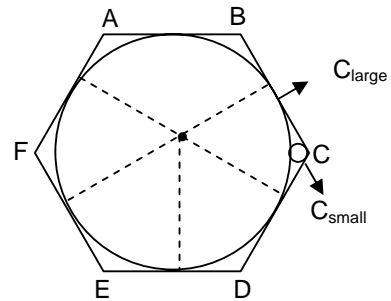


MOCK CAT**SECTION – A**

1. If $m^2a^2 + (n^2 + 1)b^2 + c^2 = 2b(mna - c)$, then which of the following statement(s) is/are necessarily true?
- I. $ma = nb$
 II. $ma = -nc$
 III. $ma = nc$
- (1) I only (2) only II and III (3) Only I and II (4) None of these

2. In the adjacent figure ABCDEF is a regular hexagon. Find the ratio of the radius of C_{large} to that of radius of C_{small} .

- (1) $\frac{\sqrt{2} + 1}{\sqrt{2} - 1}$ (2) $\frac{2 + \sqrt{3}}{2 - \sqrt{3}}$
 (3) $\frac{\sqrt{2}}{1}$ (4) Can't say



Directions for questions 3 – 4: Refer to the following data for the following questions.

There are 4 cities A, B, C & D. There can be two types of routes between any two cities. One is a direct one while the other one indirect. A, B & C all have direct routes between them. While city D is connected only to A & C with only one road to each. There are a total of 18 routes between A & C, 27 routes between A & B and 22 routes between B & C.

3. How many direct roads are there between A & B?
 (1) 4 (2) 3 (3) 6 (4) 2
4. How many direct roads are there between B & C?
 (1) 4 (2) 3 (3) 5 (4) 1
5. On a certain pasture the grass grows at an even rate. It is known that 40 cows can graze on it for 40 days before the grass is exhausted, but 30 cows can graze there for as long as 60 days. How many days would the pasture last if 20 cows were to graze on it.
 (1) 90 days (2) 80 days (3) 100 days (4) 120 days

Directions for questions 6 – 8: Refer to the following data for the following questions.

A polynomial of the form $a_1 x^{n_1} + a_2 x^{n_2} + \dots + a_i x^{n_i} + \dots + a_k x^{n_k}$ where $n_1 > n_2 > \dots > n_k$ and $a_1 \neq 0$ and $0 \leq i < k$ is represented by the sequence $(a_1, n_1, a_2, n_2, a_3, n_3, \dots, a_k, n_k)$

6. The value of $(3, 5, 2, 2, 4, 1) + (1, 5, 2, 4, 5, 1)$ is
 (1) $(3, 5, 2, 4, 2, 2, 9, 1)$ (2) $(4, 5, 2, 4, 2, 3, 3, 2, 9, 1)$
 (3) $(4, 5, 2, 3, 5, 1)$ (4) None of these
7. The value of $(4, 2, 6, 1, 5, 0) \times (1, 1, 1, 0)$ is
 (1) $(4, 3, 6, 1, 5, 0)$ (2) $(4, 3, 6, 2, 5, 1)$
 (3) $(4, 3, 10, 2, 11, 1, 5, 0)$ (4) None of these

8. If $(1, 2, 0) \times y = (1, 2, 4, 1, 4, 0)$ and $(1, 1, 2, 0) \neq 0$, then $y =$
(1) $(1, 1, 2, 0)$ (2) $(1, 1, 4, 0)$ (3) $(1, 2, 2, 1)$ (4) None of these
9. For some digit 'a' we have $0.a25a25a25 \dots = \frac{K}{810}$, where K is a positive integer. Find the hundred place of K.
(1) 5 (2) 7 (3) 9 (4) 3
10. M is the largest multiple of 8 which has no two digits the same. What is remainder when M is divided by 1000?
(1) 240 (2) 312 (3) 120 (4) 100
11. At the Bus-stand, I noted that most of the buses had Blue number plates. Half the buses with White plates moved off on the tour. After this the ratio of Blue to White is 12 : 1. Within an hour, 2 more Buses with White number plates started out. Now the present ratio of Blue to White becomes 20 : 1. Now guess at this stage how many buses with Blue number plates are there?
(1) 50 (2) 60 (3) 75 (4) 90
12. According to the positions of minute hand & hour hand, it is now a certain number of minutes past eight O'clock but it was six times as many minutes past seven O'clock 15 minutes ago. So guess what is the time now?
(1) 8 : 07 (2) 8 : 09 (3) 8 : 45 (4) None of these
13. Last year my father organized my birthday party. He distributed chocolates to all the children & trying to ensure each received an equal amount. But when we counted & found that each had 18 except one who had only 12. I calculated that if the number of children was subtracted from the total number of chocolates, it would equal to 1014. So guess how many children came in my birthday party?
(1) 17 (2) 55 (3) 60 (4) 65
14. A shopkeeper spent money in three equal parts in buying Pants, shirts & T-shirts. Each pant cost Rs.10 more than shirt & Rs.20 more than T-shirt. Altogether he bought 470 apparels. The number of shirts exceeded that of the pants by as many T-shirts as he could have bought by Rs. 90. The number of pants, shirts & T-shirts are respectively.
(1) 170, 120, 180 (2) 150, 130, 190 (3) 120, 150, 200 (4) None of these
15. The sequence 2, 3, 5, 6, 7, 10, 11, ... consists of all positive integers that are not a square or a cube. Find the 1000th term.
(1) 1038 (2) 1028 (3) 1039 (4) 1041
16. Mr. Munish is a computer programmer. He is assigned with three jobs for which time allotted is in the ratio of 5 : 4 : 2 (jobs are needed to be done individually). But due to some technical snag, 10%, 12.5% and 25% of the time allotted for each job gets wasted respectively. He invests only 50%, 40% and 30% of the hours of what was actually allotted to do the three jobs individually. Find how much percentage of the total time allotted is the time wasted by Munish?
(1) 38.33% (2) 39.4545% (3) 49.09% (4) Cannot be determined

