
 (e) None of these
45. Which of the following represents the group of females in the family ?  
 (a) PSR (b) PSU (c) QTR (d) Data inadequate  
 (e) None of these
46. Which of the following is true about the grand-daughter in the family ?  
 (a) She is a lawyer (b) She is a student  
 (c) She is an engineer (d) Data inadequate (e) None of these

**Directions: Questions No. 47 to 51**

- (i). P, Q, R, S, T and U are traveling in a bus.  
 (ii). There are two reporter, two technicians, one photographer and one writer in the group  
 (iii). The photographer 'P' is married to S who is a reporter  
 (iv). The writer is married to Q who is of the same profession as that of U.  
 (v). P, Q, R, S, are two married couples and nobody in the group has same profession.  
 (vi) U is brother of R

47. Which of the following is a pair of technicians ?  
 (a) RS (b) SU (c) PT (d) QU
48. Which of the following is a pair of reporters ?  
 (a) PQ (b) RT (c) ST (d) SU
49. How is R related to U ?  
 (a) Brother (b) Sister (c) Uncle (d) cannot be determined
50. Which of the following is a pair of reporter ?  
 (a) PQ (b) QR (c) QS (d) PT
51. Which of the following is a pair of husbands ?  
 (a) QP (b) PR (c) QS (d) cannot be determined

**Directions: Questions No. 52 to 55**

- A team of five is to be selected from amongst five boys A,B,C,D and E and four girls P,Q,R and S some criteria for selection are  
 A and S have to be together  
 P cannot be put with R  
 D and Q cannot go together

C and E have to be together

R cannot be put with B

Unless otherwise stated, these criteria are applicable to all questions below.

52. If two of the members have to be boys, the team will consists of  
 (a) ABSPQ (b) ADSQR (c) BDSRQ (d) CESPQ
53. If R be one of the members, the other members of the team are:  
 (a) PASD (b) QSAD (c) QSCE (d) SACE
54. If two of the members are girls and D is one of the members, the members of the team other than D are:  
 (a) PQBC (b) PQCE (c) PSAB (d) PSCE
55. If including P at least three are girls the members of the team other than P are:  
 (a) QSAB (b) QSBD (c) QSCE (d) RSAD

**KEY:**

- 01.b 02.a 03.e 04.c 05.b 06.e 07.a 08.d 09.b 10.d 11.d 12.b  
 13.e 14.a 15.c 16.a 17.b 18.d 19.e 20.c 21.e 22.c 23.a 24.b  
 25.c 26.c 27.d 28.c 29.e 30.d 31.a 32.b 33.b 34.c 35.d 36.e  
 37.e 38.a 39.b 40.c 41.b 42.d 43.a 44.c 45.d 46.b 47.d 48.c  
 49.d 50.b 51.d 52.a 53.d 54.c 55.a

Numerical estimation questions test your ability

Numerical computation questions involve basic principles of arithmetic like addition, subtraction, multiplication and division. They also use mathematical terms and methods such as percentages ratios, fractions and decimals. To score well on these questions you will simply need to make quick and accurate calculations.

This type of test can be categorized as a speed test and is used to determine your basic numeric. Obviously you will not be allowed to use a calculator.

If you are very rusty with arithmetic, try re-learning the times tables up to 12 and practice multiplication, division and percentage calculations. Practice can improve your test scores for all types of aptitude tests, so try as many examples as you can.

These sample numerical computation questions are directly applicable to many administrative and clerical jobs but can also appear as a component of graduate and managerial tests. The speed at which you can answer these questions is the critical measure, as most people could achieve a very high score given unlimited time in which to answer.

### (1) NUMBER SYSTEM

#### Test of Divisibility:

- Divisibility By 2:-** A number is divisible by 2, if its units digits is any 0, 2, 4, 6, 8.  
Eg:- 84932
- Divisibility By 3:-** A number is divisible by 3, if the sum of its digits is divisible by 3.  
Eg:- 592482
- Divisibility By 4:-** A number is divisible by 4, if the number formed by the last two digits is divisible by 4.  
Eg:- 892648
- Divisibility By 5:-** A number is divisible by 5, if its units digits is either 0 or 5.  
Eg:- 20820
- Divisibility By 6:-** A number is divisible by 6, if its divisible by both 2 and 3.  
Eg:- 35256

- Divisibility By 8:-** A number is divisible by 8, if the number formed by the last three digits of the given number is divisible by 8.  
Eg:- 953360
- Divisibility By 9:-** A number is divisible by 9, if the sum of its digits is divisible by 9.  
Eg:- 60732
- Divisibility By 10:-** A number is divisible by 10, if it ends with 0.  
Eg:- 96410
- Divisibility By 11:-** A number is divisible by 11, if the difference of the sum of its digits at odd places and the sum of its even places, is either 0 (or) 11.  
Eg:- 4832718  
 $(8 + 7 + 3 + 4) - (1 + 2 + 8) = 22 - 11 = 11$
- Divisibility By 12:-** A number is divisible by 12, if its divisible by 4 and 3.  
Eg:- 34632.
- Divisibility By 14:-** A number is divisible by 4, if its divisible by both 2 as well as 7.
- Divisibility By 15:-** A number is divisible by 15, if its divisible by both 3 and 5.
- Divisibility By 16:-** A number is divisible by 16, if the number formed by the last digits is divisible by 16.  
Eg: 7957536
- Divisibility By 24:-** A number is divisible by 24, if its divisible by both 3 and 8.
- Divisibility By 40:-** A number is divisible by 40, if its divisible by both 5 and 8.
- Divisibility By 80:-** A number is divisible by 80, if its divisible by both 5 and 16.

#### BASIC FORMULAE

- $(a + b)^2 = a^2 + b^2 + 2ab$
- $(a - b)^2 = a^2 + b^2 - 2ab$
- $(a + b)^2 - (a - b)^2 = 4ab$
- $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$
- $(a^2 - b^2) = (a + b)(a - b)$
- $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
- $(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
- $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$



$$9. (a^3 + b^3 + c^3 - 3abc) = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$10. \text{If } a + b + c = 0, \text{ then } a^3 + b^3 + c^3 = 3abc.$$

**Some Important Results**

$$(i) (1 + 2 + 2 + 3 + \dots + n) = \frac{n(n+1)}{2}$$

$$(ii) (1^2 + 2^2 + 3^2 + \dots + n^2) = \frac{n(n+1)(2n+1)}{6}$$

$$(iii) (1^3 + 2^3 + 3^3 + \dots + n^3) = \frac{n^2(n+1)^2}{4}$$

**CLASSWORK**

01.  $(51 + 52 + 53 + \dots + 100)$  is equal to ---- ?

- (a) 2525 (b) 2975 (c) 3225 (d) 3775

02. If the number  $357 * 25 *$  is divisible by both 3 and 5, then the missing digits in the units place and the thousands place respectively are?

- (a) 0,6 (b) 5,6 (c) 5,4 (d) None

03.  $5 * 2$  is a three digit number with \* as a missing digit. If the number is divisible by 6, the missing digit is ---- ?

- (a) 2 (b) 3 (c) 6 (d) 7

04. Which one of the following numbers is exactly divisible by 11?

- (a) 235641 (b) 245642 (c) 315624 (d) 415624

05. What least value must be given to \* so that the number  $451 * 603$  is exactly divisible by 9?

- (a) 2 (b) 5 (c) 7 (d) 8

06. The number 311311311311311311311 is ---- ?

- (a) divisible by 3 but not by 11 (b) divisible by 11 but not by 3  
(c) divisible by both 3 and 11 (d) neither divisible by 3 nor 11

**KEY:** 01.d 02.b 03.a 04.d 05.d 06.d

**ASSIGNMENT**

1. Evaluate:  $986 \times 137 + 986 \times 863$

- (a) 986000 (b) 896000

2.  $983 \times 207 - 983 \times 107$

3.  $1605 \times 1605 - (a + b)^2$

4.  $1398 \times 1398 - (a - b)^2$

5. Evaluate:  $(313 \times 313 + 287 \times 287) - a^2 + b^2$

$$6. 896 \times 896 - 204 \times 204$$

$$7. 387 \times 387 + 114 \times 114 + 2 \times 81 \times 68$$

$$8. 81 \times 81 + 68 \times 68 - 2 \times 81 \times 68$$

$$9. (475 + 425)^2 - 4 \times 475 \times 425 \text{ is equal to}$$

$$10. (64)^2 - (36)^2 = 20Z, \text{ the value of } Z \text{ is ----}$$

$$11. \frac{(856 + 167)^2 + (856 - 167)^2}{856 \times 856 + 167 \times 167} \text{ is equal to ----}$$

- (a) 1 (b) 2 (c) 689 (d) 1023

$$12. \frac{(469 + 174)^2 - (469 - 174)^2}{469 \times 174} \text{ is equal to ----}$$

- (a) 2 (b) 4 (c) 295 (d) 643

$$13. 106 \times 106 + 94 \times 94 = ?$$

- (a) 20032 (b) 20072 (c) 21032 (d) 23032

$$14. 217 \times 217 + 183 \times 183 = ?$$

- (a) 79698 (b) 80578 (c) 80698 (d) 81268

15. The sum of first 45 natural numbers is ---- ?

- (a) 1035 (b) 1280 (c) 2070 (d) 2140

16. The sum of even numbers between 1 and 31 is ---- ?

- (a) 16 (b) 128 (c) 240 (d) 512

17. If  $1 * 548$  is divisible by 3, which of the following digits can replace \* ---- ?

- (a) 0 (b) 12 (c) 7 (d) 9

18. What least value must be assigned to \* so that the number  $63576 * 2$  is divisible by 8?

- (a) 1 (b) 2 (c) 3 (d) 4

19. What least value must be given to \* so that the number  $451 * 603$  is exactly divisible by 9?

- (a) 2 (b) 5 (c) 7 (d) 8

20. Which of the following number is exactly divisible by 24?

- (a) 37578 (b) 63810 (c) 537804 (d) 3125736

21. Which of the following number is exactly divisible by 99?

- (a) 114345 (b) 135792 (c) 913464 (d) 3572404

22. The digits indicated by \* and \$ in  $3422213 * \$$  so that this number is divisible by 99 are respectively?

- (a) 1,9 (b) 3,7 (c) 4,6 (d) 5,5

23. If X and Y are the two digits of the number 653xy such that this number is divisible by 80, then  $x + y$  is equal to ---- ?  
 (a) 2 (b) 3 (c) 4 (d) 6
24. Which of the following numbers is exactly divisible by all prime numbers between 1 and 17?  
 (a) 345345 (b) 440440 (c) 510510 (d) 515513
25. There is one number which is formed by writing one digit 6 times (e.g 111111, 444444 etc.) such a number is always divisible by: --- ?  
 (a) 7 (b) 11 (c) 13 (d) All the above
26. A 4-digit number is formed by repeating a 2-digits number such as 2525, 3232 etc. any number of this form is exactly divisible by: ---- ?  
 (a) 7 (b) 11 (c) 13 (d) smallest 3-digit prime number
27. A six digit number is formed by repeting a three number: for 4example, 256256, 678678 etc. Any number 9 this form is always exactly divisible by ---- ?  
 (a) 7 only (b) 11 only (c) 13 only (d) 1001
28. The largest natural number which exactly divides the product of any four consecutive natural number is ---- ?  
 (a) 6 (b) 12 (c) 24 (d) 120
29. The largest natural number by which the product of three consecutive even natural numbers is always divisible is ---- ?  
 (a) 16 (b) 24 (c) 48 (d) 96
30. The sum of three consecutive odd numbers is always divisible by ---- ?  
 I : 2 II : 3 III : 5 IV : 6  
 (a) only I (b) only II (c) only I & III (d) only III & IV
31. The difference between the squares of two consecutive odd integers is always divisible by:  
 (a) 3 (b) 6 (c) 7 (d) 8
32. The sum of the digits of a 3-digits number is subtracted from the number the subtracted from the number the resulting number is ---- ?  
 (a) divisible by 6 (b) divisible 9  
 (c) divisible neither by 6 nor by 9 (d) divisible by both 6 and 9
33. A 3- digit number 4 a 3 is added to another 3- digit number 984 to give the four digit number 1367, which is divisible by 11, then,  $(a + b)$  is ---- ?  
 (a) 10 (b) 11 (c) 12 (d) 15
34. The smallest number to be added to 1000 so that 45 divides the sum exactly is: --- ?  
 (a) 10 (b) 20 (c) 35 (d) 80

35. The smallest number that must be added to 803642 in order to obtain a multiple of 11 is ---- ?  
 (a) 1 (b) 4 (c) 7 (d) 9
36. The least number which must be subtracted from 6709 to make it exactly divisible by 9 is ---- ?  
 (a) 2 (b) 3 (c) 4 (d) 5
37. What least number must be subtracted from 427398 so that the remaining number is divisible by 15?  
 (a) 3 (b) 6 (c) 11 (d) 16
38. When the sum of two numbers is multiplied by 5, the product is divisible by 15. Which one of the following pairs of numbers satisfies the above condition?  
 (a) 240, 335 (b) 250, 341 (c) 245, 342 (d) None
39. Find the number which is nearest to 457 and is exactly divisible by 11  
 (a) 450 (b) 451 (c) 460 (d) 462
40. What largest number of fine digits is divisible by 99- - - ?  
 (a) 99909 (b) 99981 (c) 99990 (d) 99999

## KEY:

- 11.b 12.b 13.b 14.b 15.a 16.c 17.a 18.c 19.d 20.d 21.a 22.a  
 23.a 24.c 25.d 26.d 27.d 28.c 29.c 30.b 31.d 32.b 33.a 34.c  
 35.c 36.c 37.a 38.b 39.b 40.c

## (2) DECIMAL FRACTIONS

**Decimal Fractions:-** Fractions in which denominators are powers of 10 are known as decimal fractions

Eg:-  $\frac{1}{10} = 1 \text{ tenth} = 0.1$ ,  $\frac{1}{100} = 1 \text{ hundredth} = 0.01$

$\frac{99}{100} = 99 \text{ hundredth} = 0.99$ ,  $\frac{7}{1000} = 7 \text{ thousandths} = 0.007$  etc.

**II. Conversion of a Decimal into Vulgarfraction:-** Put 1 in the denominator under the decimal point and annex with it as many zeros as is the number of digits after the decimal point. Now, remove the decimal point and reduce the fraction to its lowest terms.

Eg:  $0.25 = \frac{25}{100} = \frac{1}{4}$ ;  $2.008 = \frac{2008}{1000} = \frac{251}{125}$

## III. Operation of Decimal fractions:

1. Addition and subtraction of Decimal Fraction
2. Multiplication of Decimal fractions
3. Dividing or Decimal fraction By a counting Number.

IV. **Recurring Decimal:-** If in a decimal fraction, a figure or a set of figures is repeated continuously, then such a number is called recurring decimal.

In a recurring decimal, if a single figure is repeated then it is expressed by putting a dot on it. If a set of figures is repeated, it is expressed by putting a bar on the set.

$$\text{Eg:- } \frac{1}{3} = 0.333\overline{\Rightarrow} 0.3$$

$$\frac{23}{7} = 3.142857142857\overline{\Rightarrow} 3.\overline{142857}$$

**Pure Recurring Decimal:-** A decimal fraction in which all the figures after the decimal point are repeated, is called a pure recurring decimal.

**Converting a pure Recurring Decimal into vulgar fraction:**

$$\text{Eg:- } 0.5 = \frac{5}{9}, 0.\overline{53} = \frac{53}{99}; 0.0\overline{67} = \frac{67}{999} \text{ etc.}$$

**Mixed Recurring Decimal:-** A decimal fraction in which some figures do not repeat and some of them are repeated, is called a mixed recurring decimal.

$$\text{Eg:- } 0.17333\overline{\Rightarrow} 0.1\overline{73}$$

**Converting a Mixed Recurring Decimal into Vulgar Fraction:** In the numerator, take the difference between the number formed by all the digits after decimal point. (taking repeated digits only once) and that formed the digits which are not repeated.

In the denominator, take the number formed by as many nines as there are repeating digits following by as many zeros as is the number of non-repeating digits.

$$\text{Eg:- } 0.16 = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$$

$$0.227\overline{3} = \frac{2273-22}{9900} = \frac{2251}{9900}$$

## CLASSWORK

01. Which of the following is equal to  $3.14 \times 10^6$ ?  
(a) 314 (b) 3140 (c) 3140000 (d) None
02. If  $1.125 \times 10^k = 0.001125$ , then the value of k is ---- ?  
(a) -4 (b) -3 (c) -2 (d) -1
03. A tailor has 37.5 meters of cloth and he has to make 8 pieces out of a meter of cloth. How many pieces can he make out of this cloth?  
(a) 320 (b) 360 (c) 400 (d) None
04. When  $0.232323 \dots$  is converted into a fraction, then the result is ---- ?  
(a)  $\frac{1}{5}$  (b)  $\frac{2}{9}$  (c)  $\frac{23}{99}$  (d)  $\frac{23}{100}$

05. The rational number for the recurring decimal  $0.125125 \dots$  is ?

- (a)  $\frac{63}{487}$  (b)  $\frac{119}{993}$  (c)  $\frac{125}{999}$  (d) None

06.  $0.\overline{36}$  expressed in the form of  $\frac{P}{Q}$  equals:

- (a)  $\frac{4}{11}$  (b)  $\frac{4}{13}$  (c)  $\frac{35}{90}$  (d)  $\frac{35}{99}$

07. The correct expression of  $6.\overline{46}$  in the fractional form is ---- ?

- (a)  $\frac{646}{99}$  (b)  $\frac{64640}{1000}$  (c)  $\frac{640}{100}$  (d)  $\frac{640}{99}$

08. If  $\frac{547.527}{0.0082} = x$ , then the value of  $\frac{547527}{82}$  is ---- ?

- (a)  $\frac{x}{10}$  (b)  $10x$  (c)  $100x$  (d) None

09. If  $\frac{1}{6.198} = 0.16134$ , then the value of  $\frac{1}{0.0006198}$  is: ---- ?

- (a) 0.016134 (b) 0.16134 (c) 1613.4 (d) 16134

## KEY:

- 01.c 02.b 03.d 04.c 05.c 06.a 07.c 08.a 09.

## ASSIGNMENT

1. The fraction  $101\frac{27}{100000}$  in decimal form is: ---- ?  
(a) 0.01027 (b) 0.10127 (c) 101.00027 (d) 101.000027
2. When 0.36 is written in simplest fraction form, the sum of the numerator and the denominator is ---- ?  
(a) 45 (b) 15 (c) 114 (d) 135 (e) 34
3. If  $47.250.6 = 4A + \frac{7}{B} + 2c + \frac{5}{D} + 6E$ , Then the value of  $5A + 3B + 6C + D + 3E$  is -  
(a) 53.6003 (b) 53.603 (c) 153.6003 (d) 213.0003
4. Which of the following has fractions in ascending order?  
(a)  $\frac{1}{3}, \frac{2}{5}, \frac{4}{7}, \frac{3}{5}, \frac{5}{6}, \frac{6}{7}$  (b)  $\frac{1}{3}, \frac{2}{5}, \frac{3}{5}, \frac{4}{7}, \frac{5}{6}, \frac{6}{7}$   
(c)  $\frac{1}{3}, \frac{2}{5}, \frac{3}{5}, \frac{5}{6}, \frac{4}{7}, \frac{6}{7}$  (d)  $\frac{2}{5}, \frac{3}{5}, \frac{1}{3}, \frac{4}{7}, \frac{5}{6}, \frac{6}{7}$

5. What is the difference between the biggest and smallest fraction among  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{4}{5}$  and  $\frac{5}{6}$  ?
- (a)  $\frac{1}{6}$  (b)  $\frac{1}{12}$  (c)  $\frac{1}{20}$  (d)  $\frac{1}{30}$
6. The value of  $34.95 + 240.016 + 23.98$  is ----?
- (a) 298.0946 (b) 298.111 (c) 298.946 (d) 299.09
7.  $138.009 + 341.981 - 146.305 = 123.6 + ?$
- (a) 120.085 (b) 120.85 (c) 220.85 (d) None
08.  $0.002 \times 0.5 = ?$
- (a) 0.0001 (b) 0.001 (c) 0.01 (d) 0.1
09.  $40.83 \times 1.02 \times 1.2 = ?$
- (a) 41.64660 (b) 42.479532 (c) 49.97592 (d) 58.7952
10. How many digits will be there to the right of the decimal point in the product of 95.75 and 0.02554?
- (a) 5 (b) 6 (c) 7 (d) None
11. 0.00625 of  $\frac{23}{5}$ , when expressed as a vulgar fraction, equals ----?
- (a)  $\frac{23}{80}$  (b)  $\frac{23}{800}$  (c)  $\frac{23}{8000}$  (d)  $\frac{125}{23}$
12. Which is the closest approximation to the product  $0.3333 \times 0.25 \times 0.499 \times 0.125 \times 24$ ?
- (a)  $\frac{1}{8}$  (b)  $\frac{3}{4}$  (c)  $\frac{3}{8}$  (d)  $\frac{2}{5}$
13. 4.036 divided by 0.04 gives: ----?
- (a) 1.009 (b) 10.09 (c) 100.9 (d) None
14.  $\left(\frac{0.05}{0.25} + \frac{0.25}{0.05}\right)^3 = ?$
- (a) 139.4 (b) 140 (c) 140.6 (d) 143.9
15. If  $\frac{144}{0.144} = \frac{14.4}{x}$ , Then the value of x is ----?
- (a) 0.0144 (b) 1.44 (c) 14.4 (d) 144
16. The value of  $6.\overline{57}$  is ----?
- (a)  $\frac{51}{10}$  (b)  $\frac{57}{99}$  (c)  $\frac{26}{45}$  (d)  $\frac{52}{9}$
17. Let  $F = 0.84181$ . when F is written as a fraction in lowest terms, the denominator exceed the numerator by: ----?
- (a) 13 (b) 14 (c) 29 (d) 87