17. An electronic lock has 10 digit codes. A combination is any subset of 5 digits. It can be opened by the combination in any order. Let there be X combinations possible. Suppose it is redesigned to allow a combination to be any subset of 1 to 9 digits. What is the approx. percentage increase in total combinations?
- (1) 210 (2) 305 (3) 83 (4) 350
18. If $M = 107$, $N = 108$, $O = 109$, $P = 110$ then the square root of $(1 + (M + 1)(N + 1)(O + 1)(P + 1))$
- (1) 11989 (2) 11909 (3) 10979 (4) 9069
19. Five consecutive positive integers are such whose sum is a cube and sum of the middle three is a square, find the smallest possible middle integer.
- (1) 27 (2) 125 (3) 675 (4) 225
20. If $16^{101} + 8^{101} + 4^{101} + 2^{101} + 1$ is divided by $2^{100} + 1$, then the remainder is
- (1) 0 (2) 11 (3) 4 (4) 2
21. At how many points does the graph of $y = (x - 2)(2x^2 - 5x + 4)(2x^2 - 7x + 4)$ intersect the x-axis?
- (1) 0 (2) 1 (3) 2 (4) 3
22. A child starts counting all the natural numbers starting from one. After sometime he stops and finds that he has not counted one of the numbers and also that he has counted one other number thrice. To his surprise he finds that the final count is the same as he would have got without making any mistake. What is the total number of such combinations possible if the count was 496?
- (1) 14 (2) 15 (3) 16 (4) None of these
23. Give that $1025/1024 = 1.0009765625$, what is the sum of the digits of 5^{10} ?
- (1) 36 (2) 40 (3) 41 (4) 50
24. $f(x, y)$ is defined for positive integers x, y and satisfies $f(x, x) = x$, $f(x, y) = f(y, x)$, $f(x, x + y) = (1 + x/y)f(x, y)$. Find $f(14, 52)$.
- (1) 246 (2) 424 (3) 190 (4) 364
25. A biased coin has probability p of coming up tails. If it is tossed five times, the probability of just two tails is the same as the probability of just one tail. Find the probability of just three tails in five tosses.
- (1) $\frac{40}{3^5}$ (2) $\frac{5}{16}$ (3) $\frac{25}{3^5}$ (4) $\frac{10}{3^5}$

SECTION – B

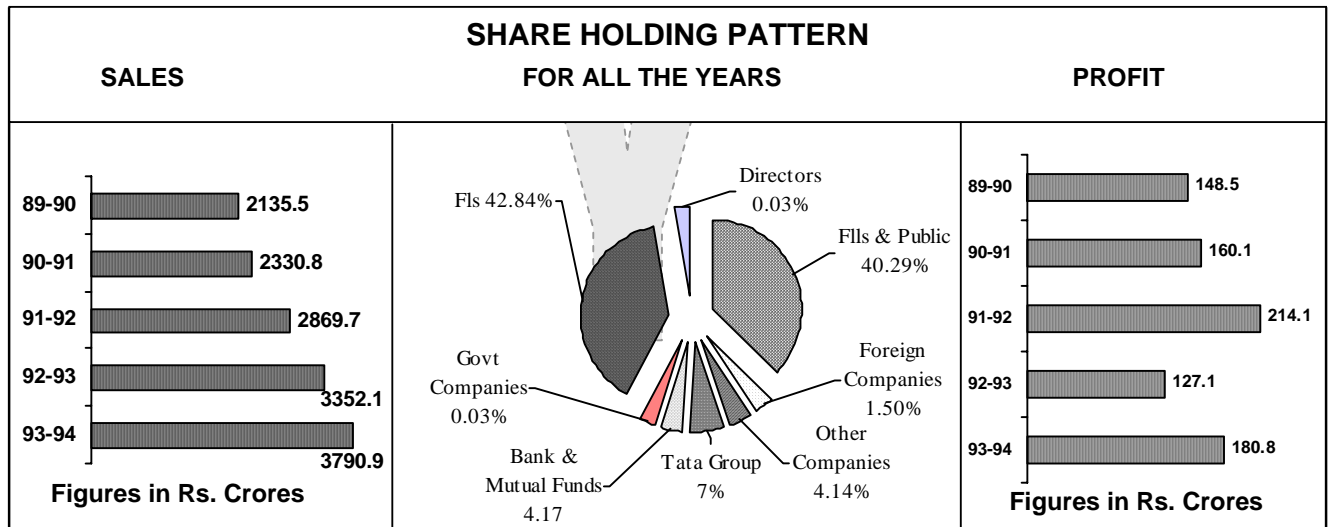
Directions for questions 26 – 28: Read the following and answer the questions that follow the BSNL announced a cut in the STD rates on 27 December 2001. The new rates and slabs are given in the table below and are to be implemented from the 14 January 2002.

SLAB DETAILS

Rates (Rs./min)				
Distance	Peak Rates		Off Peak	
	Old	New	Old	New
50 – 200	4.8	2.4	1.2	1.2
200 – 500	11.6	4.8	3	2.4
500 – 1000	17.56	9.00	4.5	4.5
1000+	17.56	9.00	6	4.5

26. The maximum percentage reduction in costs will be experienced for calls over which of the following distances?
 (1) 50-200 (2) 500-1000 (3) 1000+ (4) 200-500
27. The percentage difference in the cost of a set of telephone calls made on the 13th and 14th January having durations of 4 minutes over a distance of 350 km, 3 minutes for a distance of 700 km and 3 minutes for a distance of 1050 kms is (if all the three calls are made in peak times)
 (1) 51.2% (2) 51.76% (3) 59.8% (4) Cannot be determined
28. If one of the three calls in question 48 were made in an off peak time on both days, then the percentage reduction in the total cost of the calls between 13th and 14th January will
 (1) Definitely reduce
 (2) Definitely increase
 (3) Will depend on which particular call was made in an off peak time
 (4) Cannot be determined

Directions for questions 29 – 31: Refer to the graphs below:



29. If profits have to be distributed in the ratio of the shareholding, the difference of profit of Tata Group in 90-91 and profit of Banks and mutual funds in 93-94, will be (Rs.) :
- (1) 3.66 crores (2) 4.98 crores (3) 3.15 crores (4) 2.34 crores
30. The angles subtended by the FIs and FII's & public (at the center of the pie chart) differ by :
- (1) 8.36° (2) 8.8° (3) 9.18° (4) 9.36°
31. The approximate Average annual growth rate of 'sales' from 89-90 to 92-93 is:
- (1) 19% (2) 21% (3) 17% (4) 22%

Directions for questions 32 – 36:

The chart below shows the distances in km between four villages A, B, C and D which are connected by straight roads.

–	A	B	C	D
A	–	15	13	24
B	15	–	12	28
C	13	12	–	21
D	24	28	21	–

32. If a health visitor has to visit all the villages starting from B and to return to B, which is the shortest route he should take?
- (1) B A C D B (2) B A D C B (3) B D C A B (4) B D A C B
33. Health camps have to be set up in two of the four villages, so that the distances from the remaining two villages to the health camps may be the least. Which two villages should be selected?
- (1) B and C (2) A and C (3) A and D (4) C and D
34. If a village E is 8 km from A on the road to B, what is E's distance from C?
- (1) 10 km (2) 18 km (3) 9 km (4) 20 km
35. If the bus fare along route ABD is Re.0.25 per km and along ACD it is Re.0.18 per km, which route is less expensive and by how much?
- (1) ABD by Rs. 2.83 (2) ACD by Rs. 4.63
(3) ABD by Rs. 1.25 (4) ACD by Rs. 1.35
36. If a village is equidistant from B, C and A, what is its distance from B?
- (1) 10 km (2) 12 km (3) 8 km (4) 16 km

Directions for questions 37 – 41: Study the data and answer the following questions.

Two machines X and Y can produce three different types of spare parts A, B and C for motor vehicles. X can produce 1, 4 and 3 of A, B and C respectively in one hour while Y takes $\frac{1}{2}$, $\frac{3}{8}$, and $\frac{1}{8}$ hour respectively to produce one A, B and C. Each machine can produce only one article at a time and can work for 20 hours per day.

37. 70 of A, 30 of B and 60 of C are required to be produced. Which machine will take less time to produce these?
- (1) X (2) Y
(3) Both will take same time (4) Cannot be found

38. In the above question, X and Y start working at the same time. After they have worked for 10 hrs, during which they produce only Part A, one of them is required to be switched off. By switching off Machine X there will be a saving of hrs. to produce the remaining articles by Y alone than the time have taken to do it with X alone working.
- (1) $25\frac{1}{4}$ (2) $30\frac{1}{2}$ (3) $28\frac{3}{4}$ (4) $12\frac{3}{4}$
39. Machines X and Y working in succession for two days produce 180 parts of C. For how many hours was X working?
- (1) 22 (2) 26 (3) 28 (4) 24
40. A manufacturer wants to hire machine X or Y to produce 40 of B and 120 of C. If the rate of hire charge of Y is twice that of X, he will save percentage by hiring
- (1) 16.7%, X (2) 20%, Y (3) 16.7%, Y (4) 20%, X
41. Machine X is switched on to produce articles A, B and C successively for one hour by turns. How many of A, B and C would be produced in $2\frac{1}{2}$ days?
- (1) A : 17; B : 68; C : 48 (2) A : 16; B : 64; C : 48
(3) A : 17; B : 58; C : 62 (4) A : 15; B : 48; C : 50

Directions for questions 42 – 44: Each question below is followed by two numbered facts. You are to determine whether the data given in the statements is sufficient for answering the questions. Use the data given to choose between the four answers.

- (1) If the statement I alone is sufficient to answer the question, but statement II alone is not sufficient.
(2) If the statement II alone is sufficient to answer the question, but statement I alone is not sufficient.
(3) if both statements together are needed to answer the question, but neither statement alone is not sufficient.
(4) If not enough facts are given to answer the question.
42. A, B, and C are three consecutive even integers (not necessarily in order). Which has the greatest value?
- I. $A + B = C$
II. C is a positive number
43. A man has eight 3-lb weights, ten 5-lb weights, and seven 10-lb weights. He places eight of these weights on a scale. How many 5-lb weights are used?
- I. The scale registers 47 lbs.
II. The number of 10-lb weights used is one less than the number of 3-lb weights used.
44. Is the integer T divisible by 15?
- I. The sum of the digits of T equal 15. II. The units digit of T is a 3.