18. The value of  $(0.\overline{2} + 0.\overline{3} + 0.\overline{4} + 0.\overline{9} + 0.39)$  is ----?
- (a) 0.57 (b)  $1\frac{20}{33}$  (c)  $2\frac{1}{3}$  (d)  $2\frac{13}{33}$
19.  $3.\overline{87} - 2.\overline{59} = ?$
- (a) 1.20 (b)  $1.\overline{2}$  (c)  $1.\overline{27}$  (d)  $1.\overline{28}$
20. The simplification of  $3.\overline{36} - 2.\overline{05} + 1.\overline{33}$  equals
- (a) 2.60 (b) 2.64 (c)  $2.\overline{61}$  (d)  $2.\overline{64}$
21.  $(0.\overline{09} \times 7.\overline{3})$  is equal to ----?
- (a)  $0.\overline{6}$  (b)  $0.\overline{657}$  (c)  $0.\overline{67}$  (d)  $0.\overline{667}$
22.  $(0.34\overline{67} + 0.138\overline{3})$  is equal to ----
- (a)  $0.4\overline{8}$  (b)  $0.4\overline{8}$  (c)  $0.480\overline{1}$  (d)  $0.48$
23.  $\frac{5.3472 \times 324.23}{3.489 \times 5.42}$  is the same as: ----?
- (a)  $\frac{53472 \times 3.2423}{3.489 \times 54.2}$  (b)  $\frac{53472 \times 32423}{34.89 \times 54.2}$
- (c)  $\frac{534.72 \times 324.23}{34.89 \times 5.42}$  (d)  $\frac{53472 \times 3242.3}{34.89 \times 54.2}$
24. If  $1^3 + 2^3 + \dots + 9^3 = 2025$ , then the value of  $(0.11)^3 + (0.22)^3 + \dots + (0.99)^3$  is close to.....
- (a) 0.2695 (b) 0.3695 (c) 2.695 (d) 3.695
25. The value of  $\frac{1}{4} + \frac{1}{4 \times 5} = \frac{1}{4 \times 5 \times 6}$  correct to 4 decimal places is ----?
- (a) 0.3075 (b) 0.3082 (c) 0.3083 (d) 0.3085
26. If  $1.5x = 0.04y$ , then the value of  $\left(\frac{y-x}{y+x}\right)$  ----?
- (a)  $\frac{730}{77}$  (b)  $\frac{73}{77}$  (c)  $\frac{7.3}{77}$  (d) None
27. The value of  $35.7 - \left[3 + \frac{1}{3+\frac{1}{3}}\right] - \left[2 + \frac{1}{2+\frac{1}{2}}\right]$  is ----?
- (a) 30 (b) 34.8 (c) 36.6 (d) 41.4

28. The value of  $\frac{3.6 \times 0.48 \times 2.50}{0.12 \times 0.09 \times 0.5}$  is -----?
- (a) 80 (b) 800 (c) 8000 (d) 80,000
29. The value of  $(68.237)^2 - (31.763)^2$  is -----?
- (a) 3.6474 (b) 36.474 (c) 364.74 (d) 3647.4
30. Evaluate:  $\frac{(2.39)^2 - (1.61)^2}{2.39 - 1.61}$
- (a) 2 (b) 4 (c) 6 (d) 5
31. The value of  $\frac{(67.542)^2 - (32.458)^2}{75.458 - 40.374}$  is -----?
- (a) 1 (b) 10 (c) 100 (d) None of the above
32.  $\frac{(36.54)^2 - (3.46)^2}{?} = 40$
- (a) 3.308 (b) 4 (c) 33.08 (d) 330.8
33.  $\frac{4.2 \times 4.2 - 1.9 \times 1.9}{2.3 \times 6.1} = ?$
- (a) 0.5 (b) 1 (c) 1.9 (d) 4.2
34. Simplify:  $\frac{5.32 \times 56 + 5.32 \times 44}{(7.66)^2 - (2.34)^2}$
- (a) 0.5 (b) 1 (c) 10 (d) 12
35.  $\frac{(0.6)^4 - (0.5)^4}{(0.6)^2 + (0.5)^2}$  is equal to -----?
- (a) 0.1 (b) 0.11 (c) 1.1 (d) 11
36. The value of  $\frac{(2.697 - 0.498)^2 + (2.697 + 0.498)^2}{2.697 \times 2.697 + 0.498 \times 0.498}$  is
- (a) 0.5 (b) 2 (c) 2.199 (d) 3.195
37. The value of  $\frac{(0.137 + 0.098)^2 - (0.137 - 0.098)^2}{0.137 \times 0.098}$  is -----?
- (a) 0.039 (b) 0.235 (c) 0.25 (d) 4

38. The value of  $\frac{[0.051 \times 0.051 \times 0.051 + 0.041 \times 0.041 \times 0.041]}{[0.051 \times 0.051 - 0.051 \times 0.041 + 0.041 \times 0.041]}$  is ----?
- (a) 0.039 (b) 0.0092 (c) 0.092 (d) 0.92
39. The value of  $\frac{[0.953 \times 0.953 - 0.953 \times 0.047 + 0.047 \times 0.047]}{[0.953 \times 0.953 \times 0.953 + 0.047 + 0.047 \times 0.047]}$  is ----?
- (a) 0.32 (b) 0.886 (c) 1.1286 (d) None of the above
40.  $\frac{[10.3 \times 10.3 \times 10.3 + 1]}{[10.3 \times 10.3 - 10.3 + 1]}$  is equal to -----?
- (a) 9.3 (b) 10.3 (c) 11.3 (d) 12.3
41. The value of  $\frac{[8.94 \times 8.94 \times 8.94 - 3.56 \times 3.56 \times 3.56]}{[8.94 \times 8.94 + 8.94 \times 3.56 + 3.56 \times 3.56]}$  is ----?
- (a) 0.538 (b) 5.38 (c) 0.0538 (d) 53.8

KEY:

- 01.c 02.e 03.c 04.a 05.a 06.c 07.d 08.b 09.c 10.c 11.b 12.a  
 13.c 14.c 15.a 16.c 17.d 18.d 19.d 20.d 21.a 22.c 23.d 24.d  
 25.b 26.b 27.a 28.b 29.d, 30.b 31.c 32.c 33.b 34.c 35.b 36.b  
 37.d 38.c 39.d 40.c 41.b

**(3) H.C.F. AND L.C.M.**
**I. FACTORS AND MULTIPLES:**

If a number 'a' divides another number 'b' exactly we say that 'a' is a factor of 'b'. In this case, b is called a multiple of a

**II. Highest common Factor (H.C.F.) or Greatest Common Measure (G.C.M.) or Greatest Common Divisor (G.C.):**

The H.C.F. of two or more than two numbers is the greatest number that divides each of them exactly

There are two methods of finding the H.C.F. of a given set of numbers

**1. FACTORIZATION MEHTODS**

Express each one of the given numbers as the product of prime factors. The product of least powers of common prime factors gives H.C.F.

Eg. Find the H.C.F. of 108, 288 and 360

$$108 = 2^2 \times 3^3$$

$$288 = 2^5 \times 3^2$$

$$360 = 2^3 \times 3^2 \times 5$$

$$\text{H.C.F.} = 2^2 \times 3^2 = 4 \times 9 = 36$$

## 2. Division Methods:

Suppose we have to find the H.C.F. of two given numbers. Divide the larger number by the smaller one. Now, divide the divisor by the remainder. Repeat the process of dividing the preceding number by the remainder last obtained till zero is obtained as remainder.

The last divisor is the required H.C.F.

Eg: Find the H.C.F. of 513, 1134 and 1215

$$\begin{array}{r} 1134 \ ) \ 1215 \ ( \ 1 \\ \underline{1134} \\ 81 \end{array}$$

$$\begin{array}{r} 81 \ ) \ 1134 \ ( \ 14 \\ \underline{1134} \\ 81 \\ \underline{324} \\ 324 \\ \underline{324} \\ 0 \end{array}$$

$\therefore$  H. C. F. of 1134 and 1215 is 81

H. C. F. of 513, 81

$$\begin{array}{r} 81 \ ) \ 513 \ ( \ 6 \\ \underline{486} \\ 27 \end{array}$$

$$\begin{array}{r} 27 \ ) \ 81 \ ( \ 3 \\ \underline{81} \\ 0 \end{array}$$

$\therefore$  H. C. F. = 81

## Problems:

- Find H. C. F. of  $2^3 \times 3^2 \times 5 \times 7^4$ ,  $2^3 \times 3^5 \times 5^2 \times 7^3$ ,  $2^3 \times 5^3 \times 7^2$
- Find the greatest number which will divide 1365 and 1755 leaving no remainder
- A trader has two varieties of sugar 204 kg and 1190 kg by weights. Find the number of minimum bags of equal size in which he can store the sugar without mixing
- A worker was engaged for a certain number of days and was promised to be paid Rs. 1189. He remained absent for some days and was paid Rs. 1073 only. What were his daily wages?
- What is the greatest number that will divide 2930 and 3246 that will leave as remainders 7 in each case
- Find the greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5 respectively

## III. LEAST COMMON MULTIPLE (L.C.M.)

The least number which is exactly divisible by each one of the given number is called their L.C.M.

### 1. FACTORIZATION METHOD OF FINDING L.C.M.

Resolve each one of the given number into a product of prime factors. Then, L.C.M. is the product of highest powers of all the factors.

Eg. Find the L.C.M. of 72, 108 and 2100

$$72 = 2^3 \times 3^2$$

$$108 = 3^3 \times 2^2$$

$$2100 = 2^2 \times 5^2 \times 3 \times 7$$

$$\text{L.C.M.} = 2^3 \times 3^3 \times 5^2 \times 7^1$$

### 2. Common Division Method of Finding L.C.M.

- Find the L.C.M. of 16, 24, 36 and 54      ans. 432, 864
- Find the least number exactly divisible by 12, 15, 20 and 27      Ans. 540
- Find the least number which when divided by 6, 7, 8, 9 and 12 leaves the same remainder 1 in each case      Ans.  $504 + 1 = 505$

## IV. H.C.F AND L.C.M. OF FRACTIONS

$$\text{i. H.C.F.} = \frac{\text{H.C.F. of Numerators}}{\text{L.C.M. of Denominators}}$$

$$\text{ii. H.C.F.} = \frac{\text{L.C.M. of Numerators}}{\text{H.C.F. of Denominators}}$$

Eg. Find the H.C.F. and L.C.M. of  $\frac{3}{7}$ ,  $\frac{8}{9}$ ,  $\frac{16}{81}$  and  $\frac{10}{27}$

2. Find the H.C.F. and L.C.M. of  $\frac{3}{7}$ ,  $\frac{15}{14}$  and  $\frac{18}{28}$

3. Find the L.C.M. / H.C.F. of the fractions  $\frac{108}{375}$ ,  $\frac{17}{25}$ ,  $\frac{54}{55}$

## CLASSWORK

- The H.C.F. of  $2^2 \times 3^3 \times 5^5 \times 7$  and  $2^3 \times 3^2 \times 5^2 \times 7$  and  $2^4 \times 3^4 \times 5 \times 7^2 \times 11$  is
  - $2^2 \times 3^2 \times 5$
  - $2^2 \times 3^2 \times 5 \times 7 \times 11$
  - $2^4 \times 3^4 \times 5^5$
  - $2^4 \times 3^4 \times 5^5 \times 7 \times 11$
- The L.C.M. of  $2^3 \times 3^2 \times 5 \times 11$ ,  $2^4 \times 3^4 \times 5^2 \times 7$  and  $2^5 \times 3^3 \times 5^3 \times 7^2 \times 11$  is ---- ?
  - $2^3 \times 3^2 \times 5$
  - $2^5 \times 3^4 \times 5^3$
  - $2^3 \times 3^2 \times 5 \times 7 \times 11$
  - $2^5 \times 3^4 \times 5^3 \times 7^2 \times 11$

(i) Product of two numbers = Product of their H.C.F. and L.C.M.

(ii) The Ratio of two numbers = H.C.F. of that numbers

03. The ratio of two numbers is 3 : 4 and their H.C.F. is 4. Their L.C.M. is  
(a) 12 (b) 16 (c) 24 (d) 48
04. The H.C.F. of two numbers is 11 and their L.C.M. is 7700. If one of the numbers is 275, then the above is  
(a) 680 (b) 308 (c) 2960 (d) 3700
05. Three different containers contain 496 liters, 403 litres and 713 litres of mixtures of milk and water respectively what biggest measure can measure all the different quantities exactly?  
(a) 1 litre (b) 7 litres (c) 31 litres (d) 41 litres
06. The maximum number of students among them 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and same number of pencils is  
(a) 91 (b) 910 (c) 1001 (d) 1911
07. A rectangular courtyard 3.78 meters long and 5.25 wide is to be paved exactly with square tiles, all the same size. What is the largest size of the tile which could be used for the purpose?  
(a) 14 cms (b) 21 cms (c) 42 cms (d) None
- KEY: 01.a 02.d 03.d 04.b 05.c 06.a 07.b

## ASSIGNMENT

01. The H.C.F. of  $2^4 \times 3^2 \times 5^3 \times 7$ ,  $2^3 \times 3^3 \times 5^2 \times 7^2$  and  $3 \times 5 \times 7 \times 11$  is  
(a) 105 (b) 1155 (c) 2310 (d) 27720
02. H.C.F. of  $4 \times 27 \times 3125$ ,  $8 \times 9 \times 25 \times 7$  and  $16 \times 81 \times 5 \times 11 \times 49$  is -----?  
(a) 180 (b) 360 (c) 540 (d) 1260
03. Find the highest common factor of 36 and 84?  
(a) 4 (b) 6 (c) 12 (d) 18
04. The H.C.F. of 204, 1190 and 1445 is -----?  
(a) 17 (b) 47 (c) 19 (d) 21
05. The H.C.F. of 2923 and 3239 is -----?  
(a) 37 (b) 47 (c) 73 (d) 79
06. Find the lowest common multiple of 24, 36, 40?  
(a) 120 (b) 240 (c) 360 (d) 480
07. The L.M.C. of 22, 54, 108, 135 and 198 is -----?  
(a) 330 (b) 1980 (c) 5940 (d) 11880
08. The L.M.C. of 148 and 185 is -----?  
(a) 680 (b) 740 (c) 2960 (d) 3700

09. The H.C.F. of  $\frac{2}{3}$ ,  $\frac{8}{9}$ ,  $\frac{64}{81}$  and  $\frac{10}{27}$  is -----?  
(a)  $\frac{2}{3}$  (b)  $\frac{2}{81}$  (c)  $\frac{160}{3}$  (d)  $\frac{160}{81}$
10. The H.C.F. of  $\frac{9}{10}$ ,  $\frac{12}{25}$ ,  $\frac{18}{35}$  and  $\frac{21}{40}$  is -----?  
(a)  $\frac{3}{5}$  (b)  $\frac{252}{5}$  (c)  $\frac{3}{2800}$  (d)  $\frac{63}{700}$
11. The L.M.C. of  $\frac{2}{3}$ ,  $\frac{3}{5}$ ,  $\frac{4}{7}$ ,  $\frac{9}{13}$  is -----?  
(a) 36 (b)  $\frac{1}{36}$  (c)  $\frac{1}{1365}$  (d)  $\frac{12}{455}$
12. The L.M.C. of  $\frac{1}{3}$ ,  $\frac{5}{6}$ ,  $\frac{2}{9}$ ,  $\frac{4}{27}$  is -----?  
(a)  $\frac{1}{54}$  (b)  $\frac{10}{27}$  (c)  $\frac{20}{3}$  (d) None
13. The H.C.F. of 1.75, 5.6 and 7 is --- ?  
(a) 0.07 (b) 0.7 (c) 3.5 (d) 0.35
14. The G.C.D. of 1.08, 0.36 and 0.9 is -----?  
(a) 0.03 (b) 0.9 (c) 0.18 (d) 0.108
15. The L.C.M. of 3, 2.7 and 0.09 is  
(a) 2.7 (b) 0.27 (c) 0.027 (d) 27
16. The H.C.F. of two numbers is 11 and their L.C.M. is 693. If one of the numbers is 77, find the other  
(a) 89 (b) 99 (c) 98 (d) 79
17. Two numbers are in the ratio of 15 : 11. If their H.C.F. is 13, Find the numbers  
(a) 195 and 143 (b) 143 and 195 (c) 154 and 159 (d) None
18. Three numbers are in the ratio 1 : 2 : 3 and their H.C.F. is 12. The numbers are  
(a) 4, 8, 12 (b) 5, 10, 15 (c) 10, 20, 30 (d) 12, 24, 86
19. The sum of two numbers is 216 and their H.C.F. is 27. The numbers are  
(a) 27, 189 (b) 81, 189 (c) 108, 108 (d) 154, 162
20. The sum of two numbers is 528 and their H.C.F. is 33. The numbers of pairs of numbers satisfying the above conditions is  
(a) 4 (b) 6 (c) 8 (d) 12

21. The product of two numbers is 4107. If the H.C.F. of these number is 37, Then the greater numbers is  
(a) 101 (b) 107 (c) 111 (d) 185
22. The product of two numbers is 2028 and their H.C.F. is 13. The number of such pairs is  
(a) 1 (b) 2 (c) 3 (d) 4
23. The L.C.M. of two number is 48. The numbers are in the ratio 2 : 3. The sum of the numbers is  
(a) 28 (b) 32 (c) 40 (d) 64
24. Three numbers are in the ratio of 3 : 4 : 5 and their L.C.M. is 2400. Their H.C.F. is  
(a) 40 (b) 80 (c) 120 (d) 200
25. The H.C.F. and L.C.M. of two numbers are 84 and 21 respectively. If the ratio of the two numbers is 1 : 4, then the larger of the two numbers is  
(a) 12 (b) 48 (c) 84 (d) 108
26. The L.C.M. of two numbers of 495 and their H.C.F. is 5. If the sum of the numbers is 100, then their difference is  
(a) 10 (b) 46 (c) 70 (d) 90
27. If the sum of two numbers is 55 and the H.C.F. and L.C.M. of these numbers are 5 and 120 respectively, then the sum of the reciprocals of the numbers is equal to  
(a)  $\frac{55}{601}$  (b)  $\frac{601}{55}$  (c)  $\frac{11}{120}$  (d)  $\frac{120}{11}$
28. The L.C.M. of two numbers is 45 times their H.C.F. If one of the numbers is 125 and the sum of H.C.F. and L.C.M. is 1150, the other number is  
(a) 215 (b) 220 (c) 225 (d) 235
29. The H.C.F. and L.C.M. of two numbers are 50 and 250 respectively. If the first number is divided by 2, the quotient is 50. The second number is  
(a) 50 (b) 100 (c) 125 (d) 250
30. The product of two numbers is 1320 and their H.C.F. is 6. The L.C.M. of the numbers is  
(a) 220 (b) 1314 (c) 1326 (d) 7920
31. The H.C.F. and L.C.M. of two numbers 11 and 385 respectively. If one number lies between 75 and 125, then that number is  
(a) 77 (b) 88 (c) 99 (d) 110
32. The greatest number that exactly divides 105, 1001 and 2436 is  
(a) 3 (b) 7 (c) 11 (d) 121
33. The greatest possible length which can be used to measure exactly the length 7m, 3m 85 cm, 12 m 95cm is  
(a) 15 cm (b) 25 cm (c) 35 cm (d) 42 cm
34. Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case  
(a) 4 (b) 7 (c) 9 (d) 13

35. Let N be the greatest number that will divide, 1305, 4665 and 6905, leaving the same remainder in each case. The sum of the digits in N is: --- ?  
(a) 4 (b) 5 (c) 6 (d) 8
36. The greatest number which can divide 1356, 1868 and 2764 leaving the same remainder 12 in each case, is: --- ?  
(a) 64 (b) 124 (c) 156 (d) 260
37. The greatest number of four digits which is divisible by 15, 25, 40 and 75 is  
(a) 9000 (b) 9400 (c) 9600 (d) 9800
38. The least number of five digits which is exactly divisible by 12, 15, and 18 is: --- ?  
(a) 10010 (b) 10015 (c) 10020 (d) 10080
39. The least number which should be added to 2497 so that the sum is exactly divisible by 5, 6, 4 and 3 is: --- ?  
(a) 3 (b) 13 (c) 23 (d) 33
40. The smallest number which when diminished by 7, is divisible by 12, 16, 18, 21 and 28 is: --- ?  
(a) 1008 (b) 1015 (c) 1022 (d) 1032
41. The least number, which when increased by 5 is divisible by each one of 24, 32, 36, and 54 is: --- ?  
(a) 427 (b) 859 (c) 869 (d) 4320
42. The least number, which when divided by 12, 15, 20 and 54 leaves in each case a remainder of 8 is: --- ?  
(a) 504 (b) 536 (c) 544 (d) 548
43. The greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5 respectively is: --- ?  
(a) 123 (b) 127 (c) 235 (d) 305

## KEY:

- 01.a 02.a 03.c 04.a 05.d 06.c 07.c 08.b 09.a 10.c 11.a 12.c  
13.d 14.c 15.d 16.b 17.a 18.d 19.a 20.a 21.c 22.b 23.c 24.a  
25.c 26.c 27.c 28.c 29.a 30.a 31.a 32.b 33.c 34. 35.a 36.a  
37.c 38.d 39.c 40.b 41.b 42.d 43.b



**(4) SQUARE ROOTS AND CUBE ROOTS****1. FACTORS AND MULTIPLES:**

**Square root:-** If  $x^2 = y$  we say that the square root of  $y$  is  $x$  and we write,  $\sqrt{y} = x$

Eg:  $\sqrt{4} = 2$ ,  $\sqrt{196} = 14$

**Cube root:-** The cube root of a given number is  $x$  is the number whose cube is  $x$ , we denote = the cube root of  $x$  by  $\sqrt[3]{x}$

$\sqrt[3]{8} + \sqrt[3]{2 \times 2 \times 2} = 2$ ,  $\sqrt[3]{343} = \sqrt[3]{7 \times 7 \times 7} = 7$  etc

**Important notes:-**

1.  $\sqrt{xy} = \sqrt{x} \times \sqrt{y}$

2.  $\sqrt{\frac{x}{y}} = \frac{\sqrt{x}}{\sqrt{y}}$   $\sqrt{\frac{y}{x}} = \frac{\sqrt{y}}{\sqrt{x}}$   $\sqrt{\frac{xy}{y}} = \frac{\sqrt{xy}}{y}$

3.  $\sqrt{x^2 \times y^2} = xy$

4.  $\sqrt{a^3 \times b^3} = ab\sqrt{ab}$

5.  $\sqrt{a^4 \times b^4 \times c^4} = a^2 b^2 c^2$

6.  $\sqrt{a^m \times b^n} = a^{\frac{m}{2}} \times b^{\frac{n}{2}}$

**Properties of a perfect square Number:-**

- (a) A number ending with 2,3,7 (or) 8 cannot be a perfect square.  
 (b) The last digit of a perfect square must be 0, 1, 4, 5, 6.  
 (c) A number ending with odd number of zero's cannot be a perfect square Eg. 9000, 25000, 16000 are not perfect squares.  
 (d) A perfect square number is either divisible by 3 or - - - leaves a remainder of 1, when divided by 3  
 64 if divided by 3, will leave a remainder of 1.  
 36 is exactly divisible by 3  
 (e) A perfect square number is either exactly divisible by 4, (or) leaves a remainder of 1 when divided by 4  
 Eg:- 81  $\rightarrow$  remainder 1.  
 100  $\rightarrow$  4 remainder