45. In a triangular hockey series, three teams A, B, C took part. In three games, A played against B, B against C, and A played against C, the final scores of the games consisted of the numbers 1, 2, 3, 4, 5, 6. The difference between the A's higher score and B's higher score was one more than difference between the B's lower score and C's lower score. The highest Total of a team's two score was achieved by the team that lost the greatest number of games. Which team achieved the highest total of its two scores?
 (1) A (2) B (3) C (4) Data insufficient
46. Three bags A, B, C containing 1, 2 and 3 balls respectively are to be used in a game played by Aman and Rajan. The rules of the game are: Each player in turn can pick only one ball or all the balls from just one bag. The person who has to take the last ball loses the game. If Aman starts the game then what should Aman do in order to win?
 (1) Pick 1 ball from Bag A (2) Pick 1 ball from Bag B
 (3) Pick 1 ball from Bag C (4) Pick all the balls from Bag B

Directions for questions 47 – 50: For each of the following questions, read the data given below and answer the questions that follow.

Mr. Einstein Kapoor went to give a curious multiple – choice entrance exam, which will help him get into a top B school. But during the exam he was not able to solve a set of questions and hence was not able to get through the exam. Afterwards while solving it with Mr. Planck Khan he was able to solve it. Here is the set of questions study them & answer the following questions.

47. The correct answer for question 1 is:
 (1) p (2) q (3) r (4) s
48. The correct answer for question 2 is:
 (1) p (2) q (3) r (4) s
49. The correct answer for question 3 is:
 (1) p (2) q (3) r (4) s
50. The correct answer for question 4 is:
 (1) p (2) q (3) r (4) s

SECTION – C

Directions for questions 51 – 52: In each of the following questions, four statements are provided. These statements form a coherent paragraph when properly arranged. Select the alternative representing the proper and logical sequencing of these statements.

51. A. It is well he knows that it is long enough to reach the bottom at such places as are necessary to direct his voyage, and caution him against running upon shoals that may ruin him.
 B. If we can find out those measures, whereby, a rational creature, put in that state which man is in this world, may and ought to govern his opinions and actions depending thereon, we need not to be troubled that some other things escape our knowledge.
 C. Our business here is not to know all things, but those which concern our conduct.
 D. It is of great use to sailor to know the length of his line, though he cannot with it fathom all the depths of the ocean.
- (1) CBDA (2) BADC (3) DABC (4) CDBA
52. A. The early stages of a science necessitate exploration to become familiar with the relationships that later will become the object of more precise study.
 B. Study of preliterate tribes reveals the ranges of variation in human institutions, which would go unrecognized if we confined our study to men and women of our own culture.
 C. Observation of chimpanzees in their natural environment of Africa may tell us things about their social organisation that will help us conduct our laboratory investigations.
 D. Careful observation of animal and human behaviour including the study of our conscious processes is the starting point of psychology.
- (1) ABCD (2) BDCA (3) ADCB (4) CBDA

Direction for questions 53 – 54: Select the option that fills in the blanks most suitably (in the same order).

53. History is _____ with example of _____ who have led their kings to ruin by their flattery and smooth talk.
- (1) replete, sycophants (2) repine, flatterers
 (3) reprobate, sybarites (4) requite, tatterdemalions
54. _____ of themes drawn from the land _____ life in the English countryside has earned for Constable undying fame as a landscape painter.
- (1) Predisposition, discussing (2) Preponderance, depicting
 (3) Pretentious, delineating (4) Preamble, divulging

Directions for questions 55 – 56: Select the option that best replaces the underlined portion in the sentence.

55. Khushwant Singh is the kind of writer who makes you want to grab the next person you see and say "Read this!"
- (1) Khushwant Singh is the kind of writer who makes you want to
 (2) Khushwant Singh is a kind of writer who makes you want to
 (3) Khushwant Singh is the kind of writer who makes you
 (4) Khushwant Singh is the one writer who makes you want to
56. In the past two decades, some of the harsher provisions of the Act were reformed
- (1) the harsh provisions were reformed.
 (2) the harsh provisions of the Act have been reformed.
 (3) the harsher provisions of the Act have been reformed.
 (4) the harsher provisions of the Act were reformed.

Directions for questions 57 – 58: In each of the following questions, four statements are provided between an opening statement 1 and a closing statement 6. The four statements are jumbled up and form a coherent paragraph when properly arranged. Select the alternative representing the proper & logical sequencing of these six taken together.

57. 1. The redesigned engine and the fully electronic injection and ignition systems make for increased efficiency and lower exhaust emission rather than power.
 A. The hydraulic clutch and the two mass flywheels isolate engine vibrations.
 B. The car is not loaded, fortunately, with electronics, which can later cause serious service problems.
 C. Apart from the three way catalytic converters, every component, paint, refrigerant and manufacturing process of this car has been aimed at preserving the environment.
 D. Pollution is also a major concern.
 6. This makes it a truly futuristic car.
 (1) BDAC (2) CABD (3) CDAB (4) BADC
58. 1. There are few, I believe, who have not observed in themselves or others that what in one way of proposing was very obscure, another way of expressing it has made it very clear and intelligible, though afterwards the mind found little difference in the phrases & wondered why one failed to understand more than the other.
 A. The truth is, those who advised me to publish it, advised me, for this reason to publish it as it is; and, since I have been brought to let it go abroad, I desire it should be understood by whoever gives himself the pains to read it.
 B. We have our understanding no less different than our palates.
 C. But every thing does not hit alike upon every man's imagination.
 D. I have so little affection to be in print that if I were not flattered this essay might be of some use to others, as I think it has been to me, I should have confined it to the view of some friends, who gave the first occasion to it.
 6. My appearing therefore in print being on purpose to be as useful as I may, I think it necessary to make what I have to say as easy and intelligible to all sorts of readers as I can.
 (1) ACBD (2) CBAD (3) DACB (4) BACD

Directions for questions 59 – 60: In the following questions, five statements are provided. These statements form a coherent paragraph when properly arranged. Select the alternative representing the proper and logical sequencing of these statements.

59. A. Almost all managers in every organisation are better equipped to perform their duties when they have a reasonable grasp of accounting data.
 B. That someone may be a company president, a production manager, a sales manager, or a shareholder.
 C. In answering these and a wide variety of other questions, managers turn to accounting information.
 D. Ultimately, all accounting information is collected to help someone make decisions.
 E. For example, a knowledge of accounting is crucial for decisions by government agencies regarding research contracts, defense contracts and loan guarantees.
 (1) DBACE (2) CDEBA (3) DBAEC (4) CDEAB

60. A. Yet even today, a strong strain from their old animist tradition persists.
 B. The Lepchas were converted to Buddhism from the 17th century onwards.
 C. In most Lepcha villages and households, Buddhist monks play an important role.
 D. Unlike the Bon practiced in pre-Buddhist Tibet, the Lepcha animism has little 'black magic' in it.
 E. Later with the arrival of Scottish and Finnish missionaries, some were converted to Christianity.
- (1) BADCE (2) BCEAD (3) CADBE (4) BECAD

Directions for questions 61 – 72: Read the passages and answer the questions that follow:

Passage – I

The fundamental objectives of sociology are the same as those of science: general discovery and explanation. To discover the essential data of social behaviour and the connections among the data is the first objective of sociology. To explain the data and the connections is the second larger objective. Science makes its advances in terms of both of these objectives. Sometimes it is the discovery of a new element or set of elements that marks a major breakthrough in the history of a scientific discipline. Closely related to such discovery is the discovery of relationships of data that had never been noted before. All of this is, as we know, of immense importance in science. But the drama of discovery, in this sense, can sometimes lead us to overlook the greater importance of explanation of what is revealed by the data. Sometimes decades, even centuries, pass before known connections and relationships are actually explained. Discovery and explanation are the two great interpenetrating, interacting realms of science.

The order or reality that interests the scientists is the empirical order, that is, the order of data and phenomena revealed to us through observation or experience. To be precise or explicit about what is, and is not, revealed by observation is not always easy, to be sure. And often it is necessary for our natural powers of observation to be supplemented by the most intricate of mechanical aids for given object to become "empirical" in the sense just used. That the electron is not as immediately visible as is the mountain range does not mean, obviously, that is any less empirical. That social behaviour does not lend itself to as quick and accurate description as, say, chemical behaviour of gases and compounds does not mean that social roles, statuses, and attitudes are any less empirical than molecules and tissues. What is empirical and observable today may have been non-existent in scientific consciousness a decade ago. Moreover, the empirical is often data inferred from direct observation. All of this is clear enough, and we should make no pretence that there are not often shadow areas between the empirical and the non-empirical. Nevertheless, the first point to make about any science, physical or social, is that its world of data is the empirical world. A very large amount of scientific energy goes merely into the work of expanding the frontiers, through discovery, of the known, observable, empirical world.

From observation or discovery we move to explanation. The explanation sought by the scientist is, of course, not at all like the explanation sought by the theologian or metaphysician. The scientist is not interested, that is, not in his role of scientist in ultimate, transcendental, or divine causes of what he sets himself to explain. He is interested in explanations that are as empirical as the data themselves. If it is the high incidence of crime in a certain part of a large city that requires explanation, the scientist is obliged to offer his explanation in terms of factors, which are empirically real as the phenomenon of crime itself. He does not explain the problem, for example, in terms of references to the will of God, demons, or original sin. A satisfactory explanation is not only one that is empirical, however, but one that can be stated in terms of a causal preposition. Description is an indispensable point of beginning, but description is not explanation. It is well to stress this point, for there are all too many scientists, or would be scientists, who are primarily concerned with data gathering, data counting and data describing, and who seem to forget that such operations, however useful, are but the first step. Until we have accounted for the problem at hand, explained it casually by referring the data to some

principle or generalization already established, or to some new principle or generalization, we have not explained anything.

61. According to the passage, scientists are not interested in theological explanations because
- (1) scientists tend to be atheists.
 - (2) theological explanations are not empirical.
 - (3) theology cannot explain social behaviour.
 - (4) scientists are concerned primarily with data gathering.
62. Which of the following statements best agrees with the author's position?
- (1) Explanation is inferred from data
 - (2) Casual connection is a basis for explanation
 - (3) Generalization is a prerequisite for explanation
 - (4) Empiricism is the science of discovery
63. Judging from the contents of the passage, the Final step in a study of social behaviour would be to
- (1) establish principles
 - (2) offer an explanation of the data by determining causal connection
 - (3) collect data
 - (4) establish generalizations
64. According to the passage, which of the following activities contributes to the progress of science?
- I. Finding data relationships
 - II. Expanding limits of the empirical
 - III. Establishing ultimate causes of phenomena
- (1) I (2) II (3) III (4) I, II and III
65. The author's main point in the first paragraph may best be described by which of the following statements?
- (1) Science and sociology are interdisciplinary.
 - (2) The First objective of sociology is discovery.
 - (3) Discovery without explanation is meaningless.
 - (4) Both discovery and explanation are fundamental in science.