**For finding square root two methods:-**

1. By Factored method,
2. By division method,

**CLASSWORK**

01. If  $0.13 \div P^2 = 13$ , then  $P$  equals: - - - ?  
 (a) 0.01 (b) 0.1 (c) 10 (d) 100
02. If  $\sqrt{18 \times 14 \times X} = 84$ , then  $x$  equals: - - - ?  
 (a) 22 (b) 24 (c) 28 (d) 32
03. A man plants 15376 apple trees in his garden and arranges them so that there are as many rows as there are apples trees in each row. The number of rows is: - - - ?  
 (a) 124 (b) 126 (c) 134 (d) 144
04. A General wishes to draw up his 36581 soldiers in the form of a solid square. After arranging them, he found that some of them are left over. How many are left/  
 (a) 65 (b) 81 (c) 100 (d) None of these

KEY: 01.b 02.c 03.a 04.c

**ASSIGNMENT**

01. Find the value of  $\sqrt{6084}$ ,  $\sqrt{2744} =$  Ans: 78, 14
02. Find the value of  $\sqrt{1471369} =$  Ans: 1213
03. Find the value of  $\sqrt{175.2976} =$  Ans: 13.24
04. Evaluate:  $\sqrt{248 + \sqrt{51 + \sqrt{169}}} =$  Ans: 16
05. Find the value of  $\sqrt{1\frac{9}{16}} =$  Ans:  $1\frac{1}{4}$
06. What is the square root 0.0009? = Ans: 0.03
07. Find the value of  $\sqrt{0.00121} =$  Ans: 170/11
08. If  $\sqrt{1 + \frac{x}{144}} = \frac{13}{12} =$  Ans: 25
09. What will come in place of question mark in each of the following questions.  
 (i)  $\sqrt{\frac{32.4}{?}} = 2 =$  Ans: 8.1 (ii)  $\sqrt{86.49} + \sqrt{5 + (?)^2} = 12.3 =$  Ans: 2
10. Evaluate:  $\sqrt{0.0017 \times 1.9 \times 0.021} =$  Ans: 150

11. If  $a * b * c = \frac{\sqrt{(a+2)(b+3)}}{c+1}$ , then find the value of  $6 * 15 * 3$ .
12. Evaluate  $\sqrt{0.9}$  up to 3 places of decimals
13. find the values of  $\sqrt{3}$  upto three places of decimal.
14. Find the smallest number that must be added to 1780 to make it a perfect square. (Ans: 69)
15. The smallest number added to 680621 to make the sum a perfect square is --- ?  
(a) 4 (b) 5 (c) 6 (d) 8
16. What is the smallest number to be subtracted from 549162 in order to make it a perfect square  
(a) 28 (b) 36 (c) 63 (d) 81
17. What is the least number which should be subtracted from 0.000326 to make it a perfect square?  
(a) 0.000002 (b) 0.000004 (c) 0.02 (d) 0.04
18. The least number by which 294 must be multiplied to make it a perfect square, is ---?  
(a) 2 (b) 3 (c) 6 (d) 24
19. Find the smallest number by which 5808 should be multiplied so that the product becomes a perfect square.  
(a) 2 (b) 3 (c) 7 (d) 11
20. The least number by which 1470 must be divided to get a number which is a perfect square is  
(a) 5 (b) 6 (c) 15 (d) 30
21. The greatest four-digit perfect square number is --- ?  
(a) 19000 (b) 9801 (c) 9900 (d) 19981
22. The least number of 4 digits which is perfect square is --- ?  
(a) 1000 (b) 1016 (c) 1024 (d) 1036

Key:

15.a 16.d 17.a 18.c 19.b 20.d 21.b 22.c

**EXERCISE. I**

01.  $\sqrt{53824} = ?$   
(a) 202 (b) 232 (c) 242 (d) 332
02. The square root of 64009 is --- ?  
(a) 253 (b) 347 (c) 363 (d) 303

03. The value of  $\sqrt{10 + \sqrt{25 + \sqrt{108 + \sqrt{154 + \sqrt{225}}}}$  is: --- ?  
(a) 4 (b) 6 (c) 8 (d) 10
04. Evaluate:  $\sqrt{41 - \sqrt{21 + \sqrt{19 - \sqrt{9}}}}$   
(a) 3 (b) 5 (c) 6 (d) 6.4
05.  $\sqrt{176 + \sqrt{2401}}$  is equal to: --- ?  
(a) 14 (b) 15 (c) 18 (d) 24
06.  $\left[ \frac{\sqrt{625}}{11} \times \frac{14}{\sqrt{25}} \times \frac{11}{\sqrt{196}} \right]$  is equal to: --- ?  
(a) 5 (b) 6 (c) 8 (d) 11
07.  $\left[ \sqrt{\frac{225}{729}} - \sqrt{\frac{25}{144}} \right] + \sqrt{\frac{16}{81}} = ?$   
(a)  $\frac{1}{48}$  (b)  $\frac{5}{48}$  (c)  $\frac{5}{16}$  (d) None of these
08. The square root of  $(272^2 - 128^2)$  is: --- ?  
(a) 144 (b) 200 (c) 240 (d) 256
09.  $\sqrt{110\frac{1}{4}} = ?$   
(a) 10.25 (b) 10.5 (c) 11.5 (d) 19.5
10.  $\sqrt{\frac{25}{81} - \frac{1}{9}} = ?$   
(a)  $\frac{2}{3}$  (b)  $\frac{4}{9}$  (c)  $\frac{16}{81}$  (d)  $\frac{25}{81}$
11. The value of  $\sqrt{0.000441}$  is: --- ?  
(a) 0.00069 (b) 0.0021 (c) 0.021 (d) 0.21
12.  $\sqrt{0.00004761}$  equals: --- ?  
(a) 0.00069 (b) 0.0069 (c) 0.0609 (d) 0.069
13.  $(1.5)^2 \times \sqrt{0.0225} = ?$   
(a) 0.0375 (b) 0.3375 (c) 3.275 (d) 32.75

14.  $\sqrt{0.01} + \sqrt{0.0064} = ?$   
 (a) 0.03 (b) 0.3 (c) 0.42 (d) None of these
15. The value of  $\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009}$  is: ---?  
 (a) 2.03 (b) 2.1 (c) 2.11 (d) 2.13
16.  $\sqrt{0.0025} \times \sqrt{2.25} \times \sqrt{0.0001} = ?$   
 (a) 0.000075 (b) 0.0075 (c) 0.075 (d) None of these
17.  $\sqrt{1.5625} = ?$   
 (a) 1.05 (b) 1.25 (c) 1.45 (d) 1.55
18. If  $\sqrt{18225} = 135$ , then the value of  
 $\sqrt{182.25} + \sqrt{1.8225} + \sqrt{0.018225} + \sqrt{0.00018225}$  is: ---?  
 (a) 1.49985 (b) 14.9985 (c) 149.985 (d) 1499.85
19. If  $\frac{52}{x} = \sqrt{\frac{169}{289}}$ , the value of x is: ---?  
 (a) 52 (b) 58 (c) 62 (d) 68
20.  $\sqrt{\frac{?}{169}} = \frac{54}{39}$   
 (a) 108 (b) 324 (c) 2916 (d) 4800
21. If  $\sqrt{x} \div \sqrt{441} = 0.02$ , then the value of x is: ---?  
 (a) 0.1764 (b) 1.764 (c) 1.64 (d) 2.64
22.  $\sqrt{\frac{0.0196}{?}} = 0.2$   
 (a) 0.49 (b) 0.7 (c) 4.9 (d) None of these
23.  $\sqrt{\frac{0.136}{0.00169}} = ?$   
 (a)  $\frac{1.9}{13}$  (b)  $\frac{19}{13}$  (c)  $\frac{1.9}{130}$  (d)  $\frac{190}{13}$
24. If  $\sqrt{1 + \frac{55}{729}} = 1 + \frac{x}{27}$  then the value of x is: ---?  
 (a) 1 (b) 3 (c) 5 (d) 7

25. The value of  $\frac{\sqrt{80} - \sqrt{112}}{\sqrt{45} - \sqrt{63}}$  is ---?  
 (a)  $\frac{3}{4}$  (b)  $1\frac{1}{3}$  (c)  $1\frac{7}{9}$  (d)  $1\frac{3}{4}$
26. Given  $\sqrt{2} = 1.414$ . The value of  $\sqrt{8} + 2\sqrt{32} - 3\sqrt{128} + 41$   
 (a) 8.426 (b) 8.484 (c) 8.526 (d) 18.876
27.  $\sqrt{\frac{0.081 \times 0.484}{0.0064 \times 6.25}}$  is equal to ---?  
 (a) 0.9 (b) 0.99 (c) 9 (d) 99
28.  $\sqrt{\frac{0.204 \times 42}{0.07 \times 3.4}}$  is equal to: ---?  
 (a)  $\frac{1}{6}$  (b) 0.06 (c) 0.6 (d) 6
29.  $\sqrt{\frac{0.081 \times 0.324 \times 4.624}{1.5625 \times 0.0289 \times 72.9 \times 64}}$  is equal to: ---?  
 (a) 0.024 (b) 0.24 (c) 2.4 (d) 24
30.  $\sqrt{\frac{9.5 \times 0.085}{0.0017 \times 1.9}}$  equals: ---?  
 (a) 0.05 (b) 5 (c) 50 (d) 500
31. The value of  $\sqrt{\frac{(0.03)^2 + (0.21)^2 + (0.065)^2}{(0.003)^2 + (0.021)^2 + (0.0065)^2}}$  is ---?  
 (a) 0.1 (b) 10 (c)  $10^2$  (d)  $10^3$
32. The square root of  $(7 + 3\sqrt{5})(7 - 3\sqrt{5})$  is ---?  
 (a)  $\sqrt{5}$  (b) 2 (c) 4 (d)  $3\sqrt{5}$
33.  $\left[\sqrt{3} - \frac{1}{\sqrt{3}}\right]^2$  simplifies to: ---?  
 (a)  $\frac{3}{4}$  (b)  $\frac{4}{\sqrt{3}}$  (c)  $\frac{4}{3}$  (d) None of these
34. The square root of 0.4 is: ---?  
 (a)  $0.\bar{6}$  (b)  $0.\bar{7}$  (c)  $0.\bar{8}$  (d)  $0.\bar{9}$
35.  $\frac{1}{(\sqrt{9} - \sqrt{8})} - \frac{1}{(\sqrt{8} - \sqrt{7})} + \frac{1}{(\sqrt{7} - \sqrt{6})} - \frac{1}{(\sqrt{6} - \sqrt{5})} + \frac{1}{(\sqrt{5} - \sqrt{4})}$  is equal to: ---?  
 (a) 0 (b)  $\frac{1}{3}$  (c) 1 (d) 5

36. If  $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a+b\sqrt{3}$ , Then :---?

- (a)  $a = -11, b = -6$  (b)  $a = -11, b = 6$  (c)  $a = 11, b = -6$  (d)  $a = 6, b = 11$

37. If  $x = (7-4\sqrt{3})$ , then the value of  $\left[x + \frac{1}{x}\right]$  is:---?

- (a)  $3\sqrt{3}$  (b)  $8\sqrt{3}$  (c) 14 (d)  $14 + 8\sqrt{3}$

KEY:

01.b 02.a 03.a 04.c 05.b 06.a 07.c 08.c 09.b 10.b 11.c 12.b

13.b 14.b 15.b 16.c 17.b 18.b 19.d 20.b 21.a 22.a 23.d 24.a

25.b 26.b 27.b 28.d 29.a 30.c 31.b 32.b 33.c 34.a 35.d 36.c

37.c

### EXERCISE II

01. The cube root of 0.000216 is --?

- (a) 0.6 (b) 0.06 (c) 0.006 (d) None of these

02.  $\sqrt[3]{4\frac{12}{125}} = ?$

- (a)  $1\frac{2}{5}$  (b)  $1\frac{3}{5}$  (c)  $1\frac{4}{5}$  (d)  $2\frac{2}{5}$

03.  $\sqrt[3]{\sqrt{0.000064}} = ?$

- (a) 0.02 (b) 0.2 (c) 2 (d) None of these

04. By what least number 675 be multiplied to obtain a number which is a perfect cube?

- (a) 5 (b) 6 (c) 7 (d) 8

05. What is the smallest number by which 3600 be divided to make it a perfect cube?

- (a) 9 (b) 50 (c) 300 (d) 450

06. A General wishes to draw up his 36581 soldiers in the form of a solid square. After arranging them, he found that some of them are left over. How many are left?

- (a) 65 (b) 81 (c) 100 (d) None of these

07. A group of students decided to collect as many paise from each member of the group as is the number of members. If the total collection amount to Rs. 59.29, the number of members in the group is ---?

- (a) 57 (b) 67 (c) 77 (d) 87

KEY: 01.b 02.b 03.b 04.a 05.d 06.c 07.c

## (5) SIMPLIFICATION

### 1. FACTORS AND MULTIPLES:

**BBODMAS Rule:-** This rule depicts the correct sequence in which the operations are to be executed, so as to find out the value of given expression.

B  $\Rightarrow$  Bar

B  $\Rightarrow$  { }

O  $\Rightarrow$  of

D  $\Rightarrow$  %

M  $\Rightarrow$  X

A  $\Rightarrow$  +

S  $\Rightarrow$  -

### CLASSWORK

01. Simplify:  $18 - \left[15 - \left\{6 + 2(7 - 8 - 5)\right\}\right]$   
 (a) 13 (b) 15 (c) 27 (d) 32

02. What is the value of  $\frac{(P+Q)}{(P-Q)}$  if  $\frac{P}{Q} = 7$ ?

- (a)  $\frac{1}{3}$  (b)  $\frac{2}{3}$  (c)  $\frac{4}{3}$  (d)  $\frac{7}{8}$

03. Income of a company double after every one year. If the initial income was Rs. 4 lakhs, what would be the income after 5 years?

- (a) Rs. 1.24 crores (b) Rs. 1.28 crores (c) Rs. 2.56 crores (d) None of these

04. The number of students in each section of a school is 24. After admitting new students, three new sections were started. Now, the total number of sections is 16 and there are 21 students in each section, the number of new students admitted is ---?

- (a) 14 (b) 24 (c) 48 (d) 114

05. A man earns Rs. 20 on the first day and spends Rs. 1, on the next day. He again earns Rs. 20 on the third day and spends Rs. 15 on the fourth day. If he continues to save like this, how soon will he have Rs. 60 in hand?

- (a) on 17<sup>th</sup> day (b) on 27<sup>th</sup> day (c) on 30<sup>th</sup> day (d) on 40<sup>th</sup> day

06. Along a yard 225 meters long, 26 trees are planted at equal distances, one tree being at each end of the yard. What is the distance between two consecutive trees?

- (a) 8 meters (b) 9 meters (c) 10 meters (d) 15 meters

07. A boy was asked to multiply a number by 25. instead multiplied the number by 52 and got the answer 324 more than the correct answer. The number to be multiplied was ---?

- (a) 12 (b) 15 (c) 25 (d) 32

08. The total monthly salary of 4 men and 2 women is Rs. 46,000. If a woman earns Rs. 500 more than a man, what is the monthly salary of a woman?  
 (a) Rs. 6500 (b) Rs. 7500 (c) Rs. 8000 (d) Rs. 9000

KEY: 01.c 02.c 03.b 04.b 05.a 06.b 07.a 08.c

### ASSIGNMENT

01. is equal to  $5 - \left[ \frac{3}{4} + \left\{ 2 \frac{1}{2} \left( 0.5 + \frac{1}{6} - \frac{1}{7} \right) \right\} \right]$   
 (a)  $1\frac{19}{84}$  (b)  $2\frac{61}{84}$  (c)  $2\frac{23}{84}$  (d)  $\frac{47}{84}$
02.  $\frac{3}{5}$  of  $\frac{4}{7}$  of  $\frac{5}{9}$  of  $\frac{21}{24}$  of 504 = ?  
 (a) 63 (b) 69 (c) 96 (d) 109 (e) None
03.  $\frac{3}{8}$  of  $168 \times 15 \div 5 + ? = 549 \div 9 + 235$   
 (a) 107 (b) 174 (c) 189 (d) 296 (e) None of these
04. The value of  $\left( \frac{5}{7} \text{ of } 1\frac{6}{13} \right) + \left( 2\frac{5}{7} \div 3\frac{1}{4} \right)$  is ---- ?  
 (a)  $\frac{20}{169}$  (b) 1 (c)  $\frac{5}{4}$  (d)  $1\frac{119}{180}$
05.  $\frac{3}{4} \div 2\frac{1}{4}$  of  $\frac{2}{3} - \frac{1}{2} - \frac{1}{3} \times 3\frac{1}{3} + \frac{5}{6} = ?$   
 (a)  $\frac{7}{18}$  (b)  $\frac{49}{54}$  (c)  $\frac{2}{3}$  (d)  $\frac{1}{6}$
06. Simplify  $\frac{\frac{1}{3} + \frac{3}{4} \left( \frac{2}{5} - \frac{1}{3} \right)}{1\frac{2}{3} \text{ of } \frac{3}{4} - \frac{1}{4} \text{ of } \frac{4}{5}}$   
 (a)  $\frac{1}{63}$  (b)  $\frac{23}{40}$  (c)  $\frac{23}{45}$  (d)  $\frac{23}{63}$
07. The simplified value of  $\frac{\frac{1}{3} \div \frac{3}{3} \times \frac{1}{3}}{\frac{1}{3} \div \frac{1}{3} \text{ of } \frac{1}{3}} - \frac{1}{9}$  is ---- ?  
 (a) 0 (b)  $\frac{1}{9}$  (c)  $\frac{1}{3}$  (d) 1

08.  $3\frac{1}{4} - \frac{4}{5}$  of  $\frac{5}{6}$  is equal to ---- ?  
 (a)  $\frac{1}{6}$  (b)  $2\frac{7}{12}$  (c)  $15\frac{1}{2}$  (d)  $21\frac{1}{2}$
09.  $\frac{7\frac{1}{2} - 5\frac{3}{4} + \frac{1}{2} + 1\frac{1}{4}}{3\frac{1}{3} + ?} \div \frac{1\frac{1}{5} + 3\frac{1}{2}}{2} = 0.6$   
 (a)  $4\frac{1}{3}$  (b)  $4\frac{1}{2}$  (c)  $4\frac{2}{3}$  (d) None of the above
10. If  $\frac{x}{y} = \frac{4}{5}$ , then the value of  $\left[ \frac{4}{7} + \frac{2y-x}{2y+x} \right]$  is : ---- ?  
 (a)  $\frac{3}{7}$  (b) 1 (c)  $1\frac{1}{7}$  (d) 2
11. If  $\frac{x}{2y} = \frac{6}{7}$ , the value of  $\frac{x-y}{x+y} + \frac{14}{19}$  is ---- ?  
 (a)  $\frac{13}{19}$  (b)  $\frac{15}{19}$  (c) 1 (d)  $1\frac{1}{19}$
12. The value of  $\frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2}}}}$  is : ----  
 (a)  $\frac{3}{8}$  (b)  $\frac{19}{8}$  (c)  $\frac{8}{3}$  (d)  $\frac{8}{19}$
13. If, then the value of "x"  $2 = x + \frac{1}{1 + \frac{1}{3 + \frac{1}{4}}}$  is ----  
 (a)  $\frac{12}{17}$  (b)  $\frac{13}{17}$  (c)  $\frac{18}{17}$  (d)  $\frac{21}{17}$

14. If then the value of  $x = \frac{2 + \frac{1}{3\frac{4}{5}}}{2 + \frac{1}{3 + \frac{1}{1 + \frac{1}{4}}}} = x$ , is: ---- ?
- (a)  $\frac{1}{7}$  (b)  $\frac{3}{7}$  (c) 1 (d)  $\frac{8}{7}$
15. is equal to  $8 - 8x = \frac{2\frac{1}{5} - 1\frac{2}{7}}{2 - \frac{1}{6 - \frac{1}{6}}}$  : ---- ?
- (a) 2 (b) 4 (c) 6 (d) 8
16. is simplified to:  $\frac{2}{2 + \frac{2}{2} \times 0.39}$  ---- ?
- (a)  $\frac{1}{3}$  (b) 2 (c) 6 (d) None of these
17. If  $4x + 5y = 83$  and  $\frac{3x}{2y} = \frac{21}{22}$ , then  $y - x = ?$
- (a) 3 (b) 4 (c) 7 (d) 11
18.  $\left[ 999\frac{1}{7} + 999\frac{2}{7} + 999\frac{3}{7} + 999\frac{4}{7} + 999\frac{5}{7} + 999\frac{6}{7} \right]$  is simplified to: ---- ?
- (a) 2997 (b) 5979 (c) 5994 (d) 5997
19. The value of  $1 + \frac{1}{4 \times 3} + \frac{1}{4 \times 3^2} + \frac{1}{4 \times 3^3}$  is ---- ?
- (a)  $\frac{121}{108}$  (b)  $\frac{3}{2}$  (c)  $\frac{31}{2}$  (d) None of these
20.  $1.2.3 + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \frac{1}{4.5.6}$  is equal to
- (a)  $\frac{7}{30}$  (b)  $\frac{11}{30}$  (c)  $\frac{13}{30}$  (d)  $\frac{17}{30}$
21. How many pieces of 85cm. length can be cut from a rod 42.5 meters long?
- (a) 30. (b) 40 (c) 60 (d) None of these