Passage II

Lachrymose outpourings of nostalgia for our past glories have always been a national pastime and in the 50th year of independence, the recollection and remembrance industry is flourishing. How our heart swelled with pride gazing on the magnificent Padshahnama, who has mercifully been maintained in mint condition in the UK, how misty eyed we become watching the famous "tryst with destiny" speech for the nth time. Nothing wrong with all this except that this obsession with the past is threatening to preclude any real thought about where we are going as we move into the new millennium. Future scanning and anticipatory management common in other countries is still somewhat alien here.

Unfortunately, any talk of future forecasting has come to be synonymous with either the moribund five year plans or conjures up visions of less-man-stable fortune-tellers gazing into cloudy crystal balls. The government's attitude to the fate of the future was revealed in its utterly shoddy technology vision 2020 brought out by the Council of Scientific and Industrial Research, the Technology Information, Forecasting and Assessment Council and the Department of Science and Technology among others last year. It is nothing more than a somewhat ambitious list of what we should be doing, all written up in dense bureaucrats.

In the section on electronics and communication, today's major growth industry, the "vision" tells us, "with much faster growth taking place in the country of telecom infrastructure sector and the above convergence trends, the various information services (entertainment, education, home shopping, telebanking etc) at home are becoming realities. Distant education, health care, agroment services etc using multimedia are becoming techno-economically feasible and a reality in India. Various socio-economic data-bases for common use would also be available. However, appropriate application development programmes would need to be promoted consciously." Apart from the questionable English, there is not a word on how this vision can be realised. This is the manner in which future planning for all sectors from healthcare to education, from engineering to life sciences is being dealt with.

This short-sightedness is in stark contrast to the approach in other developing and developed countries. Dr Satish Seth who worked in the field of future planning for years in the government is bitterly disillusioned with the total disregard for the subject. "The Japanese take future forecasting very seriously. They have anticipated the energy needs of the next century and have already started stockpiling coal. They have acquired vast tract of grazing lands in Africa. They have bought up enough acreage abroad to ensure safety against population pressure. We have done precisely nothing", he says.

We have used our backwardness and lack of development as effective excuses for our lethargy. What future planning can be undertaken when we don't have safe drinking water, even a rudimentary public health care system, when half our population is illiterate, we ask, it now seems a very remote possibility that all this will beset right even in the next 50 years. So it is clear that we cannot wait for the ideal conditions to obtain before we plan for the future. The experience in the field of family planning reveals the folly of such thinking. The problem has spun out of control while we waited for everything, from education to healthcare, to fall into place even though the benefits of aggressively pushing a cocktail of family planning methods were apparent. Thailand did this and today the issue causes no worry to the government, the population growth having fallen below replacement fertility levels.

Singapore, the other success story that Indians look enviously upon, has not been content to rest on its economic laurels, rather it explores ever-new areas to maintain its competitive edge. While we are still debating the most appropriate method of achieving education for all by an unspecified date in the next millennium, Singapore has embarked on an ambitious one-billion-dollar programme to promote innovative thinking and problem solving in schools. It realises that with rising costs, increasing competition and more sophisticated markets, it will need to do much more than step up production and keep prices low. It has build new brands, create fresh products and market them much faster. For this, Singapore realises that the key is creativity and enhanced brainpower.

It should come as no surprise then that India is nowhere on the much touted information superhighway despite the hype and hysteria over Microsoft chief Bill Gates' recent visit. Mr. Gates cannot have been unaware that India considers itself the Mecca of software production and prides itself on its skilled manpower pool. Yet, Mr. Gates, canny businessman that he is, was distinctly reluctant to part with more than a million measly dollars for investment in India. The number of cows he apparently counted on the Capital's road - the reported number was 14 - could not have inspired too much confidence in him though he made token noises about India being a better place than China. After his departure there was considerable outrage over his extending the equivalent bus fare to India. Nobody asked why he should put his money into a country, which in no way seems prepared to move into the technological fast track.

If the political class can be accused of promising Utopia by the magical year 2020 without any thought as to how this can be achieved, industry has not exactly led the way as far as future planning and innovation are concerned. The fortunes of companies around the world show us that the professional corporate person today has to monitor the ever-changing social, technological and political environment if his/her company is to maintain a leading edge. This is not being done here. Businesses everywhere are undergoing a paradigm shift. Retailers are moving into the electronic mall, banks are facing the prospect of a cashless society, paper money is rapidly disappearing, printing technology will depend less on paper and ink and in the face of

aggressive computer-literate competition, companies will have to devise different methods to create and market a new generation of products and services. Firms which have the ability to change fastest will reap the benefits-and this is where Indian industry is sorely lacking.

It is time we seriously thought of going the way of countries like Japan in setting up a future-oriented think tank to enable us to keep up with developments in all spheres from computers to communications. What we are facing in India is not just poverty, but a poverty of ideas. Dr Seth is extremely pessimistic about the fate of future forecasting. While in government, he has advocated the introduction of this subject into the school syllabus, but this was not followed up. So, we now face the fearful prospect of a large unwieldy country with development indicators among the lowest in the world blundering blindly into a techno-savvy millennium where interactive television, animated class-rooms, an improved Internet and smart homes, among others things, will be the order of the day.

66. The fundamental excuses we make for our lethargy is:
- (1) foreign invasion
 - (2) inability to cope up with the flood of information technology
 - (3) backwardness and lack of development
 - (4) British rule over a long period of time
67. The author's tone in the passage can be best categorised as:
- (1) argumentative
 - (2) ridiculous
 - (3) castigating and advisory
 - (4) advisory and stubborn
68. The Japanese and Indians have been compared on ground of:
- (1) future consciousness
 - (2) economic strength
 - (3) technological innovation
 - (4) literacy and its deep rooted implications
69. Our political system is :
- (1) never out of excuses to defend itself or all the change made against it.
 - (2) just showing us a hollow promise of bright future without thinking how this can be done.
 - (3) highly corrupt and has gone beyond any rehabilitation.
 - (4) just the way the people deserve it.
70. Examples like Japan, Singapore and Bill Gates show us that:
- (1) India has remained a shoddy place and still continues to be the same.
 - (2) the attitude that these big economic powers carry towards India is not encouraging.
 - (3) India is on the road of development closely on the heels of Japan and Singapore.
 - (4) we Indians have attitudinal problems i.e. we wait but don't move; we prophesise but don't make a try to do it in reality.
71. Which of the following has not been mentioned in the passage:
- (1) Forecasting and Assessment council
 - (2) Dr. Satish Seth
 - (3) Padshahnama
 - (4) Cow on streets of Delhi harassing Bill Gates
72. The theme of the passage is a discussion on:
- (1) how best to remain isolated in an integrating world.
 - (2) fundamental problems regarding Indian strategic thought.
 - (3) the deep chasm between underdeveloped and developing nations.
 - (4) how we Indians have refused to genuinely invest in 'seeing' the future.

Directions for questions 73 – 74: For the following questions, select the option best representing the theme of the given paragraphs.

73. However, the government can do its bit too: a carrot-and-stick policy with a mixture of financial incentives, compulsory energy audits, and a system of rewards will generate awareness of how much power will be on tap if organised wastage-elimination is undertaken. And the pressures of the market alone would justify the switch to energy-saving practices. Since India needs an additional 1, 40, 000 MW of electricity over the next 15 years, dispelling the darkness over the power wastage can help bridge the generation gap.
- (1) A carrot and stick policy is undesirable in the context of the power sector.
 - (2) Power wastages need to be curbed, but diplomatically.
 - (3) India is on the verge of collapsing on grounds of power shortages.
 - (4) Sometimes rebuke and sometimes chastisement pay, as would be seen in the power sector.
74. Despite colonial rule, Rushdie tells me, a law abiding Indian before 1914 could pass through life hardly noticing the existence of the state beyond the policeman and the postman. He could produce and sell what he pleased, without a license or permit, and without an inspector who insisted on a cut. He could leave the country without a passport, and exchange his money freely without any restriction. He could buy anything from any country in the world and return home without a customs officials looking over his shoulder. "I was freer under colonial rule than I am today under my own government," says Rushdie "Not that I would want to return to colonial rule, mind you."
- (1) The presence of the state was unfelt in colonial rule.
 - (2) The controls in colonial rules led to greater freedom.
 - (3) Colonial rule though unpreferred was better than today's conditions, in many aspects.
 - (4) The police and the postman have become inexistent today as the state has withered away.

Directions for question 75: Select the option that is the best substitute for the parenthesis given in the passage.

75. Prem Chopra's eyes were heavy with sleep. And the flight was comfortable enough for him to settle down for a good night's sleep. Yet, oddly enough, Prem Chopra couldn't catch a wink. The reason of his restlessness was a host of unanswered questions that kept racing through his mind. Memories of his six-month long orientation programme at Gemendy Inc's headquarters in Denver, US, flashed before him. (.) At least seven people had monitored and supervised every stage of his orientation, almost as if he was being prepared for a major event. And he himself was doing those jobs mechanically, though he didn't feel the real pressure of it.
- (1) The exercise had been planned meticulously and Prem Chopra had been shifted from one department to another with clockwork precision.
 - (2) He wasn't getting any sleep and his head was growing heavy.
 - (3) Anyone could have sensed his emotional turmoil.
 - (4) All the training he had received was about to go down the drain as it was a sheer waste.