22. On sports day, if 30 children were made to stand in a column, then 16 columns could be formed. If 24 children were made to stand in a column, then how many columns could be formed?
- (a) 20 (b) 22 (c) 29 (d) 45
23. A class starts at 10 a.m and lasts till 1.27 pm. Four periods are held during this interval. After every period, 5 minutes are given free to the students, the exact duration of each period is ---- ?
- (a) 42 minutes (b) 48 minutes (c) 51 minutes (d) 53 minutes
24. A light was seen at intervals of 13 seconds. It was seen for the first time at 1 hr. 54 min 50 seconds a.m and the last time at 17 c. a.m. How many times was the light seen?
- (a) 360 (b) 375 (c) 378 (d) 384
25. A boy multiplied 423 by a number and obtained 65589 as his answer. If both the figures in the answer are wrong and all other figures are correct, the correct answer is: ---- ?
- (a) 60489 (b) 61189 (c) 62189 (d) 62389
26. David got two and a half times as many marks in English as in History. If his total marks in the two subjects are 140, the marks obtained by him in English are: ---- ?
- (a) 40 (b) 75 (c) 90 (d) 100
27.  $\frac{(856 + 167)^2 + (856 - 167)^2}{856 \times 856 + 167 \times 167} = ?$
- (a) 1 (b) 2 (c) 689 (d) 1023
28.  $\frac{(469 + 179)^2 - (469 - 174)^2}{469 \times 174} = ?$
- (a) 2 (b) 40 (c) 4 (d) 295
29. If  $a - b = 3$  and  $a^2 + b^2 = 29$ , find the value of  $ab$ ?
- (a) 10 (b) 12 (c) 15 (d) 18
30. If  $\frac{x^2 - 1}{x + 1} = 4$ ,  $x = ?$
- (a) 0 (b) 1 (c) 5 (d) cannot be determined (e) None of these
31.  $\frac{\left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^2}{\frac{3}{2} - \frac{1}{2}} + \frac{\left(\frac{4}{3}\right)^2 - \left(\frac{1}{3}\right)^2}{\frac{4}{3} - \frac{1}{3}} = ?$
- (a)  $\frac{37}{97}$  (b)  $\frac{74}{97}$  (c)  $1\frac{23}{74}$  (d) None of these

32. The simplified value of  $\frac{\left[1 + \frac{1}{100}\right] \left[1 + \frac{1}{100}\right] - \left[1 - \frac{1}{100}\right] \left[1 - \frac{1}{100}\right]}{\left[1 + \frac{1}{100}\right] + \left[1 - \frac{1}{100}\right]}$

(a) 100      (b)  $\frac{200}{101}$       (c) 200      (d)  $\frac{202}{100}$

33. If  $a + b + c = 13$ ,  $a^2 + b^2 + c^2 = 69$ , then find  $ab + bc + ca$  --- ?

(a) -50      (b) 50      (c) 69      (d) 75

34.  $\frac{785 \times 785 \times 785 + 435 \times 435 \times 435}{785 \times 785 + 435 \times 435 - 785 \times 435}$  simplifies to

(a) 350      (b) 785      (c) 1220      (d) 1320

35.  $\frac{147 \times 147 + 147 \times 143 + 143 \times 143}{147 \times 147 \times 147 - 143 \times 143 \times 143} = ?$

(a)  $\frac{1}{4}$       (b) 290      (c)  $\frac{1}{290}$       (d) 4

36.  $\frac{(13)^3 + (7)^3}{(13)^2 + (7)^2} = 20$

(a) 6      (b) 20      (c) 91      (d) None of these

37. The value of  $\frac{\left(\frac{3}{5}\right)^3 - \left(\frac{2}{3}\right)^3}{\left(\frac{3}{5}\right)^2 - \left(\frac{2}{5}\right)^2}$  is

(a)  $\frac{1}{5}$       (b)  $\frac{19}{25}$       (c)  $\frac{21}{25}$       (d) 1

KEY:

- 01.c 02.c 03.a 04.c 05. 06.d 07.a 08.c 09.a 10.b 11.c 12.d  
 13.d 14.c 15.b 16.d 17.b 18.d 19.a 20.a 21.d 22.a 23.b 24.d  
 25.a 26.d 27.b 28.c 29.a 30.c 31.b 32.b 33.b 34.c 35.a 36.c  
 37.b

**(6) RATIO AND PROPORTION****RATIO:**

The ratio of two quantities a and b in the same units, is the fraction  $\frac{a}{b}$  and we write it as a:b

In the ratio a:b, we call 'a' as the first term (or) antecedent and 'b', the second term (or) consequent.

**RULE:** The multiplication (or) division of each term of a ratio by the same non-zero number does not affect the ratio.

**PROPORTION:**

The equality of two ratios is called proportion. If  $a:b = c:d$ , we write  $a:b::c:d$  and we say that a,b,c,d are in proportion. Here a and d are called "extremes", while b and c are called mean terms.

product of means = product of extremes

(i.e):  $a:b::c:d = b \times c = a \times d$

**(i) Fourth proportional:**

If  $a:b = c:d$ , then 'd' is called the fourth proportional to a,b,c.

**(ii) Third proportional:**

If  $a:b = b:c$ , then 'c' is called the third proportional to a and b

**(iii) Mean proportional:**

Mean proportional between a and b is  $\sqrt{a \times b}$

**COMPOUNDED RATIO:**

The compounded ratio of the ratios (a:b),(c:d),(e:f) is (ace: bdf)

(i) Duplicate ratio of (a:b) is  $\Rightarrow a^2 : b^2$

(ii) Sub-duplicate ratio of (a:b) is  $\Rightarrow \sqrt{a} : \sqrt{b}$

(iii) Triplicate ratio of (a:b) is  $\Rightarrow a^3 : b^3$

(iv) Sub-triplicate ratio of (a:b) is  $\Rightarrow a^{1/3} : b^{1/3}$

**Componendo and dividendo rule:**

If  $\frac{a}{b} = \frac{c}{d}$ , then  $\frac{a+b}{a-b} = \frac{c+d}{c-d}$

## CLASSWORK

01. If the ratio of A to B is 9 times the ratio of B to A, then A:B is \_\_\_\_\_
02. A and B together have Rs.1200/- with them. If  $\frac{4}{15}$  of A's amount is equal to  $\frac{2}{5}$  of B's amount, how much does 'B' have \_\_\_\_\_
03. Five bananas and four apples cost as much as three bananas and seven apples. The ratio of the cost of one banana to that of one apple is \_\_\_\_\_
04. The average age of three boys is 25 years and their ages are in the proportion 3:5:7. The age of the youngest boy is \_\_\_\_\_
05. An amount of money is to be distributed to P:Q:R in the ratio 3:5:7. If Q's share is Rs.1500/-, what is the difference between P's and R's share is \_\_\_\_\_
06. A sum of money is to be divided among P, Q and R in the ratio of 2:3:5. If the total share of P and R together is Rs. 4000/- more than that of Q, what is R's share is in it \_\_\_\_\_
07. The prices of scooter and T.V are in the ratio of 5:4. If scooter cost Rs. 4000 more than T.V. The price of T.V set is \_\_\_\_\_
08. Two numbers are in the ratio of 1:3 and the sum of their squares is 360. The small number is \_\_\_\_\_
09. The two numbers are in the ratio of 4:7 and their product is 252. The big number is \_\_\_\_\_?
10. At present the sum of ages are Rahim and Karim is 63 years, the ratio of their ages after 7 years will be 7:4. What is present age of Rahim?
11. An amount of Rs. 2,430/- is divided among A,B,C such that if their shares being reduced by Rs.5/-, 10/- and Rs. 15/- respectively, the remainders shall be in the ratio 3:4:5. The share of B is \_\_\_\_\_
12. An amount of Rs. 735/- was divided between A, B & C. If each of them had received by 25/- less, the shares would have been in the ratio of 1:3:2. The money received by c was \_\_\_\_\_
13. Rs.1,555/- are distributed to three men A,B and C in such a way, if 15/-, 20/- and 10/- be added to their shares respectively then ratio becomes 2:5:9. Find the share of c?
14. Rs. 1870/- is divided in to three parts,  $\frac{1}{2}$  of the first part  $\frac{1}{3}$  of second part  $\frac{1}{6}$  of third part are equal, what is second part?
15. Rs. 2160/- are divided among A,B,C such that 50% of A's amount,  $33\frac{1}{2}\%$  of B's amount and 25% of c's amount are equal. What is c's amount
16. Rs. 1540/- was divided among A, B and C, such that B's amount is equal to  $\frac{3}{11}$  of A and C together receive, then B's amount?

17. In a college, the ratio of the number of boys to girls is 8:5. If there are 160 girls, the total number of students in the college is \_\_\_\_\_
18. A sum of money is divided among three persons A, B and C in such a way that 5 times A's share, 3 times B's share and 2 times C's share are equal. The ratio between A, B and C share is \_\_\_\_\_
19. A and B are two alloys of Gold and Copper prepared by mixing metals in the ratio 7:2 and 7:11 respectively. If equal quantities of the alloys are melted to form a third alloy C, the ratio of Gold and copper in 'C' will be \_\_\_\_\_
20. In a mixture of 60 lit of milk and water in the ratio of 2:1, what amount of water must be added to make the ratio 1:2?
21. 729 lit of mixture milk and water ratio 7:2, How much water is to be added to make the ratio 7:3 is \_\_\_\_\_
22. A mixture contains milk and water in the ratio 2:1 on adding 15 lit of water, the ratio of milk to water becomes 1:2. The quantity of milk in the original mixture is \_\_\_\_\_
23. A mixture contain milk and water in the ratio 5:1 adding 5 liter water, the ratio of milk and water becomes 5:2. The quantity of milk in the original mixture is \_\_\_\_\_
24. The incomes of A and B are in the ratio of 5:6, expenses are in ratio 6:7, savings ratio 4:5, if the sum of their expenses 3,900/-. Find the income of each? (3000, 3,600)
25. Rs.180/- contain in a bag consists of 1/-, 0.5 paise & 0.25 paise coins ratio is 2:3: 4. What is number of 0.5 paise coins.  
Ans: (120 /-)
26. A Box contain Rs.56/- in the form of 1 Rs. 0.50 paise 0.25 paise coins. The number of 0.50 paise coins is double the number of 0.25 paise coins and 4 times of 1.00 Rs. How many 0.50 paise coins are there?(64)

## ASSIGNMENT

01. If A:B = 5:7 and B:C = 6:11, then A:B:C is \_\_\_\_\_  
(a) 55:77:66 (b) 30:42:77 (c) ~~35:49:42~~ (d) None of these
02. If A:B = 3:4 and B:C = 8:9, then A:C is \_\_\_\_\_  
(a) 1:3 (b) 3:2 (c) 2:3 (d) 1:2
03. If A:B:C = 2:3:4, then  $\frac{A}{B} : \frac{B}{C} : \frac{C}{A}$  is equal to \_\_\_\_\_  
(a) 4:9:16 (b) 8:9:12 (c) 8:9:16 (d) 8:9:24
04. If  $2A = 3B = 4C$ , then A:B:C is \_\_\_\_\_  
(a) 2:3:4 (b) 4:3:2 (c) 6:4:3 (d) 20:15:2



05. If  $2A = 3B$  and  $4B = 5C$ , then A:C is \_\_\_\_\_  
 (a) 4:3 (b) 8:15 (c) 15:8 (d) 3:4
06. If  $\frac{A}{3} = \frac{B}{4} = \frac{C}{5}$ , then A:B:C is \_\_\_\_\_  
 (a) 4:3:5 (b) 5:4:3 (c) 3:4:5 (d) 20:15:2
07. If A:B = 8:15, B:C = 5:8 and C:D = 4:5, then A:D is equal to: \_\_\_\_\_  
 (a) 2:7 (b) 4:15 (c) 8:15 (d) 15:4
08. If A:B =  $\frac{1}{2} : \frac{3}{8}$ , B:C =  $\frac{1}{3} : \frac{5}{9}$  and C:D =  $\frac{5}{6} : \frac{3}{4}$ , then the ratio A:B:C:D is: \_\_\_\_\_  
 (a) 16:22:30:35 (b) 16:24:15:35 (c) 16:24:30:35 (d) 18:24:30:35
09. If  $0.75:x::5:8$ , then x is equal to: \_\_\_\_\_  
 (a) 1.12 (b) 1.20 (c) 1.25 (d) 1.30
10. If  $\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{1}{1.25}$ , then the value of x is: \_\_\_\_\_  
 (a) 1.5 (b) 2 (c) 2.5 (d) 3.5
11. The ratio of  $4^{3.5} : 2^5$  is same as: \_\_\_\_\_  
 (a) 2:1 (b) 4:1 (c) 7:5 (d) 7:10
12. If  $x:y = 5:2$ , then  $(8x + 9y):(8x + 2y)$  is: \_\_\_\_\_  
 (a) 22:29 (b) 26.61 (c) 29:22 (d) 61:26
13. If 15% of x = 20% of y, then x:y is \_\_\_\_\_  
 (a) 3:4 (b) 4:3 (c) 17:16 (d) 16:17
14. If  $(x:y) = 2:1$ , then  $(x^2 - y^2) : (x^2 + y^2)$  is: \_\_\_\_\_  
 (a) 3:5 (b) 5:3 (c) 1:3 (d) 3:1
15. If  $\frac{x}{5} = \frac{y}{8}$ , then  $(x + 5) : (y + 8)$  is equal to: \_\_\_\_\_  
 (a) 3:5 (b) 13:8 (c) 8:5 (d) 5:8
16. If  $\frac{a}{3} = \frac{b}{4} = \frac{c}{7}$ , then  $\frac{a+b+c}{c}$  is equal to: \_\_\_\_\_  
 (a) 7 (b) 2 (c)  $\frac{1}{2}$  (d)  $\frac{1}{7}$
17. If  $(a + b) : (b + c) : (c + a) = 6 : 7 : 8$  and  $(a + b + c) = 14$ , then the value of 'c' is \_\_\_\_\_  
 (a) 6 (b) 7 (c) 8 (d) 14

18. The salaries of A,B,C are in the ratio 2:3:5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries?  
 (a) 3:3:10 (b) 10:11:20 (c) 23:33:60 (d) None of these
19. Rs.1210 were divided among A,B,C so that A:B = 5:4 and B:C = 9:10. Then C gets: \_\_\_\_\_  
 (a) Rs.340 (b) Rs.400 (c) Rs. 450 (d) Rs. 475
20. If Rs. 510 be divided among A,B,C in such a way that A gets  $\frac{2}{3}$  of what B gets and B gets  $\frac{1}{4}$  of what C gets, then their shares are respectively: \_\_\_\_\_  
 (a) Rs. 120, Rs.240, Rs.150 (b) Rs.60, Rs.90, Rs.360  
 (c) Rs.150, Rs.300, Rs.60 (d) None of these
21. Rs.366 are divided amongst A, B and C so, that A may get  $\frac{1}{2}$  as much as B and C together, B may get  $\frac{2}{3}$  as much as A and C together, then the share of A is: \_\_\_\_\_  
 (a) Rs.122 (b) Rs.129.60 (c) Rs.146.60 (d) Rs. 183
22. A sum of Rs.1300 is divided amongst P,Q,R and S such that  
 $\frac{P's\ share}{Q's\ share} = \frac{Q's\ share}{R's\ share} = \frac{R's\ share}{S's\ share} = \frac{2}{3}$ . Then P's share is: \_\_\_\_\_  
 (a) Rs.140 (b) Rs. 160 (c) Rs.240 (d) Rs. 320
23. The sum of three numbers is 98. If the ratio of the first to the second is 2:3 and that of the second to the third is 5:8, then the second number is: \_\_\_\_\_  
 (a) 20 (b) 30 (c) 48 (d) 58
24. A and B together have Rs. 1210. If  $\frac{4}{15}$  of A's amount is equal to  $\frac{2}{5}$  of B's amount, how much amount does B have?  
 (a) Rs. 460 (b) Rs.484 (c) Rs. 550 (d) Rs. 664
25. A sum of money is to be distributed among A,B,C,D in the proportion of 5:2:4:3. If C gets Rs.1000 more than D, what is B's share?  
 (a) Rs. 500 (b) Rs. 1500 (c) Rs. 2000 (d) None
26. Salaries of Ravi and sumit are in the ratio 2:3. If the salary of each is increased by Rs.4000, the new ratio becomes 40:57. What is sumit's present salary?  
 (a) Rs.17,000 (b) Rs. 20,000 (c) Rs. 25,500 (d) None of these
27. Ratio of the earnings of A and B is 4:7. If the earnings of A increase by 50% and those of B decrease by 25%, the new ratio of their earnings becomes 8:7. What are A's earnings?  
 (a) Rs. 21,000 (b) Rs. 26,000 (c) Rs. 28,000 (d) Data inadequate
28. The prices of a scooter and a T.V are in the ratio 7:5. If the scooter costs Rs.8000 more than a T.V set, then the price of a T.V set is: \_\_\_\_\_  
 (a) Rs.20,000 (b) Rs. 24,000 (c) Rs. 28,000 (d) Rs.32,000

29. An amount of Rs.735 was divided between A, B and C. If each of them had received Rs. 25 less, their shares would have been in the ratio of 1:3:2. The money received by C was: \_\_\_\_\_  
 (a) Rs. 195 (b) Rs. 200 (c) Rs. 225 (d) Rs. 245
30. An Amount of Rs.2430 is divided among A, B and C such that if their shares be reduced by Rs.5, Rs.10 and Rs.15 respectively, the remainders shall be in the ratio of 3:4:5. Then, B's share was: \_\_\_\_\_  
 (a) Rs. 605 (b) Rs. 790 (c) Rs. 800 (d) Rs. 810
31. Two numbers are in the ratio 3:5. If 9 is subtracted from each, the new numbers are in the ratio 12:23. The smaller number is: \_\_\_\_\_  
 (a) 27 (b) 33 (c) 49 (d) 55
32. The ratio of three numbers is 3:4:7 and their product is 18144. The numbers are : \_\_\_\_\_  
 (a) 9, 12, 21 (b) 15, 20, 25 (c) 18, 24, 42 (d) None of these
33. Seats for Mathematics, Physics and Biology in a school are in the ratio 5:7:8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?  
 (a) 2:3:4 (b) 6:7:8 (c) 6:8:9 (d) None of these
34. The ratio of the number of boys and girls in a college is 7:8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?  
 (a) 8:9 (b) 17:18 (c) 21:22 (d) cannot be determined
35. In a mixture of 60 litres, the ratio of milk and water is 2:1. If the ratio is to be 1:2, then the quantity of water to be further added is \_\_\_\_\_  
 (a) 20 litres (b) 30 litres (c) 40 litres (d) 60 litres
36. In a school, 10% of the boys are same in number as  $\frac{1}{4}$  of the girls. What is the ratio of boys to girls in that school?  
 (a) 3 : 2 (b) 5 : 2 (c) 2 : 1 (d) 4 : 3
37. A sum of Rs.53 is divided among A, B, C in such a way that A gets Rs. 7 more than what B gets and B gets Rs.8 more than what C gets. The ratio of their shares is \_\_\_\_\_  
 (a) 16 : 9 : 18 (b) 25 : 18 : 10 (c) 18 : 25 : 10 (d) 15 : 8 : 30

**KEY:**

- 01.b 02.c 03.d 04.c 05. 06.c 07.b 08.d 09.b 10.c 11.b 12.c  
 13.b 14.a 15.d 16.b 17.a 18.c 19.b 20.b 21.a 22.b 23.b 24.b  
 25.c 26.d 27.d 28.c 29.c 30.d 31.b 32.c 33.a 34.c 35.d 36.b  
 37.b

**(7) AVERAGES**

The average of a number is a measure of the central tendency of a set of numbers. In other words, it is an estimate of where the center point of a set of numbers lies.

The basic formula for the average of  $n$  numbers  $x_1, x_2, x_3, \dots, x_n$  is

$$A_n = \frac{(x_1 + x_2 + x_3 + \dots + x_n)}{n}$$

$$= \left[ \frac{\text{Total of set of 'n' numbers}}{n} \right]$$

This also means  $A_n \times n = \text{total of the set of numbers}$ .  
 The average is always calculated for a set of numbers.

**Concept of Weighted Average:**

When we have two (or) more groups whose individual averages are known, then to find the combined average of all the elements of all the groups we use weighted average. Thus, if we have  $K$  groups with averages  $A_1, A_2, \dots, A_k$  and having  $n_1, n_2, \dots, n_k$  elements then the weighted average is given by the formula

$$A_w = \frac{n_1 A_1 + n_2 A_2 + n_3 A_3 + \dots + n_k A_k}{n_1 + n_2 + n_3 + \dots + n_k}$$

**Another meaning of Average:**

The average (also known as arithmetic mean AM) of a set of numbers can also be defined as the number by which we can replace each and every number of the set without changing the total of the set of numbers.

**Properties of Average (AM):** The properties of averages can be elucidated by the following examples:

01. The average of 4 numbers 12, 13, 17 and 18 is \_\_\_\_\_  
 Solution: Required average =  $\frac{12 + 13 + 17 + 18}{4} = \frac{60}{4} = 15$

This means that if each of the 4 numbers of the set were replaced by 15 each, there would be no change in the total.

This is an important way to look at averages. This can be visualized as

12	→	+3	→	15
13	→	+2	→	15
17	→	-2	→	15
18	→	-3	→	15
<hr/>				
-60	→	0	→	60

02. In above example, visualize addition of a fifth number, which increases the average by 1.

$$45 + 1 = 16$$

$$15 + 1 = 16$$

$$15 + 1 = 16$$

$$15 + 1 = 16$$

The +1 appearing 4 time is due to the fifth number, which is able to maintain the average of 16 first and then 'give one' to each of the first 4.

Hence, the fifth number in this case is 20

03. The average always lies above the lowest number of the set and below the highest number of the set.

04. The net deficit due to the numbers below the average always equals the net surplus due to the numbers above the average..

#### 05. Ages and averages:

If the average age of a group of persons is  $x$  years today then after  $n$  years their average age will be  $(x + n)$

Also,  $n$  years ago their average age would have been  $(x - n)$ . This happens due to the fact that for a group of people, 1 year is added to each person's age every year.

#### EXERCISE

01. David obtained 76, 65, 82, 67 and 85 marks (out of 100) in English, Mathematics, Physics Chemistry and Biology. What are his average marks?

- (a) 65 (b) 69 (c) 72 (d) 76 (e) None of these

02. In Arun's opinion, his weight is greater than 65 kg but less than 72 kg. His brother does not agree with Arun and he thinks that Arun's weight is greater than 60 kg but less than 70 kg. His mother's view is that his weight cannot be greater than 68 kg. If all of them are correct in their estimation, is the average of different probable weight of Arun?

- (a) 67 kg (b) 68 kg (c) 69 kg (d) Data inadequate (e) None of these

03. Find the average of all the numbers between 6 and 34 which are divisible by 5.

- (a) 18 (b) 20 (c) 24 (d) 30

04. A student was asked to find the arithmetic mean of the numbers 3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and  $x$ . He found the mean to be 12. What should be the number in place of  $x$ ?

- (a) 3 (b) 7 (c) 17 (d) 31

05. The average of 2, 7, 6 and  $x$  is 5 and the average of 18, 1, 6,  $x$  and  $y$  is 10. What is the value of  $y$ ?

- (a) 5 (b) 10 (c) 20 (d) 30

06. If the mean of 5 observations  $x, x+2, x+4, x+6$  and  $x+8$  is 11, then the mean of the last three observations is:

- (a) 11 (b) 13 (c) 15 (d) 17

07. The average of first 50 natural numbers is:

- (a) 12.25 (b) 21.25 (c) 25 (d) 25.5

08. The mean of  $1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2$  is:

- (a) 10 (b) 20 (c) 30 (d) 40

09. The average of all odd numbers upto 100 is:

- (a) 49 (b) 49.5 (c) 50 (d) 51

10. If  $a, b, c, d, e$  are five consecutive odd numbers, their average is:

- (a)  $5(a + 4)$  (b)  $abcde/5$  (c)  $5(a+b+c+d+e)$  (d) None of these

11. The average of a non-zero number and its square is 5 times the number. The number is:

- (a) 9 (b) 17 (c) 29 (d) 295

12. The average of 7 consecutive numbers is 20. The largest of these numbers is

- (a) 20 (b) 22 (c) 23 (d) 24

13. The average of five consecutive odd numbers is 61. What is the different between the highest and lowest numbers?

- (a) 2 (b) 5 (c) 8 (d) cannot be determined (e) None of these

14. The sum of three consecutive odd numbers is 38 more than the average of these numbers. What is the first of these numbers?

- (a) 13 (b) 17 (c) 19 (d) Data inadequate (e) None of these

15. The average annual income (in Rs) of certain agricultural workers is  $S$  and that of other workers is  $T$ . The number of agricultural workers is 11 times that of other workers. Then the average monthly income (in Rs.) of all the workers is:

- (a)  $\frac{S+T}{2}$  (b)  $\frac{S+11T}{2}$  (c)  $\frac{1}{11S} + T$  (d)  $\frac{11S}{12} + T$

16. A library has an average of 510 visitors on Sundays and 240 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is:

- (a) 250 (b) 276 (c) 280 (d) 285

17. The average weight of 16 boys in a class is 50.25 kgs and that of the remaining 8 boys is 45.15 kg. Find the average weight of all the boys in the class.

- (a) 47.55 kg (b) 48 kg (c) 48.55 kg (d) 49.25 kg

18. A car owner buys petrol at Rs.7.50, Rs. 8 and Rs. 8.50 per litre for three successive years. What approximately is the average cost per litre of petrol if he spends Rs. 4000 each year?

- (a) Rs.7.98 (b) Rs.8 (c) Rs. 8.50 (d) Rs.9

19. The average of six numbers is  $x$  and the average of three of these is  $y$ . If the average of the remaining three is  $z$ , then:

- (a)  $x = y + z$  (b)  $2x = y + z$  (c)  $x = 2y + 2z$  (d) None of these

20. Out of 9 persons, 8 persons spent Rs.30 each for their meals. The ninth one spent Rs. 20 more than the average expenditure of all the nine. The total money spent by all of them was:  
 (a) Rs. 260 (b) Rs. 290 (c) Rs.292.50 (d) Rs. 400.50
21. The average of five numbers is 27. If one number is excluded, the average becomes 25, The excluded number is:  
 (a) 25 (b) 27 (c) 30 (d) 35

**KEY:**

- 01.e 02.e 03.b 04.b 05.c 06.b 07.d 08.b 09.c 10.d 11.a 12.c  
 13.c 14.b 15.d 16.c 17.c 18.a 19.b 20.c 21.d

**(8) PERCENTAGE**

Percent literally, means for every 100' and is derived from the French word 'cent' which is French for 100.

The basic utility the percentage arises from the fact that it is one of the most powerful tools for comparison of numerical data and information. It is also one of the simplest tools for comparison of data.

In the context of business and economic performance, it is specifically useful for comparing data such as profits, growth rates, performance, magnitude and so on.

**Mathematical definition of percentage :**

The concept of percentage mainly applies to ratios, and the percentage value of a ratio is arrived at by multiplying by 100 the decimal value of the ratio.  
 For example, a student scores 20 marks out of a maximum possible 30 marks. His marks can then be denoted as 20 out of 30 =  $(20/30)$  (or)  $(20/30) \times 100 = 66.66\%$ .

The process for getting this is perfectly illustrated through the unitary method.

<u>Marks got</u>	<u>Out of</u>
20	30
X	100
→	→

Then the value of  $X \times 30 = 20 \times 100$

$X = (20/30) \times 100 \rightarrow$  the percentage equivalent of a ratio.

Now, let us consider a classic example of the application of percentage.

**CLASSWORK**

01. It costs Re. 1 to photocopy a sheet of paper. However, 2% discount is allowed on all photocopies done after first 1000 sheets. How much will it cost to copy 5000 sheets of paper?  
 (a) Rs. 3920 (b) Rs. 3980 (c) Rs. 4900 (d) Rs. 4920
02. A housewife saved Rs. 2.50 in buying an item on sale. If she spent Rs. 25 for the item, approximately how much percent she saved in the transaction?  
 (a) 8% (b) 9% (c) 10% (d) 11%
03. When 15% is lost in grinding wheat, a country can export 30 laks tons of wheat. On the other hand, if 10% is lost in grinding, it can export 40 lakh tons of wheat. The production of wheat in the country is :  
 (a) 20 lakh tons (b) 80 lakh tons (c) 200 lakh tons (d) 800 lakh tons
04. In a market survey 20% opted for product A where as 60% opted for product B. The remaining individuals were not certain. If the difference between those who opted for product B and those who were uncertain was 720, how many individuals were covered in the survey?  
 (a) 1440 (b) 1800 (c) 3600 (d) Data inadequate
05. In an election, 30% of the voters voted for candidate A whereas 60% of the remaining voted for candidate B. The remaining voters did not vote. If the difference between those who voted for candidate A and those who did not vote was 1200, how many individuals were eligible for casting vote in that election?  
 (a) 10,000 (b) 45,000 (c) 60,000 (d) 72,000
06. In an examination, 5% of the applicants were found ineligible and 85% of the eligible candidates belonged to the general category. If 4275 eligible candidates belonged to other categories, then how many candidates applied for the examination?  
 (a) 30,000 (b) 35,000 (c) 37,000 (d) None of these
07.  $\frac{1}{333}$  % of a man's daily output is equal to 50% of a second man's daily output. If the second man turns out 1500 screws daily, then the first man's output in terms of making screws is :  
 (a) 500 (b) 1000 (c) 2000 (d) 2250
08. Sameer spends 24% of his monthly income on food and 15% on the education of his children. Of the remaining salary, he spends 25% on entertainment and 20% of conveyance. He is now left with Rs.10,736. What is the monthly salary of Sameer.  
 (a) Rs.27,600 (b) Rs.28,000 (c) Rs.31,200 (d) Rs.32,000
09. 405 sweets were distributed equally among children in such a way that the number of sweets received by each child is 20% of the total number of children. How many sweets did each child receive?  
 (a) 9 (b) 15 (c) 18 (d) 45

10. A man bought a house for Rs.5 lakhs and rents it. He puts  $12\frac{1}{2}\%$  of each month's rent a side for repairs, pay Rs. 1660 as annual taxes and realizes 10% on his investments there after. The monthly rent of the house is :  
 (a) Rs.2460 (b) Rs.2500 (c) Rs.4920 (d)Rs.5000
11. Mr. X a businessman had the income in the year 2000, such that he earned a profit of 20% on his investment in the business. In the year 2001, his investment was less by Rs.5000 but still had the same income (income = Investment + Profit) as that in 2000. Thus the percent profit earned in 2001 increased by 6%. What was his investment in 2000?  
 (a) Rs.1,02,000 (b) Rs.1,05,000 (c) Rs.1,50,000  
 (d) Data inadequate (e) None of these

**KEY:**

01.d 02.b 03.c 04.b 05.c 06.a 07.d 08.d 09.a 10.c 11.b

**ASSIGNMENT**

01. The ratio 5 : 4 expressed as a percent equals :  
 (a) 12.5% (b) 40% (c) 80% (d) 125%
02.  $63\%$  of  $3\frac{4}{7}$  is :  
 (a) 2.25 (b) 2.40 (c) 2.50 (d) 2.75
03.  $88\%$  of 370 +  $24\%$  of 210 = 118  
 (a) 256 (b) 258 (c) 268 (d) 3583
04. 60% of 264 is the same as :  
 (a) 10% of 44 (b) 15% of 1056 (c) 30% of 132 (d) None of these
05. 270 candidates appeared for an examination, of which 252 passed. The percent age is :  
 (a) 80% (b)  $83\frac{1}{2}\%$  (c)  $90\frac{1}{3}\%$  (d)  $93\frac{1}{3}\%$
06. Rajeev buys goods worth Rs. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods.  
 (a) Rs. 6876.10 (b) Rs. 6999.20 (c) Rs. 6654 (d) Rs. 7000
07. An agent gets a commission of 2.5% on the sales of cloth. If on a certain day, he gets Rs.12.50 as commission, the cloth sold through him on that day is worth.  
 (a) Rs. 250 (b) Rs. 500 (c) Rs. 750 (d) Rs. 1250
08. Two-fifth of one-third of three-seventh of a number is 15. What is 40 percent of that number ?  
 (a) 72 (b) 84 (c) 136 (d) 140  
 (e) None of these

09. The difference between a number and its two-fifth is 510. What is 10% of that number  
 (a) 12.75 (b) 85 (c) 204 (d) None of these
10. If 25% of a number is subtracted from a second number, the second number reduces to its five-sixth. What is the ratio of the first number to the second number ?  
 (a) 1 : 3 (b) 2 : 3 (c) 3 : 2 (d) Data inadequate
11. When any number is divided by 12, then dividend becomes  $\frac{1}{4}$ th of the other number, by how much percent first number is greater than the second number ?  
 (a) 150 (b) 200 (c) 300 (d) Data inadequate
12. Two numbers A and B are such that sum of 5% of A and 4% of B is two-thirds of the sum of 6% of A and 8% of B. Find the ratio of A : B.  
 (a) 2 : 3 (b) 1 : 1 (c) 3 : 4 (d) 4 : 3
13. In a competitive examination in State A, 6% candidates got selected from the total appeared candidates. State B had an equal number of candidates appeared and 7% candidates got selected with 80 more candidates got selected than A. What was the number of candidates appeared from each State ?  
 (a) 7600 (b) 8000 (c) 8400 (d) Data inadequate
14. The price of a car is Rs.3,25,000. It was insured to 85% of its price. The car was damaged completely in an accident and the insurance company paid 90% of the insurance. What was the difference between the price of the car and the amount received ?  
 (a) Rs.32,500 (b) Rs.48,750 (c) Rs.76,375 (d) Rs.81,250
15. 10% of the voters did not cast their vote in an election between two candidates. 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The number of votes enrolled on the voters list was:  
 (a) 25000 (b) 33000 (c) 35000 (d) 40000
16. If  $A = x\%$  of  $y$  and  $B = y\%$  of  $x$ , then which of the following is true ?  
 (a) A is smaller than B (b) A is greater than B  
 (c) Relationship between A and B cannot be determined  
 (d) If  $x$  is smaller than  $y$ , then A is greater than B.  
 (e) None of these

Directions (Questions 25 to 26): A survey of magazine reading habits of the people living in five cities P, Q, R, S, and T is summarized in a table gives below. The Column I in the table gives percentage of magazine-readers in each city who read only one magazine a week. The column II gives the total of magazine-readers who read two or more magazines a week. Read the table and then answer these questions :

City	I	II
P	75	6000
Q	80	3500
R	60	3000
S	55	2700
T	25	4200

17. The city with the lowest number of magazine-readers is :  
 (a) Q (b) R (c) S (d) T
18. Which city has the highest number of magazine-readers who read only one magazine a week ?  
 (a) P (b) Q (c) R (d) S
19. The highest number of magazine-readers in any given city is :  
 (a) 17500 (b) 18000 (c) 24000 (d) 30000
20. How many magazine-readers in city Q read only one magazine a week ?  
 (a) 14000 (b) 18000 (c) 12500 (d) 16500
21. The total number of all the magazine-readers in the five cities who read only one magazine a week is :  
 (a) 19400 (b) 24000 (c) 41200 (d) 42000
22. Rohit spends 40% of his salary on food, 20% on house rent, 10% on entertainment and 10% on conveyance. If his savings at the end of a month are Rs. 1500, then his monthly salary is :  
 (a) Rs.6000 (b) Rs.7500 (c) Rs.8000 (d) Rs.10,000
23. Kunal spent Rs.35,000 in buying raw materials, Rs.40,000 in buying machinery and 20% of the total amount he had as such money does he save every month ?  
 (a) Rs.80,000 (b) Rs.85,750 (c) Rs.90,000 (d) Rs.93,750
24. A man gave 40% of the amount he had to Rohan. Rohan in turn gave one-fourth of what he received from A man to Sahil. After paying Rs. 200 to the taxi driver out of the amount he got from Rohan. Sahil now has Rs.600 left with him. How much amount did A man have ?  
 (a) Rs.4000 (b) Rs.8000 (c) Rs.12,000 (d) Data inadequate
25. In an examination, there are three papers and a candidate has to get 35% of the total to pass. In one paper, he gets 62 out of 150 and in the second 35 out of 150. How much must he get, out of 180, in the third paper to just qualify for a pass ?  
 (a) 60.5 (b) 68 (c) 70 (d) 71
26. In a History examination, the average of the entire class was 80 marks. If 10% of the students scored 95 marks and 20% scored 90 marks. What was the average marks of the remaining students of the class ?  
 (a) 65.5 (b) 68 (c) 75 (d) 85
27. In a recent survey 40% houses contained two or more people. Of those houses containing only one person, 25% were having only a male. What is the percentage of all houses, which contain exactly one female and no males ?  
 (a) 15 (b) 40 (c) 75  
 (d) Can't be determined (e) None of these

28. In a city, 35% of the population is composed of migrants, 20% of whom are from rural areas. Of the local population, 48% is female while this figure for rural and urban migrants of 30% and 40% respectively. If the total population of the city is 728400, what is its female population ?  
 (a) 324138 (b) 349680 (c) 509940 (d) None of these
29. The price of a T.V set is decreased by 25% as a result of which the sale increased by 20%. What will be the effect on the total revenue of the shop ?  
 (a) No effect (b) 5% decrease (c) 5% increase (d) 10% increase  
 (e) None of these
30. The price of tea being increased by 20%, a man reduces his consumption by 20%. by how much percent will his expenses for tea be decreased ?  
 (a) 2% (b) 4% (c) 6% (d) 8%
31. Prices register an increase of 10% on food grains and 15% on other items of expenditure. If the ratio of an employee's expenditure on food grains and other items be 2 : 3 by how much should his salary be increased in order that he may maintain the same level of consumption as before, his present salary being Rs.2590 ?  
 (a) Rs.323.75 (b) Rs.350 (c) Rs.360.50 (d) None of these
32. In the month of January, the Railway Police caught 4000 ticket less travelers. In February, the number rose by 5%. However, due to constant vigil by the Police and the Railway staff, the number reduced by 5% and in April it further reduced by 10%. The total number of ticket less travelers caught in the month of April was :  
 (a) 3125 (b) 3255 (c) 3575 (d) 3591
33. The population of a variety of tiny bush in an experimental field increased by 10% in the first year, increased by 8% in the second year but decreased by 10% in the third year. If the present number of bushes in the experimental field is 26730, then the number of bushes in the beginning was :  
 (a) 25000 (b) 27000 (c) 28000 (d) 24600
34. The population of a company has ups and down every year. The production increases for two consecutive by 15% and in the third year it decreases by 10%. Again in the next two years it increases by 15% each year and decrease by 10% in the third year. If we start counting from the year 1998, approximately what will be the effect on production of the company in 2002.  
 (a) 27% increase (b) 32% increase (c) 37% increase (d) 42% increase  
 (e) 52% increase
35. A building worth Rs.133,100 is constructed on land worth Rs.72,900. After how many years will the value of both be the same if land appreciates at 10% p.a and building depreciates at 10% p.a. ?  
 (a)  $1\frac{1}{2}$  (b) 2 (c)  $2\frac{1}{2}$  (d) 3
36. The total population of a village is 5000. The number of males and females increases by 10% and 15% respectively and consequently the population of the village becomes 5600. What was the number of males in the village ?  
 (a) 2000 (b) 2500 (c) 3000 (d) 4000

37. 5% of income of A is equal to 15% of income of B and 10% of income of B is equal to 20% of income of C. If C's income is Rs.2000, then the total income of A, B and C is :  
 (a) Rs.6000 (b) Rs.14,000 (c) Rs.18,000 (d) Rs.20,000
38. Amit's monthly income is 30% more than that of Raunaq. Raunaq's monthly income is 20% less than that of Deepak. If the difference between the monthly incomes of Amit and Deepak is Rs.800, what is the monthly income of Raunaq ?  
 (a) Rs.12,000 (b) Rs.16,000 (c) Rs.20,000  
 (d) Data inadequate (e) None of these

**KEY:**

- 01.d 02.a 03.b 04.b 05.d 06.a 07.b 08.e 09.b 10.b 11.b 12.d  
 13.b 14.c 15.a 16.e 17.d 18.a 19.c 20.a 21.c 22.b 23.d 24.b  
 25.d 26.c 27.e 28.d 29.e 30.b 31.d 32.d 33.a 34.c 35.d 36.c  
 37.c 38.b

**(9) QUANTITATIVE APTITUDE****RATIO AND PROPORTION**

01. The ratio of number of males to number of females in a club is 7 : 4. if there are 84 males in the club, the total numbers in the club are  
 (a) 126 (b) 132 (c) 136 (d) 148 (e) 168
02. The prices of scooter and T.V are in the reatio of 5 : 4. If scooter cost 4,000 more than T.V. The price of T.V set is  
 (a) 20,000 (b) 16,000 (c) 800 (d) 10,000 (e) None
03. The sum of money is divided among P, Q & R, in the ratio of 2 : 3 : 5. If the amount of P and R together is Rs. 400/- more than that of Q. What is R's Amount?  
 (a) Rs. 200 (b) Rs.300 (c) Rs.500 (d) Rs.400
04. An amount of 735/- was divided between A, B, C. If each of them had received Rs. 25/- less the shares would have been in the ratio of 1 : 3 : 2. The money received by C was  
 (a) 355 (b) 135 (c) 245 (d) 255 (e) None

**PARTNERSHIP**

05. A, B and C are partners in a business. A puts Rs.45,000/-, B puts, Rs.54,000/- and C puts Rs.36,000/-. What is the share of C in a total profit of Rs.37,500/-  
 (a) Rs.12500 (b) Rs.15000 (c) Rs.19000 (d) Rs.18500 (e) None
06. Yogesh started a business, investing Rs.45,00/-. After 3 months pranab joined him with a capital of Rs.60,000/-. After another 6 months, Ashok joined with a capital of Rs.90,000/- At the end of the year they made a profit of Rs.20,000/-. What would be Ashok share in it  
 (a) Rs.8000 (b) Rs.4000 (c) Rs.3000 (d) Rs.2000 (e) None

07. A and B started a business with initial investments in the ratio 14 : 15 and their profits were in the ratio 7 : 6. If A invested the money for 10 months, for how many months did B invests his money  
 (a) 8 months (b) 4 months (c) 6 months (d) 12 months (e) None
08. 'A' is a working partner and 'B' is a sleeping partner in a business. A invests Rs.12000/-, and B invests Rs.20,000/-. A receives 10% of the profit for managing and rest being divided in proportion to their capitals out of a total profit of Rs.9600/-. The money received by A is  
 (a) Rs.4200/- (b) Rs.4600/- (c) Rs.5100/- (d) Rs.4800/-

**TIME & WORK**

09. Tuktuki and Rasmani can do a job alone in 20 days and 30 days respectively. In how many days the job will be finished if they work together?  
 (a) 12 days (b) 14 days (c) 15 days (d) 16 days (e) None
10. Ram, Shyam and mohan can do a piece of work in 12, 15 and 20 days respectively. How long will they take to finish it together?  
 (a) 10-days (b) 12 days (c) 14 days (d) 8 days (e) 5 days
11. A Tailor is able to finish a consignment of Garment fabrication in 80 days less than second Tailor. If the first tailor is thrice as fast as the second tailor, In how many days both a of them can finish this consignment together  
 (a) 120 days (b) 40 days (c) 30 days (d) 20 days (e) None
12. A alone can do a work in 10 days, which B alone can do it 15 days. If they work together and finish it, then out of total wages of Rs.225/-, the amount 'A' will get is  
 (a) Rs.135 (b) Rs.90 (c) Rs.130 (d) Rs.120 (e) None

**TIME AND DISTANCE**

$$\text{mps} = \text{kmph} \times \frac{5}{18} \quad \text{kmps} = \text{mph} \times \frac{18}{5}$$

$$01. \text{Speed (V)} = \frac{\text{Total distance traveled (d)}}{\text{Total time taken (t)}}$$

02. Average Speed for whole journey

$$V_a = \frac{d_1 + d_2 + \dots + d_n}{t_1 + t_2 + \dots + t_n}$$

13. A car can finish a certain Journey in 10 hours, at a speed of 48 kmph. In order to cover the same distance in 8 hours, the speed of the car must be  
 (a) 60 kmph (b) 30 kmph (c) 45 kmph (d) 15 kmph (e) None
14. A man traveled at certain distance by train at the rato of 50 kmph and came back by bus at a average speed of 30 kmph. The journey took 8 hours. What distance did he traveled by train  
 (a) 150 km (b) 200 km (c) 125 km (d) 175 km (e) None
15. Two buses start from stations A and B and traveled towards each other a speeds of 50 kmph and 60 kmph respectively. At the time of their meeting the second bus has found 120 km more than first. The distance between A and B is  
 (a) 1320 km (b) 1330 km (c) 1310 km (d) 1300 km (e) None



**PROBLEMS ON TRAINS**

16. A train is moving at a speed of 132 kmph, if length of the train is 110 m, how long will it take to cross a railway plot form of 165 m long is ....  
 (a) 7.5 sec (b) 7 sec (c) 7.2 sec (d) 8.6 sec (e) None
17. A train takes 23 sec to past completely through a station of 272 m long and 19 sec to another station is 200 m long. The length of the train is .....  
 (a) 140 m (b) 142 m (c) 144 m (d) 145 m (e) None
18. Two trains travel in opposite directions at 36 kmph and 45 kmph, a man sitting in lower train crosses the faster train in 8 sec. The length of faster train is .....  
 (a) 150 m (b) 160 m (c) 180 m (d) 170 m (e) None

**PIPES AND CISTERNS**

19. A tap can fill a tank in 20 minutes and another can empty it in 30 min. Find whether the tank will be filled up (or) emptied and in how many minutes?  
 (a) 60 min empty (b) 60 min filled up (c) 40 min, empty  
 (d) 40 min, filled up (e) None
20. A leak in the bottom of a tank can empty the full tank in 10 hours. An inlet pipe fills water at the rate of 6 lit a minute. When the tank is full, the inlet is opened and due to the leak it will take to empty 5 hours more. The capacity of the tank is ...  
 (a) 11,000 lit (b) 10,800 lit (c) 10,600 lit (d) 10,000 lit (e) None
21. A cistern has two taps which fill it in 12 min and 15 min respectively. There is also a waste pipe in the cistern. When all the three are opened, the empty cistern is full in 20 min. How long will waste pipe take to empty the full cistern.  
 (a) 5 min (b) 8 min (c) 10 min (d) 12 min

**CHAIN RULE**

$$\frac{N_1 \times D_1 \times R_1 \times E_1}{W_1} = \frac{N_2 \times D_2 \times R_2 \times E_2}{W_2}$$

Where:—

 $N_1, N_2$  = No. of workers;  $D_1, D_2$  = time of work $R_1, R_2$  = Work rate of worker (or) machine, $E_1, E_2$  = efficiency of worker (or) machine, $W_1, W_2$  = Amount of work done (of same nature)

22. A contract is to be completed in 56 days and 104 men were set to work, each working 8 hours a day. After 30 days, 2/5 of the work is finished. How many additional men may be employed so that work may be completed on time each man now working a hours per day?  
 (a) 46 men (b) 48 men (c) 52 men (d) 56 men (e) None
23. A can do a piece of work in  $2\frac{1}{2}$  days with 'B' can do in  $3\frac{1}{2}$  days. If A's wages are 50 per week and B's wages are Rs.42.50 per week, What 'A' would have changed for soing a piece of work for which B received Rs.340?  
 (a) Rs.200 (b) Rs.300 (c) Rs.400 (d) Rs.500 (e) None

24. Two coal loading machines each working 12 hours per day for 8 days handles 9000 tones of coal with an efficiency of 90%. While 3 other coal loading machines at an efficiency of 80% set to handle 12,000 tonnes of coal in 6 days. Find how many hours per day each should work.  
 (a) 16 hr/day (b) 14 hr/day (c) 15 hr/day (d) None

**AVERAGES**

$$(1) \text{ Average} = \frac{\text{Sum of all the items}}{\text{Number of items}}$$

$$(2) \text{ Average of combined group} = \frac{ma + nb}{m + n}$$

$$(3) \text{ Average of numbers 1 to } n \rightarrow \frac{\text{First No.} + \text{Last No.}}{2}$$

25. The average age of students in section A of 40 students in 10 years and the average age of students in section B of 30 students is 12 years. Find the average age of students in both sections taken together.  
 (a) 10.86 yrs (b) 11.86 yrs (c) 12.86 yrs (d) None
26. The average age of husband and wife who are married 5 years ago was 26 years, the average age including a child which was born during the interval is 21 years at present child age was .....  
 (a) 1 year (b) 2 years (c) 3 years (d) 4 years (e) None
27. The average age of class of 36 students is 17 years. When the age of the teacher also included, the average will be increased by 1 year. What is the age of teacher is .....  
 (a) 50 years (b) 52 years (c) 54 years (d) 56 years (e) None
28. The average salary of 35 workers is Rs.1800/-. When the salary of the manager is also included, the average will be increased by Rs.125/-. What is salary of the manager?  
 (a) Rs.6200 (b) Rs.6300 (c) Rs.6400 (d) Rs.6500 (e) None

**AGES**

29. The ratio of the ages of Suresh and his father is 2 : 7. The difference of their ages is 40 years, the ratio of the ages 6 years ago was  
 (a) 1 : 4 (b) 1 : 5 (c) 1 : 6 (d) 1 : 8 (e) None
30. The ages of Ram and Mukta are in the ratio of 3 : 5, After 9 years the ratio of their Ages will become 3 : 4. the present age of mukta is .....  
 (a) 9 years (b) 12 years (c) 15 years (d) 18 years
31. The age of a man is 4 times that of his son. 5 years ago, the man was 9 times as well as his son was at that time. What was man's age 5 years ago.....  
 (a) 3 years (b) 9 years (c) 27 years (d) 29 years (e) None

**PERCENTAGE**

32. A student has to secure 40% of marks to pass. He gets 178 marks and fails by 22 marks. The maximum marks are .....  
 (a) 250 marks (b) 350 marks (c) 500 marks (d) 550 marks (e) None



33. A got 36% of maximum marks and failed by 12 marks. B got 42% of maximum marks, which are 6 marks above the pass marks. Find the pass marks.  
(a) 110 marks (b) 100 marks (c) 120 marks (d) 140 marks (e) None
34. Of the total amount received by Rajesh 25% was spent on purchase, 20% of the remaining on house rent and 10% of the remaining transportation. It is left with Rs.2700/- The initial amount is .....  
(a) Rs.10,000 (b) Rs.7500 (c) Rs.5000 (d) Rs.2500 (e) None
35. The population of a town is 10,000. It increases by 10% during the first year, During the second year it decreases by 20% and increased by 30%, during the Third year. What is the population of 3 years will be  
(a) 14,440 (b) 12,440 (c) 11,440 (d) 11,240 (e) None

**PROFIT AND LOSS**

- (1) (P) Profit = S.P - C.P (2) (L) Loss = C.P - S.P
- (3)  $S.P = C.P \times \frac{100 + P\%}{100}$  (4)  $S.P = C.P \times \frac{100 - L\%}{100}$
- (5)  $C.P = S.P \times \frac{100}{100 + P\%}$  (6)  $C.P = S.P \times \frac{100}{100 - L\%}$
- (7)  $P\% = \frac{P}{C.P} \times 100$  (8)  $L\% = \frac{L}{C.P} \times 100$
36. A man purchased an old scooter for Rs.6400/- and spent Rs.1,600/- in its repairing. If he sold the scooter for Rs.8,400, The gain % is  
(a) 5% (b) 10% (c) 15% (d) 20% (e) None
37. A brought radio set and spent Rs.110/- on its repairs, he then sold it to 'B' at 20% profit, 'B' sold into 'C' it a loss of 10% and 'C' sold it for Rs.188/- to a profit of 10%. What is the amount for which 'A' brought the radio set/  
(a) Rs.870 (b) Rs.890 (c) Rs.850 (d) Rs.820 (e) None
38. A machine is sold for Rs.5,500/- at a gain of 10%. What would have been the gain (or)loss percent, if it he had been sold for Rs.4750/-  
(a) 5% gain (b) 5% loss (c) 10% gain (d) 10% loss
39. A house and a cow sold for Rs.12,000/- each. The house was sold at loss 20% and the cow it a gain of 20%. The entire transaction, the gain / loss in amount is .....  
(a) Rs.1000 gain (b) Rs.1000 loss (c) Rs.500 loss  
(d) Rs.500 gain (e) None

**KEY:**

- 01.b 02.b 03.c 04.c 05.e 06.b 07.a 08.a 09.a 10.e 11.c 12.b  
13.a 14.a 15.a 16.a 17.b 18.c 19.a 20.b 21.c 22.d 23.b 24.a  
25.a 26.a 27.c 28.b 29.b 30.c 31.c 32.c 33.c 34.c 35.c 36.a  
37.b 38.c 39.b

The interpretation of data is the process through which inferences are drawn about the data available for analysis. In other words, the process of drawing inferences and conclusions through the interpretation of data is what data interpretation is all about.

**ORGANISATION AND PRESENTATION OF DATA**

Normally, data is generated in such volumes and in such great proportions that it becomes impossible to make any useful judgments through the volume of data. Unless organized in a condensed form that will highlight the main characteristics, facilitate comparisons and render it suitable for further processing and interpretation, raw data will have little meaning. To management people rarely find time to go through the entire details of any report, be it daily production or the sales forecast. An effective presentation of data enables them to draw upon the information with the least effort and time. One chart table or graph gives at least 10 times more information than one page of words.

There is thus a need to organize the data into meaningful presentations. Data is organized and presented through one of the several forms of presentations available. The most commonly used amongst these are tables, pie charts, bar graphs, the line charts, and so on.

Data can be represented by using any one or more than one of these. Normally data is represented through a graphical representation or a set a graphical representations linked to each other.

Effective presentation of data is broadly classified in the following categories:

1. Tabular presentation
2. Bar charts
3. X - Y charts
4. Pie charts
5. Case lets
6. Miscellaneous charts

We will now go on and analyze each of the types of charts briefly.

**Types of Problems**

1. Tabular form
2. Bar Diagram
3. Histogram
4. Line graph
5. Pie Diagram
6. Other Diagrammatic Representation
7. Caselet form

**Basic Tools of Analysis:**

1. Ratio
2. Percentage
3. Important Measures in statistics:

One of the most widely used set of summary figures is known as measures of central tendency (or) Averages. The following are the five measures of central (or) measures of location which are commonly used in practice.

- (i) Arithmetic mean (or) simply mean
- (ii) Median
- (iii) Mode
- (iv) Geometric Mean
- (v) Harmonic Mean

(i) Arithmetic mean :-

When data are ungrouped the arithmetic mean (A.M) is given by:

$$\bar{X} = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum x}{n}$$

Where,  $x_1, x_2, \dots, x_n$  are the given 'n' observations

$\bar{x}$  = arithmetic mean of the given 'n' observations

(ii) Median :-

If data are arranged in ascending (or) descending order, then the middle – most term is taken as the median.

Median may be defined as the value of that item which divides an arranged series in two equal parts.

Thus when there are 'n' terms the median would be the value of  $\left(\frac{n+1}{2}\right)^{th}$  term

$$\text{Median} = I_1 + \frac{\left[\frac{N+1}{2} - C\right]}{f} \times i$$

$I_1$  = the lower limit of the median class

$f$  = frequency of the median class

$N$  = the total frequency

$C$  = cumulative frequency of the class preseding the median class

$i$  = the class interval of the median class

**(1) TABULATION**

**CLASSWORK**

**Directions (01 to .05):** Study the following table carefully and answer the questions given below it:

Number of Different categories of vehicles sold in the country over the years (in thousands)

Year	Heavy	Light commercial vehicles	Cars	Jeeps	Two-Wheelers
1990	26	64	232	153	340
1991	45	60	242	172	336
1992	72	79	248	210	404
1993	81	93	280	241	411
1994	107	112	266	235	442
Total	331	408	1268	1011	1933

01. The percentage increase in the sales in 1993 over the previous year was maximum for which of the following categories of vehicles?  
 (a) Cars (b) Heavy Vehicles (c) Jeeps  
 (d) Light commercial vehicles (e) None of these
02. In which year was the number of 2-wheelers sold as a percentage of the total number of Vehicles sold during that year, the highest?  
 (a) 1994 (b) 1991 (c) 1990 (d) 1992 (e) 1993
03. The number of Heavy Vehicles sold in 1993 was approximately what percent of the total number of Vehicles sold in 1992?  
 (a) 8 (b) 10 (c) 7 (d) 9 (e) 11
04. If the same percentage increase in the number of Heavy Vehicle as in 1994 over 1993 is expected in 1995, approximately how many heavy vehicles will be sold in 1995?  
 (a) 139 (b) 141 (c) 144 (d) 133 (e) 131
05. In which of the following years was the number of light commercial vehicles sold approximately 25% of the number of 2-whcelers sold?  
 (a) 1993 (b) 1991 (c) 1990 (d) 1994 (e) 1992

**Directions (06 to 09):** Study the following table and answer the questions given below:

	Average sale price to customer in US\$	
	U. S. A	India
Personal computers Basic	1, 600	1, 800
Advanced	2, 000	2, 600
Dot matrix printers	300	270
Colour Monitors	250	250
Key board	30	30

06. Which of the following is correct?  
 (a) The total price of two colour monitors and two dot matrix printers in U. S. A is equal to the price of one basic P. C in India  
 (b) The total price of four colour monitors and two dot matrix printers in U. S. A is equal to the price of the basic computer in India  
 (c) The total price of four colour monitors and two dot matrix printers in U. S. A is equal to the price of one basic PC in India  
 (d) the total price of 10 colour monitors in Inida is equal to the price of one Advanced PC in India  
 (e) All are correct.
07. Which of the following statements is false with reference to the table?  
 (a) The personal computers are costlier in India than U. S. A.  
 (b) The Dot matrix printers are cheaper in India than U. S. A.  
 (c) If a person buys equal number of basic computers and dot matrix printers from U.S.A. and India, he will have to pay different prices.  
 (d) The price of the colour monitors and key boards are same in U. S. A and India.  
 (e) all the above statements are false.

08. If a person purchases 20 Advanced PCs in U. S. A and sells them in India, what will be the percentage profit?  
 (a) 30 (b) 15 (c) 20 (d) 25 (e) None of these
09. The sale price of Dot matrix printers in India is lesser than that in U. S. A. What is the percentage difference with respect to the price in U. S. A?  
 (a) 10% (b)  $11\frac{1}{2}\%$  (c) 30% (d) 5% (e) None of these

**Directions (10 to 12):** study the following table carefully and answer the questions given below it:

*Base of PC's and Telephone Lines in India*

	Installed base of PC's per 1000 Population	Installed base of Telephones per 1000 Population	Ratio of PC's to Telephones	World Ratio	% of GDP Spent on IT	
					India	World
1995-96	1.1	12	1:11	1:5	0.7	3
2001-02	8	60	1:8	1:3	2.0	2

10. Approximately what is the ratio of percentage of GDP spent on IT in India to that of world in 1995-96?  
 (a) 0.28 (b) 0.18 (c) 0.24 (d) 0.32 (e) 0.14
11. Approximately what is the expected percentage growth in installation of PC's per thousand population by 2001-02 from 1995-96?  
 (a) 525 (b) 625 (c) 650 (d) 475 (e) 550
12. What is the estimated percentage growth in installation of telephone lines from 1995-96 to 2001-02 per thousand Population?  
 (a) 200 (b) 300 (c) 600 (d) 500 (e) 400

**KEY:**

- 01.d 02.c 03.a 04.b 05.d 06.c 07.e 08.a 09.a 10.c  
 11.b 12.e

**ASSIGNMENT**

Directions (1 to 6): Given below is the general as well as subject – wise result of a school for the secondary Examination. Study the chart carefully and answer the questions that follow:

Total Number of candidates	No. of candidates passed					Result		
	English	Hindi	Maths	Science	Social Studies	I Div	II Div.	III Div
760	748	752	740	745	750	247	291	165

**Note:** No student failed in more than two subjects

01. How many students failed in two subjects?  
 (a) 8 (b) 16 (c) 13 (d) 19
02. The pass percentage of the institution is  
 (a) 93.2% (b) 94.4% (c) 93.6% (d) 92.5%
03. If half the students who failed in two subjects in science and maths and the remaining half in maths and one of the languages, how many failed in science alone?  
 (a) 16 (b) 7 (c) 12 (d) 11
04. What is the percentage of the students who secured I Division?  
 (a) 29.6% (b) 32.5% (c) 30.4% (d) 33.3%
05. If after re – evolution, three more students were declared passed, the pass percentage of the school went up by approximately  
 (a) 0.2% (b) 0.4% (c) 0.5% (d) 0.6%
06. Which is the highest pass – percentage approximately subject – wise?  
 (a) 98.25% (b) 97.98% (c) 98.68% (d) 98.95%

**Direction (7 to 11):** Study the following table carefully and answer the question below it:

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	80	40	150	80	100
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Miscellaneous	40	10	50	10	50
Total	900	500	1500	700	1000

07. Who among the following employees earns maximum bonus in comparison to his total income?  
 (a) A (b) B (c) C (d) D (e) E
08. The income from overtime is what percent of the income from arrears in the case of employee A?  
 (a) 90 (b) 80 (c) 75 (d) 40 (e) None

09. How many employees have their salary less than 3 times the income from bonus?  
 (a) 1 (b) 2 (c) 3 (d) 4 (e) None
10. Who among the following employees has maximum percentage of his salary out of the total income?  
 (a) A (b) B (c) C (d) D (e) E
11. Who among the following employees has minimum ratio of income from arrears to the income from salary?  
 (a) A (b) B (c) C (d) D (e) E

**Direction (12 to 16):** Study the table and answer the questions given below it.  
 Number of employees working in various departments of a factory

Department	Production	Sales	Purchase	Admn and Accts	R & D
Year					
1980	175	50	75	70	100
1981	125	85	70	87	65
1982	450	90	55	115	98
1983	440	98	57	130	94
1984	525	125	60	157	99
1985	503	108	61	155	100

12. In which department the number of employees remained the same during the years 1980 and 1985?  
 (a) production (b) sales (c) R & D (d) purchase  
 (e) Admn. And Accts
13. In which of the following years, each department had more number of employees than it had in the immediately preceding year?  
 (a) 1983 (b) 1984 (c) 1985 (d) 1982 (e) None
14. In which year the number of employees in the production department was three times the number of employees in 1980 of the same department?  
 (a) 1984 (b) 1983 (c) 1982 (d) 1981 (e) None
15. Which two departments have the same total number of employees all through the years 1980 to 1985?  
 (a) sales and (R and D) (b) sales and purchase  
 (c) production and sales (d) purchase and (R and D) (e) None
16. The total no. of employees of which department is four times the total no. of employees in R & the time 1980 to 1985? Approximately  
 (a) production (b) sales (c) purchase (d) Admn. And Accts (e) None

**Directions (17 to 21)**

The food values and the unit price of a number of food items are given below:

	% of protein	% of carbohydrate	% of fat	Cost per 100 gm
Food A	10	20	30	Rs. 1.80
Food B	20	15	10	Rs. 3.00
Food C	20	10	40	Rs. 2.75

17. If you purchased x grams of food A, y grams of food B and Z grams of food C, the cost will be  
 (a)  $(1.8x + 3y + 11/4z)P$  (b) Rs.  $(9x/5 + 3y + 11/4z)$   
 (c) Rs.  $(x + y + z)$  (d)  $(3x + 1.8y + 2.75z)P$
18. Which of the following diets would supply the maximum grams of protein?  
 (a) 150 grams of A and 200 gms of B (b) 200 gms of B and 200 gms of C  
 (c) 500 gms of A (d) 350 gms of C
19. All of the following diets would supply at least 75 grams of fat. Which of these diets would cost the least?  
 (a) 200 gms of A and 150 gms of B (b) 500 gms of B and 100 gms of A  
 (c) 300 gms of A (d) 200 gms of C
20. All of the following diets would supply at least 100 gms of carbohydrates. Which of them would cost the least?  
 (a) 500 gms of A (b) 250 gms of A, 125 gms of B, 125 gms of C  
 (c) 1 kilogram of C (d) 700 gms of B
21. If one's diet has 100 gms each of A, B and C, what is the amount of fat that is included in the diet?  
 (a) 50 gms (b) 80 gms (c) 65 gms (d) 45 gms

**Directions: (22 to 26)** Study the following table carefully and answer the questions given below it.

Schemes & Months	V	W	X	Y	Z	TOTAL
September	200	70	30	290	10	600
October	120	130	70	150	290	760
November	45	35	25	125	160	390
December	160	110	40	115	130	555
January	80	90	70	100	140	480
February	130	150	30	40	390	740

Subscription to different schemes of a mutual fund company over the months (Rupees in crores).

22. What is the difference in the subscription of V scheme between December and January?  
 (a) 80 lacs (b) 240 cores (c) crores (d) 240 lacs (e) None of these

23. If the subscription to a scheme is the criterion of popularity which of the schemes can be termed as the most popular over the months?  
(a) V (b) W (c) X (d) Y (e) Z
24. In which of the following months, the total subscription to W and X schemes was equal to the subscription to W scheme in February?  
(a) September (b) October (c) November (d) December (e) January
25. For which of the following types of schemes was there continuous decrease over the months?  
(a) V (b) W (c) X (d) Y (e) None of these
26. What is the percentage increase in the subscription to Z scheme from January to February?  
(a) 130 (b) 260 (c) 200 (d) 100 (e) None of these

Directions (27 to 31): Read the following table and answer the questions given below it:

Year →	Yearly commission earned by five salesman is Rs.					
Sales Man ↘	1988	1989	1990	1991	1992	1993
A	27,350	28,500	25,200	29,800	24,600	27,000
B	26,850	27,900	27,400	28,000	28,500	29,000
C	26,200	27,800	28,200	29,100	29,400	30,000
D	27,850	30,040	29,800	30,060	20,800	32,000
E	28,640	29,000	28,750	30,000	29,750	29,700

27. In the year 1992 commission earned by salesman 'D' was greater than that earned by A by what per cent (approximately)?  
(a) 18 (b) 21 (c) 17 (d) 19 (e) None of these
28. In which year did the commission earned by the salesman 'C' show the highest increase over that of the preceding year?  
(a) 1989 (b) 1990 (c) 1991 (d) 1992 (e) None
29. In which of the following years was the difference between the highest and lowest commission earned by any salesman maximum?  
(a) 1990 (b) 1991 (c) 1992 (d) 1993 (e) None of these
30. Which salesman commission in 1991 shows the highest increase over that in 1988?  
(a) A (b) B (c) E (d) D (e) C
31. In the year 1990, the commission of B was approximately what percent of the total commission earned by five salesmen in that year?  
(a) 20 (b) 98 (c) 80 (d) 90 (e) 2

Direction (32 to 36): The following five questions are to be answered on the basis of the table given, which gives the growth of regular monthly invest at 7% return, compounded monthly.

Number of years	Monthly Investment			
	Rs.50	Rs.100	Rs. 250	Rs. 500
2	1, 292	2, 583	6, 458	12, 915
5	3, 601	7, 201	18, 003	36, 005
10	8, 705	17, 409	43, 524	87, 047
20	26, 198	52, 397	1, 30, 991	2, 61, 983

32. How much total interest is earned on a 7% investment for a 5-years period with monthly investments Rs. 100?  
(a) Rs. 7, 201 (b) Rs. 1, 201 (c) Rs. 6000 (d) Rs. 201
33. How much more is earned on a Rs. 50 monthly investment for 10 years, than on a Rs. 100 monthly investment for 5 years?  
(a) Rs. 150 (b) Rs. 701 (c) Rs. 870 (d) 1, 504
34. How much less is earned on a Rs. 500 monthly investment for 10 years, than on a Rs. 250 monthly investment for 20 years?  
(a) Rs. 43, 944 (b) Rs. 18, 003 (c) Rs. 36, 005 (d) Rs. 7, 201
35. How much total interest is earned on a 7% investment for a 10-years period with monthly investments of Rs. 100?  
(a) Rs. 5, 409 (b) Rs. 10, 208 (c) Rs. 17, 409 (d) Rs. 8, 705
36. What is the approximate ratio of the interest earned on a 10-years period to the interest earned over a 5-years period with monthly investment of Rs. 100?  
(a) 2 : 1 (b) 4 : 1 (c) 8 : 1 (d) 9 : 2

Directions (37 to 41): The following table represents the export of wheat and import of sugar in various years. Read the table and answer the questions given below it.

Year	Export of Wheat (in crores of Rs.)	Import of Sugar (in crores of Rs.)
1979-80	44	58
1981-82	45	50
1983-84	60	54
1985-86	56	60
1987-88	92	68
1989-90	100	78
1991-92	68	60

37. During which period was there maximum fall in export?  
 (a) 1985-86 (b) 1987-88 (c) 1989-90 (d) 1991-90
38. The percentage of increase of imports in 1989-90 over 1987-88 is ---- ?  
 (a) 1.47% (b) 14.7% (c) 17.4% (d) 20.0%
39. In 1981-82 the ratio of export to the import is ----?  
 (a) 9 : 10 (b) 10 : 9 (c) 14 : 15 (d) 15 : 14
40. During which period was there maximum increase in import over its preceding year?  
 (a) 1983-84 (b) 1985-86 (c) 1987-88 (d) 1989-90
41. During which period was there minimum increase in import over its preceding year?  
 (a) 1985-86 (b) 1987-88 (c) 1989-90 (d) None

Directions (42 to 46): The following five questions are to be answered on the basis of the table given below.

*Weight Distribution in the Average Adult*

Organ	Weight (in grams)
Muscles	30,000
Skeleton	10,000
Blood	5,000
Gastrointestinal Tract	2,000
Lunge	1,000
Liver	1,700
Brain	1,500

42. The total body weight of the average adult is  
 (a) 70,000 grams (b) More than 51 kg (c) 50,000 grams (d) Less than 50 kg
43. If the weight of the skeleton is represented as S grams, then the weight of the liver can be represented as ----?  
 (a) 1.7S (b) 0.17S (c) 17S (d) 71S
44. The ratio expressed in decimals of the weight of the blood to the weight of the gastrointestinal tract is ----?  
 (a) 0.4 (b) 4.0 (c) 2.5 (d) 0.25
45. The ratio expressed in decimals of the weight of the brain to the weight of the muscles is ----?  
 (a) 0.5 (b) 0.15 (c) 0.20 (d) 0.05
46. The ratio expressed in decimal of the weight of the brain to the weight of the lungs is ----?  
 (a) 1.5 (b) 0.15 (c) 15.0 (d) 5.1

Directions (47 to 51): study the following table carefully and answer the questions given below it.

*Index of whole sale prices of commodities (Base 1969-70 = 100)*

Commodities	Oct.11 1996	Oct 10 1996	Oct.9 1996	Oct.8 1996	Oct.7 1996	Week ago	Month ago
Rice	857.2	857.2	857.2	857.2	857.2	857.2	864.3
Wheat	494.4	491.0	488.9	486.1	484.5	484.5	479.0
Groundnut oil	787.8	789.3	798.3	786.3	787.1	796.0	807.1
Sugar	533.1	533.1	533.1	533.3	533.3	534.0	542.7
Gur	1457.9	1457.9	1457.9	1443.7	1443.7	1443.7	1340.4
Raw Jute	179.0	179.0	179.0	179.0	179.0	179.0	179.0
Cotton	1105.4	1105.4	1105.4	1105.4	1105.4	1105.4	1105.4
Ground nut	814.7	814.7	814.7	825.4	820.7	820.7	819.4
Metals	955.9	955.9	955.3	954.0	957.1	957.1	974.2

47. The difference in the index of which of the following commodities was the maximum between sept-96 and Oct-96?  
 (a) Wheat (b) Sugar (c) Gur (d) Ground nut (e) Name of these
48. In how many commodities was there increase in the index from the position of 'month ago' and oct-11-1996?  
 (a) 1 (b) 2 (c) 3 (d) 4 (e) None of these
49. With reference to the base price of 1969-70, the price of which of the following commodities has undergone maximum increase over the years?  
 (a) Rice (b) Gur (c) Cotton (d) Wheat (e) Sugar
50. The price of which of the following commodities has remained same from sept,1996 to oct-1996?  
 (a) Raw Jute (b) Cotton (c) Rawjute and Cotton (d) Ground net (e) name of these
51. In the case of which of the following commodities the percentage increase in the index from oct-7 to oct-11 was the maximum?  
 (a) Wheat (b) Ground nut (c) Gur (d) Metals (e) None of these

**KEY:**

- 01.a 02.d 03.d 04.b 05.b 06.d 07.d 08.a 09.e 10.d  
 11.d 12.c 13.b 14.a 15.a 16.a 17.a 18.b 19.c 20.a  
 21.b 22.e 23.e 24.d 25.d 26.e 27.b 28.a 29.c 30.e  
 31.a 32.b 33.d 34.a 35.a 36.d 37.d 38.b 39.a 40.d  
 41.d 42.b 43.b 44.c 45.d 46.a 47.c 48.b 49.b 50.c

51.a

**(2) BAR CHARTS**

Bar charts are one of the easiest, graphically attractive and hence most commonly used methods of presenting all types of data. They are especially useful for representing various data series (normally 1 to 4). The data series comprises the continuous variables while the values of the specific instances at which the value of the data series is measured represents the values of the discrete variables.

Presentation of data as bar easy. A bar charts makes the comparative study of the data very easy. A bar chart consists of group of bars which are equidistant from each other. The values on the bar charts are read by the measurement of the length (or) the height of the bars. The width of the bars is largely inessential and is used only for the clarity of the presentation.

Points noteworthy with respect to bar charts :

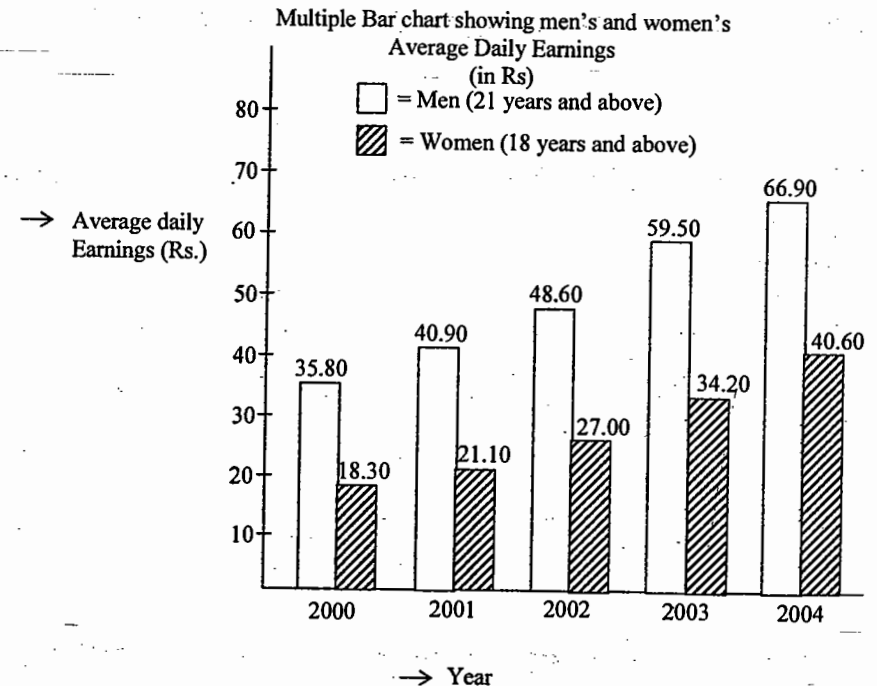
1. Bar diagrams are visual aids for presenting statistical data very often in bar charts, different colours, shades, dots, dashes, etc. are used in the bars to distinguish between different continuous variables being represented. There will always be an explanatory index indicating the meanings of the different colours, shades and markings.

2. Each bar diagram has a title (which is displayed either at the top (or) at the bottom of the diagram) indicating the subject matter depicted in the diagram. Besides, at times, there may be foot notes at the bottom of the diagram to explain facts that are not covered in the title. The student is advised to be very-careful about readings these footnotes and not to overlook these facts while interpreting bar diagrams.

3. One axis (normally the x – axis) of every bar diagram will represent a discrete variable while the other axis represents the scale for one (or) more continuous variable.

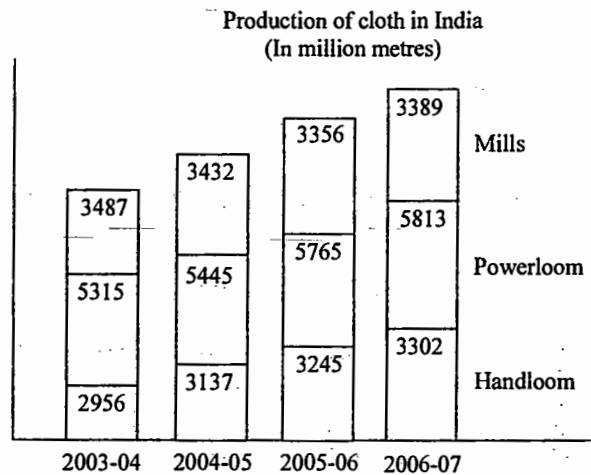
**CLASSWORK**

**Directions (Questions 01 to 03) :** The following is a multiple bar chart showing men's and women's average daily earnings in certain industries. Study the chart and answer the questions given below.



01. In which year is the ratio of men's average daily earnings and women's average daily earnings, the highest ?  
 (a) 2000      (b) 2002      (c) 2001      (d) 2004      (e) 2003
02. In which year is the percentage increase in the average daily earnings of men over the preceding year, the maximum ?  
 (a) 2001      (b) 2004      (c) 2002      (d) 2003
03. The difference between the average daily earnings of men and women over successive years \_\_\_\_\_  
 (a) increase      (b) decrease      (c) remains the same      (d) None of these

Directions (Questions 04 to 08) : Study the bar chart carefully and answer the following questions.



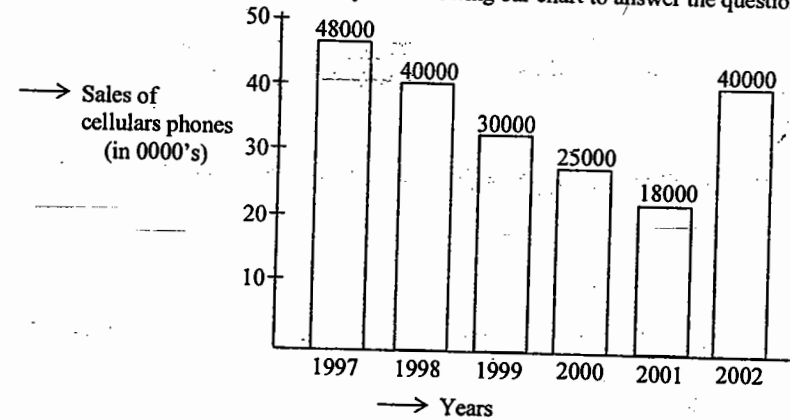
04. Total cloth production in India in the year 2003 - 04 was (in million metres)  
(a) 11,758 (b) 12,014 (c) 11,000 (d) 12,504
05. What is the growth percent in the production of cloth in the powerloom sector in 2006 - 07 over 2004 - 05 ?  
(a) 10 (b) 8 (c) 5 (d) 6.8
06. What is the approximate ratio of the production of cloth in the powerloom sector to that in the Handloom sector during 2003 - 04 ?  
(a) 18 : 13 (b) 9 : 5 (c) 5 : 9 (d) 8 : 3
07. If the average price of a metre of cloth produced in the Handloom, powerloom and mill sectors is 2.5 : 1.5 : 1, then the percentage growth of the value of the cloth produced in 2004 - 05 over 2003 - 2004 was (assume no change in the relative price)  
(a) 12 (b) 3 (c) 16 (d) cannot be determined
08. In the year 2006 - 07, it was found that per capita production of labour employed in Handloom, powerloom and mill sectors was 1500 metres, 3000 metres, and 5600 metres respectively. Approximately how many people were employed in the cloth industry during that year ?  
(a) 37 lakhs (b) 5 lakhs (c) 12.5 lakhs (d) 47 lakhs

KEY:

01.a 02.d 03.a 04.a 05.d 06.b 07.b 08.c

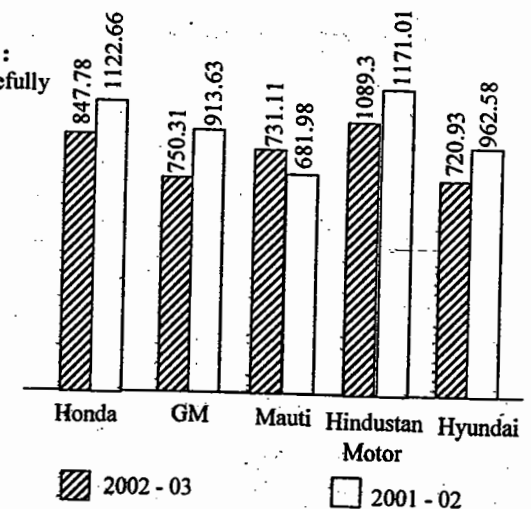
### ASSIGNMENT

Direction for Questions 1 to 4 : Study the following bar chart to answer the questions.



1. The percentage increase in sales from 2001 to 2002 was  
(a) 115% (b) 128% (c) 122% (d) 118%
2. The sum of sales of cellular phones in the year 1999 and 2001 is equal to that of \_\_\_\_\_  
(a) 1997 (b) 1998 (c) 2000 (d) 2002
3. The two years between which the rate of change of cellular phones is minimum are :  
(a) 1997 and 1998 (b) 1999 and 2000 (c) Both 1 and 2 (d) 2001 and 2002
4. The difference in the sales of cellular phones for the years 1997 and 1999 is \_\_\_\_\_  
(a) 500 units (b) 1,000 units (c) 5,000 units (d) 18,000 units

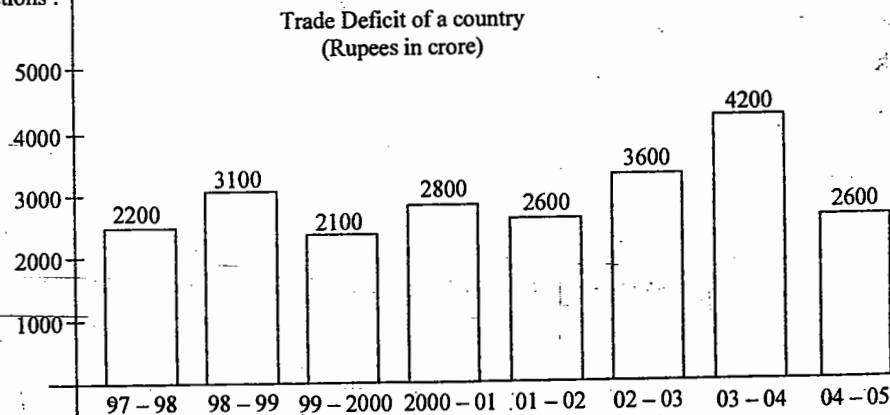
Direction for Questions (5 to 9) :  
Study the following bar chart carefully and answer the questions given.





5. What is the approximate difference between the average sales turnover of all the companies put together between the years 2001 – 02 and 2002 – 2003 ?  
 (a) 133.45 (b) 142.48 (c) 117.6 (d) None
6. What should have been the sales turnover of GM in 2002 – 03 to have shown an excess of the same quantum over 2001 – 02 as shown by the sales turnover of maruti ?  
 (a) 953.76 (b) 963.76 (c) 952.76 (d) 962.76
7. Which of the companies shows the maximum percentage difference in sales turnover between the two years ?  
 (a) Honda (b) GM (c) Hyundai (d) Maruti
8. What is the percentage change in the overall sales turnover of the five companies together between 2001 – 02 to 2002 – 03  
 (a) 17.21% (b) 14.68% (c) 12.67% (d) 21.24%
9. What is the absolute change in the overall sales turn over of the five companies together between 2001 – 02 to 2002 – 2003 ?  
 (a) 712.43 (b) 142.48 (c) 683.53 (d) None of these

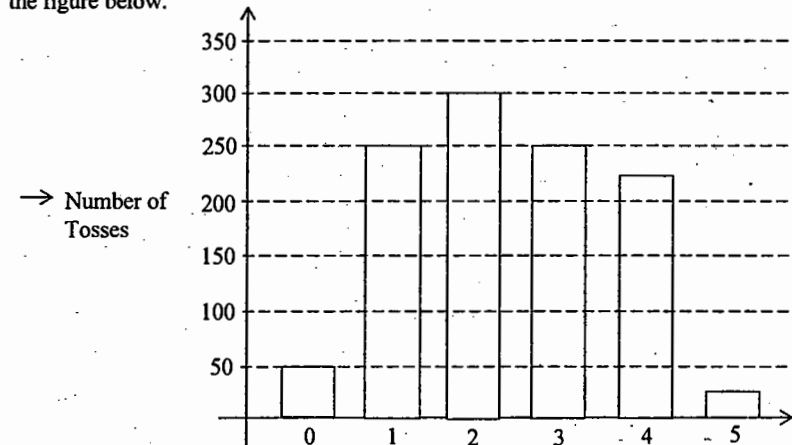
Directions (Questions 10 to 14) : Study the graph carefully and answer the following questions :



10. The deficit in 2002- 03 was roughly how many times the deficit in 1999 – 2000 ?  
 (a) 1.7 (b) 1.95 (c) 2.1 (d) 1.4
11. In which of the following years, the percent increase of deficit was highest to that in the preceding year ?  
 (a) 2002 – 2003 (b) 1998 – 1999 (c) 2000 – 2001 (d) 2003 – 2004
12. The increase in deficit in 2003 – 2004 was what percent of the deficit in 1999 – 2000 ?  
 (a) 150 (b) 200 (c) 100 (d) None of these

13. The deficit in 2004 – 2005 was approximately what percent of the average deficit ?  
 (a) 140 (b) 135 (c) 90 (d) 125
14. The ratio of the number of years in which the trade deficit is above the average deficit to those in which the trade deficit is below the average deficit is :  
 (a) 4 : 3 (b) 3 : 5 (c) 3 : 4 (d) 5 : 3

Directions (Questions 15 to 18) : These questions refer to the following data :  
 Five coins were tossed 1000 times and at each toss the number of heads was observed. The number of tosses during which 0, 1, 2, 3, 4 and 5 heads were obtained separately is shown in the figure below.



15. The total number of tosses resulting in number of heads greater than 1 is  
 (a) 950 (b) 800 (c) 500 (d) 250
16. The total number of tosses resulting in a number of heads greater than 3 is  
 (a) 250 (b) 300 (c) 350 (d) 400
17. Two heads were obtained in \_\_\_\_\_  
 (a) 2 tosses (b) 150 tosses (c) 250 tosses (d) 300 tosses
18. The total number of tosses resulting in number of heads greater than 2 but less than 4 is  
 (a) 200 (b) 250 (c) 275 (d) 300

KEY:

- 01.c 02.a 03.c 04.d 05.b 06.d 07.c 08.b 09.a 10.a  
 11.a 12.b 13.c 14.b 15.b 16.a 17.d 18.b

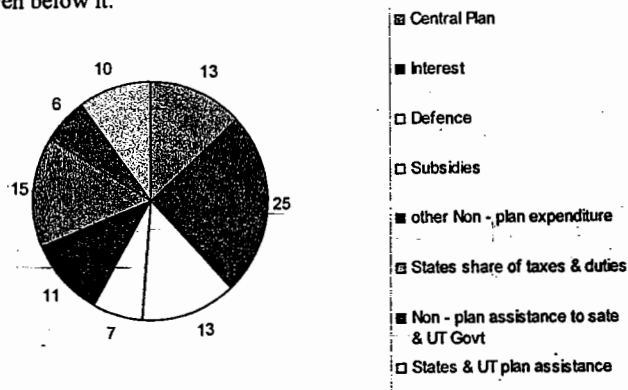
**(3) PIE CHARTS**

Pie charts are specific types of data presentation where the data is represented in the form of a circle. In a pie chart, a circle is divided into various sections or segments such that each sector (or) segment represents a certain proportion or percentage of the total. In such a diagram, the total of all the given items is equal to 360 degrees and the degrees of angles, representing different items, are calculated proportionately. The entire diagram looks like a pie and its components resemble slices cut from a pie. The pie chart is used to show the break-up of one continuous variable into its component parts.

A single pie diagram can represent only one continuous variable. Hence, in terms of versatility of data representation, pie charts are less versatile than either of bar charts, graphs (or) tables. However, their utility is in the fact that the representation of data is cleaner and it gives an immediate idea of the relative distribution of the continuous variable amongst different sectors.

**CLASSWORK**

**Direction (Questions 01 to 04):** The following pie chart shows how the rupee goes out from the national kitty in the 1997 – 98 budget proposals. Study the chart carefully and answer the questions given below it.



- Central plan: 13 P
- Interest : 25 P
- Defense : 13 P
- Subsidies : 7 P
- Other Non – plan expenditure : 11P
- States Share of taxes & duties : 15 P
- Non – plan assistance to state & UT Govt : 6P
- States & UT plan assistance : 10 P

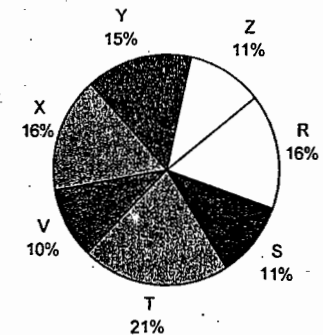
01. The states share of taxes and duties as a percentage of total divisible pool is \_\_\_\_\_
- (a) 13%      (b) 14%      (c) 15%      (d) 10%

02. What should be the central angle for state and UT plan assistance?
- (a)  $18^{\circ}$       (b)  $36^{\circ}$       (c)  $28^{\circ}$       (d)  $8^{\circ}$
03. If non – plan assistance to state and UT Govts. Is Rs. 16440 crore, the defence expenditure is \_\_\_\_\_
- (a) 30,500 Crore      (b) 30,000 Crore      (c) 35,620 Crore      (d) 31,500 Crore
04. If Rs. 29,498 Crore was allocated for defence in 1996 – 97, what is the approximate percentage increase in the allocation for defence in 1997 – 98?
- (a) 21%      (b) 15%      (c) 25%      (d) None of these

**Directions (Question No. 05 to 09):** Study the following pie – chart and the table and answer the questions based on them.

PROPORTION OF POPULATION OF SEVEN VILLAGES IN 2007

Village	% Population below poverty line
X	38
Y	52
Z	42
R	51
S	49
T	46
V	58



05. Find the population of village ‘S’ if the population of village x below poverty line in 2007 is 12160?
- (a) 18500      (b) 20500      (c) 22000      (d) 26000
06. The ratio of population of village T below poverty line to that of village Z below poverty line in 2007 is \_\_\_\_\_
- (a) 11 : 23      (b) 13 : 11      (c) 23 : 11      (d) 11 : 13
07. If the population of village R in 2007 is 32000, the what will be the population of village Y below poverty line in that year?
- (a) 14100      (b) 15600      (c) 16500      (d) 17000
08. If in 2008, the population of village Y and V increase by 10% each and the percentage of population below poverty line remains unchanged for all the villages, then find the population of village V below poverty line in 2008, given that the population of village Y in 2007 was 30,000?
- (a) 11250      (b) 12760      (c) 13140      (d) 13780

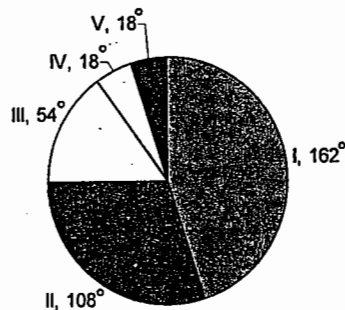
09. If in 2009, the population of village 'R' increases by 10%, while that of village Z reduces by 5% compared to that in 2007 and the percentage of population below poverty line remains unchanged for all the villages, then find the approximate ratio of population of village 'R' below poverty line to the ratio of population of village 'Z' below poverty line for the year 1999?
- (a) 2 : 1      (b) 3 : 2      (c) 4 : 3      (d) 5 : 4

KEY:

01.c 02.b 03.c 04.a 05.c 06.c 07.b 08.b 09.a

## ASSIGNMENT

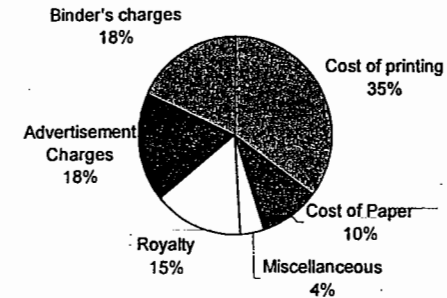
Direction (Question 1 to 4): The total population of a city is 5000. The various section are indicated in the pie diagram.



- (I) : Employees of the public sector  
 (II) : employees of the Private sector  
 (III) : Employees of the corporate sector  
 (IV) : Self - Employed  
 (V) : Unemployed

01. What percentage of the employed persons is self employed?
- (a) 5%      (b)  $5\frac{5}{19}$ %      (c) 19%      (d) 20%
02. Number of persons employed in the corporate sector is
- (a) 250      (b) 500      (c) 750      (d) 1500
03. The number of unemployed person is
- (a) 250      (b) 150      (c) 100      (d) 50
04. The number of persons employed in both the public sector and corporate sector is
- (a) 3750      (b) 3000      (c) 2500      (d) 2200

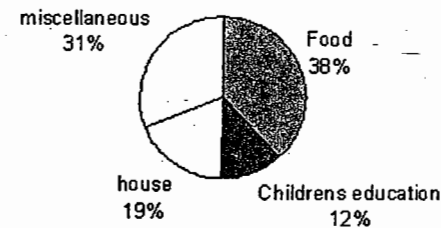
Direction (Question 5 to 8): Study the pie - chart and answer the question given below it.



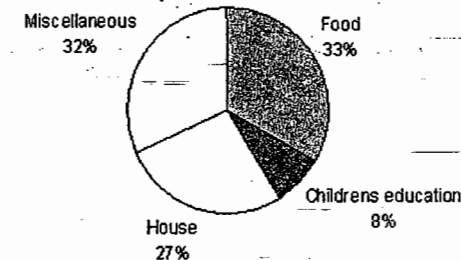
05. If the miscellaneous charges are Rs. 6,000, the advertisement charges are \_\_\_\_\_
- (a) Rs. 90,000      (b) Rs. 1,333.33      (c) Rs. 27,000      (d) Rs. 12,000
06. If the cost of printing is Rs. 17,500, the royalty is \_\_\_\_\_
- (a) Rs. 8,750      (b) Rs. 7,500      (c) Rs. 3,150      (d) Rs. 6,300
07. The central angle of cost of printing is more than that of advertisement charges by \_\_\_\_\_
- (a)  $72^\circ$       (b)  $61.2^\circ$       (c)  $60^\circ$       (d)  $54.8^\circ$
08. What should be the central angle of the sector for the cost of the paper?
- (a)  $22.5^\circ$       (b)  $16^\circ$       (c)  $54.8^\circ$       (d)  $36^\circ$

Directions (Questions 9 to 12): The following pie diagrams show the monthly expenditure of Rakesh and Sohan. Rakesh earns Rs. 15,000 per month and Sohan Rs. 18,000 per month, study the diagrams and answer the question given below/

## RAKESH



## SOHAN



09. How much more (or) less does Sohan spend on children's education than Rakesh?
- (a) Rs. 900 more      (b) Rs. 360 less      (c) Rs. 900 less      (d) Rs. 360 more  
 (e) None of these
10. Who spends more on food and how much more?
- (a) Sohan, Rs. 240 more      (b) Rakesh, Rs. 240 more  
 (c) Sohan, Rs. 140 more      (d) Rakesh, Rs. 140 more      (e) Sohan, Rs. 200 more
11. What is the ratio of the expenditure on children's education by Rakesh and Sohan?
- (a) 5 : 4      (b) 4 : 5      (c) 6 : 7      (d) 8 : 7      (e) None of these

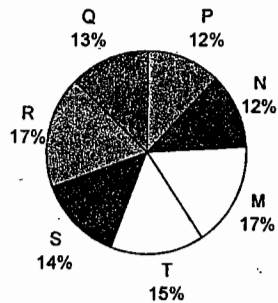
12. What is the measure of the angle used to represent the expenditure on house by Rakesh?  
 (a)  $68^\circ$  (approx) (b)  $86^\circ$  (approx) (c)  $60^\circ$  (approx)  
 (d)  $19^\circ$  (approx) (e) None of these

**Directions (Question No. 13 to 17):**

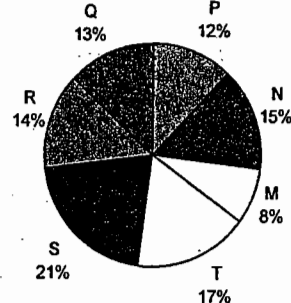
The following pie – charts show the distribution of students of graduate and post – graduate levels in seven different institutes – M, N, P, Q, R, S and T in a town.

Distribution of students at Graduate and Post – Graduate levels in seven Institutes – M, N, P, Q, R, S and T.

Total Number of students of Graduate Level = 27300



Total Number of students of Post - Graduate Level = 24700



13. How many students of institutes M and S are studying at graduate level?  
 (a) 7516 (b) 8463 (c) 9127 (d) 9404
14. Total number of students studying at post – graduate level from institutes N and P is \_\_\_\_  
 (a) 5601 (b) 5944 (c) 6669 (d) 7004
15. What is the total number of Graduate and Post – Graduate level students in institute R?  
 (a) 8320 (b) 7916 (c) 9116 (d) 8372
16. What is the ratio between the number of students at Post – Graduate and Graduate levels respectively from institute S?  
 (a) 14 : 19 (b) 19 : 21 (c) 17 : 21 (d) 19 : 14
17. What is the ratio between the number of students studying at Post – Graduate level from institute S and the number of students studying at graduate level from institute Q?  
 (a) 13 : 19 (b) 21 : 13 (c) 13 : 8 (d) 19 : 13

**KEY:**

- 01.a 02.c 03.a 04.b 05.c 06.b 07.b 08.d 09.d 10.a 11.a 12.a  
 13.b 14.c 15.d 16.d 17.d

#### (4) LINE GRAPHS / X – Y CHARTS

In this chapter, we shall concentrate on X – Y graphs as a mode of data presentation. While bar charts are useful for visual presentation of categorical and geographical data, data related to time – series and frequency distribution is best represented through X – Y (or) line graphs. This representation is widely used by news paper, television, government reports, magazines and research papers.

Besides, X – Y graphs are also very useful for determining trends, rate of change and for illustrating comparisons with respect to some time series.

The typical data shown on an X – Y chart involves a time series:

A time series is an arrangement of data on the basis of time, i.e, in chronological order. The time period may be a year, quarter, month, week, days, hours etc. Time series are extremely essential for the measurement of economic and business performance. Hence, most data relating to economics and business are in the form of time series.

In time – series data, time (the independent variable is seen as a discrete variable while the continuous variable being measured defines the other dependent variable.

Thus we have continuous variable like the population of a county, GDP of a country, data on exports and imports in an economy, data of production, sales, profit, etc. of a company and so forth which are measured against time.

Normally time is taken along the x – axis and the dependent continuous variable is taken along the y – axis

As you go through the exercise below you will see examples of various presentation of data possible, through X – Y charts. These are listed below for your quick reference. As you go through the exercise, familiarize yourself with the following representations.

Examples of various types of data presentation possible through X – Y charts. =

##### 1. Single dependent (Continuous variable graph):

These graphs show changes in a single variable over a certain period of time.

##### 2. More than one dependent (Continuous) variable graph:

In this type of graph, two (or) more lines are drawn to represent two (or) more dependent variables.

##### 3. Graphs with two scales:

When two continuous variables having different units of measurement have to be shown on the same graph, use two scales on the graph.

##### 4. Range Graph:

For some specific types of data (Such as temperatures, run rates, etc.) It is essential to depict the range of the variation of the variable over a period of time. This is depicted using a range graph, which shows the deviation between different values of the variable under consideration

## 5. Band graph:

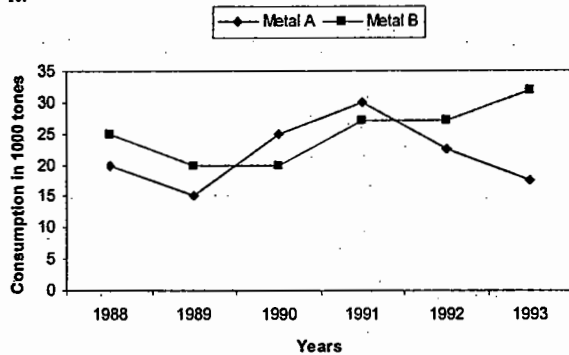
Like a stacked bar chart, the band graph is a line graph used to display the total value of a continuous variable broken up into its different components for each period.

## 6. Speed time graph:

This is a special case of an X - Y chart where the respective axes show the speed of a moving body against time.

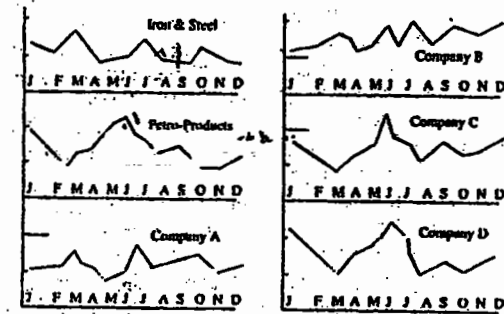
## CLASSWORK

Directions (Question 01 to 05): Study the following graph carefully and answer the question given below it:



01. In how many years, the consumption of metal A was less than the average consumption of metal B in the given years?  
 (a) One (b) Two (c) Three (d) Four (e) None of these
02. What was the difference in the consumption of metal A and metal B in 1992?  
 (a) 500 tonnes (b) 50 tonnes (c) 5000 tonnes  
 (d) 5 tonnes (e) None of these
03. In which of the following pairs of year, the consumption of metal B in 1993 was equivalent to the consumption of metal A?  
 (a) 1988 and 1989 (b) 1989 and 1993 (c) 1988 and 1993  
 (d) 1990 and 1992 (e) None of these
04. In which of the following years, the consumption of both the metals together was maximum?  
 (a) 1988 (b) 1990 (c) 1993 (d) 1991 (e) None of these
05. What is the per cent decrease in the consumption of metal A in 1992 in comparison to 1991?  
 (a) 30 (b) 70 (c) 40 (d) 35 (e) None of these

06. Direction: The following charts depict the price variation in a stock market during a year. Movement of industry - wise average price is plotted for the sectors of iron and steel and petro - products. Price movements of four companies A, B (iron and steel), C and D (petro - products) are also plotted. Study the charts and answer the question given below.

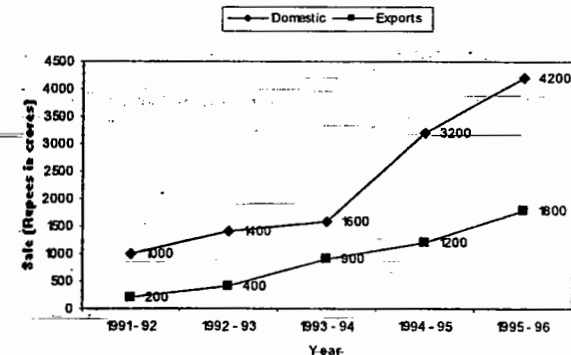


From the curves a significant feature that can be deduced is

- (a) Company C made a large profit around June  
 (b) All share prices will increase steadily in the next year  
 (c) Company B seems to be performing better than the market average  
 (d) petro - products are performing better than iron and steel

Directions (Questions 07 to 10): Study the following graph carefully and answer the question given below it.

## Sale of Hardware by the Computer Industry Over the years



07. What was the difference in sale of hardware between domestic and exports in 1993 - 94?  
 (a) Rs. 1,000 crore (b) Rs. 500 crore (c) Rs. 1,200 crore  
 (d) Rs. 700 crore (e) Rs. 200 crore
08. In which of the following years was the percentage increase in sale of hardware in domestic sector maximum over the preceding year?  
 (a) 1992 - 93 (b) 1993 - 94 (c) 1994 - 95  
 (d) 1992 - 93 and 1993 - 94 (e) None of these

09. What was the difference between the total hardware sale in exports sector in 1992 – 93 and 1993 – 94 together and hardware sale in domestic sector in 1993 – 94?  
 (a) Rs. 300 crore (b) Rs. 200 crore (c) Rs. 400 crore  
 (d) Rs. 150 crore (e) None of these
10. Approximately, what was the percentage increase in the sale of hardware in domestic sector from 1994 – 95 to 1995 – 96?  
 (a) 35 (b) 25 (c) 40 (d) 30 (e) 20

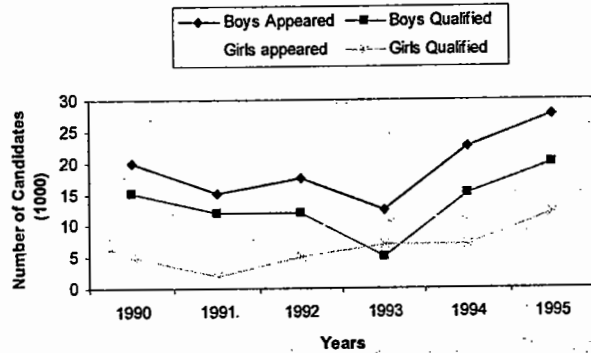
KEY:

- 01.d 02.c 03.b 04.d 05.c 06.c 07.d 08.c 09.a 10.d

ASSIGNMENT

Directions (Questions 01 to 05): Study the following graph carefully and answer the question given below it

Number of Candidates (Boys and Girls) Appeared and Qualified in an Exam. Over the years

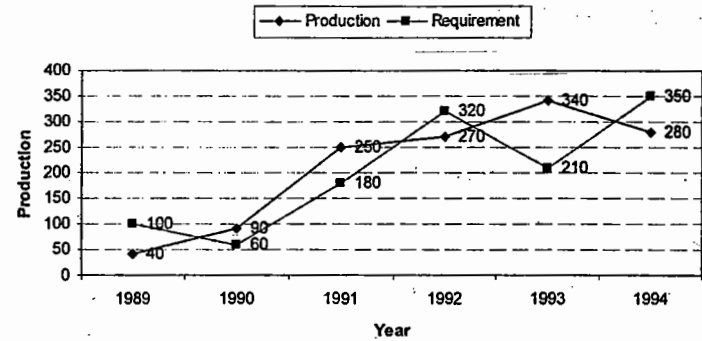


01. What was the approximate percentage of boys who qualified to those who appeared in 1992?  
 (a) 80 (b) 70 (c) 35 (d) 65 (e) 90
02. The total number of girls who qualified in 1991 and 1992 together was exactly equal to the number of girls who appeared in which of the following years?  
 (a) 1995 (b) 1994 (c) 1991 (d) 1992 (e) 1990
03. What was the percentage increase in the number of boys qualified from 1993 to 1994?  
 (a) 5 (b) 50 (c) 100 (d) 200 (e) None of these
04. What was the difference between the total number of boys and girls who appeared in 1993 and the total number of boys and girls who appeared in 1991?  
 (a) 7500 (b) 2500 (c) 5000 (d) 10000 (e) None of these

05. In which of the following years was the percentage of girls who qualified to those who appeared the highest among the given years?  
 (a) 1994 (b) 1993 (c) 1991 (d) 1992 (e) None of these

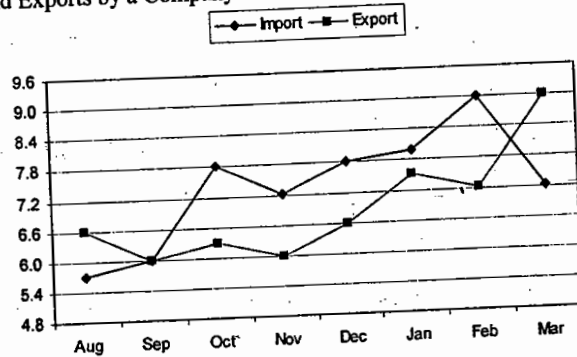
Directions (Questions 06 to 10): Study the following graph carefully and answer the question given below it.

Requirement and Production of Rubber over the years (in Thousand Tons)



06. In which of the following years, was it likely that the quantity of rubber imported to bridge the gap between demand and supply, was minimum?  
 (a) 1990 (b) 1992 (c) 1994 (d) 1989 (e) None of these
07. During which year was the percentage drop in the requirement of rubber over the previous year, the maximum?  
 (a) 1993 (b) 1992 (c) 1990  
 (d) Data inadequate (e) None of these
08. In 1990, the production of rubber was what per cent of the requirement?  
 (a) 50 (b) 67 (c) 45 (d) 300 (e) 150
09. For which of the two years was the average yearly production of rubber equal to the average yearly requirement?  
 (a) 1991 and 1994 (b) 1992 and 1993 (c) 1991 and 1992  
 (d) 1993 and 1994 (e) 1992 and 1994
10. In 1991, the quantity of requirement of rubber was what per cent of the quantity of production?  
 (a) 28 (b) 72 (c) 65 (d) 56 (e) 70

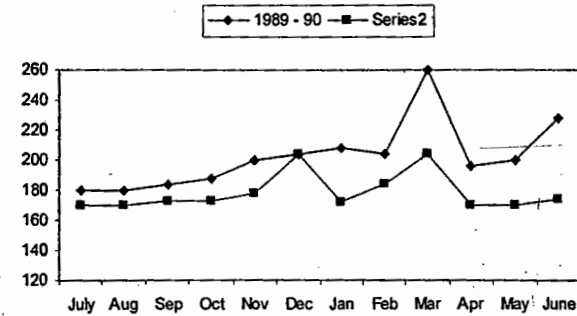
Directions (Questions 11 to 15): Study the following graph carefully and answer the question given below it.  
Total Imports and Exports by a Company in the months of August to March (Rupees in Lacs)



11. What was the average import from August to March?  
(a) Rs. 58.8 lacs (b) Rs. 7.35 lacs (c) Rs. 8.4 lacs (d) Rs. 7.31 lacs  
(e) None of these
12. What was the difference between import and export from August to March?  
(a) Rs. 36 lacs (b) Rs. 3.6 lacs (c) Rs. 45,000 (d) Rs. 4.5 lacs  
(e) None of these
13. In which of the following pairs of months was the increase in the imports from the previous month exactly the same?  
(a) September, October (b) October, November  
(c) November, December (d) December, January (e) None of these
14. What was the percentage increase in export from February to March?  
(a) 16 (b) 20 (c) 25 (d) 40 (e) none of these
15. What was the difference in the value of export between December and January?  
(a) Rs. 9 lacs (b) Rs. 90 lacs (c) Rs. 30,000 (d) Rs. 90,000  
(e) None of these

Directions (Questions 16 to 19): Study the following graph carefully and answer the question given below it.

Index of Industrial Production



16. Which month has the highest index of industrial production both in 1988-89 and 1989-90?  
(a) March 1990 (b) March 1989 (c) March 1988 (d) both (a) and (b)
17. What is the percentage change in the index of industrial production in the year 1989-90?  
(a) 27.78% (b) 26.74% (c) 27.74% (d) 26.65%
18. In which year, 1988-89 or 1989-90, has the percentage change in the index of industrial production been higher?  
(a) 1988 (b) 1989-90 (c) 1988-89 (d) 1989
19. Which of the following statement(s) is/are true?  
I. The percentage change in the index of industrial production of 1988-89 is 10%  
II. The index of industrial production is exceptionally high in March of each year.  
(a) I and II (b) I-only (c) II only (d) None of these

KEY:

- 01.b 02.e 03.d 04.b 05.b 06.b 07.c 08.e 09.a 10.b  
11.b 12.b 13.e 14.c 15.d 16. 17. 18. 19.

END OF THE BOOK

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