MOCK CAT
ANSWERS

SECTION – A

1. (3) 2. (2) 3. (2) 4. (1) 5. (4) 6. (2) 7. (3) 8. (1)
 9. (2) 10. (3) 11. (2) 12. (2) 13. (3) 14. (3) 15. (3) 16. (3)
 17. (2) 18. (1) 19. (3) 20. (2) 21. (4) 22. (2) 23. (2) 24. (4)
 25. (1)

SECTION – B

26. (4) 27. (2) 28. (1) 29. (1) 30. (3) 31. (1) 32. (2) 33. (4)
 34. (1) 35. (2) 36. (3) 37. (2) 38. (3) 39. (3) 40. (1) 41. (1)
 42. (3) 43. (1) 44. (2) 45. (3) 46. (2) 47. (4) 48. (3) 49. (1)
 50. (2)

SECTION – C

51. (3) 52. (3) 53. (1) 54. (2) 55. (1) 56. (3) 57. (4) 58. (2)
 59. (3) 60. (4) 61. (2) 62. (2) 63. (3) 64. (1) 65. (4) 66. (3)
 67. (3) 68. (1) 69. (2) 70. (4) 71. (4) 72. (4) 73. (2) 74. (3)
 75. (1)

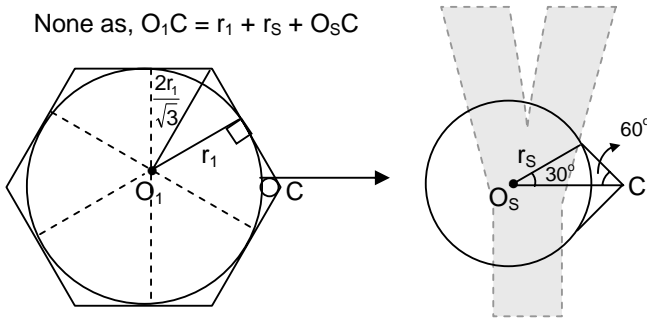
EXPLANATIONS

SECTION – A

1. Only I & II are true. Consider the given equation
 $m^2a^2 + (n^2 + 1)b^2 + c^2 = 2b(mna - c)$
 $\Rightarrow m^2a^2 + n^2b^2 + b^2 + c^2 - 2mnab + 2bc = 0$
 $\Rightarrow (ma - nb)^2 + (b + c)^2 = 0$
 This is possible only if both the terms are individually equal to zero.
 Hence, $ma = nb$, $b = -c$. This implies $ma = -nc$. **Answer: (3)**
2. As seen in the figure if the radius of C_{large} is r_1 then $O_1C = \frac{2r_1}{\sqrt{3}}$.

Similarly if the radius of small circle is r_s then $O_sC = \frac{2r_s}{\sqrt{3}}$.

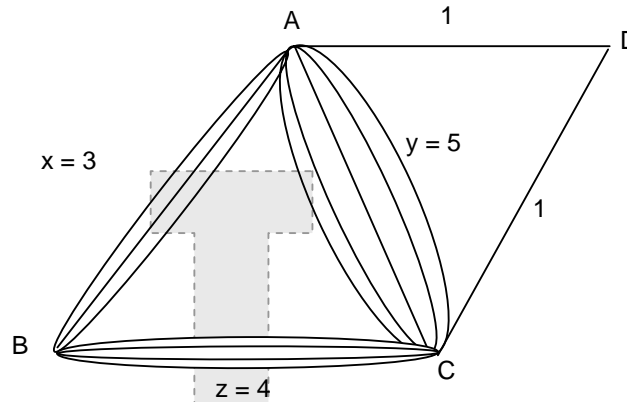
None as, $O_1C = r_1 + r_s + O_sC$



$$\Rightarrow \frac{2r_1}{\sqrt{3}} = r_1 + r_s + \frac{2r_s}{\sqrt{3}} \Rightarrow r_1 \left(\frac{2 - \sqrt{3}}{\sqrt{3}} \right) = r_s \left(\frac{2 + \sqrt{3}}{\sqrt{3}} \right)$$

$$\Rightarrow \frac{r_1}{r_s} = \frac{2 + \sqrt{3}}{2 - \sqrt{3}}. \text{ Answer: (2)}$$

Solutions 3 – 4: Refer to the following data for the following solutions.



Let there be x, y & z direct roads between AB, AC & BC respectively.

Now total number of routes between A & B, -----

$$x + (y + 1)z = 27 \quad \dots\dots\dots(i)$$

Total number of routes between B & C,

$$z + x(y + 1) = 22 \quad \dots\dots\dots(ii)$$

Total number of routes between A & C

$$y + xz + 1 = 18 \Rightarrow y + xz = 17 \quad \dots\dots\dots(iii)$$

Solving Equations we get the answers as $x = 3, y = 5, z = 4$.

3. **Answer: (2)**

4. **Answer: (1)**

5. In this problem, remember that grass is growing at an even rate & that to an unknown one has to consider. In 40 days the pasture provides 1600 feeds & in 60 days 1800 feeds. In 20 days growth in the pasture allows for 200 extra feeds, or enough grass grows every day to feed 10 cows. Thus the grass on the pasture before the cows start grazing is enough for $(1600 - 40 \times 10)$ ie 1200 feeds. Thus pasture lasts 120 days if 20 cows were to graze on it. **Answer: (4)**

6. $3x^5 + 2x^2 + 4x + 2x^3 + x^2 + x^5 + 2x^4 + 5x = 4 + 2x^4 + 2x^3 + 3x^2 + 9x = (4, 5, 2, 4, 2, 3, 3, 2, 9, 1)$.

Answer: (2)

7. $(4x^2 + 6x + 5)(x + 1) = 4x^3 + 11x^2 + 10x + 5 = (4, 3, 10, 2, 11, 1, 5, 0)$. **Answer: (3)**

8. $(x + 2) \times y = x^2 + 4x + 4 = (x + 2)^2 \therefore y = x + 2 = (1, 1, 2, 0)$. **Answer: (1)**

9. Decimal = $(100a + 25)/999$, so $37K = 3000a + 750$. So certainly 750 divides K.

If $K = 750m$, then $37m = 4a + 1$. That has unique solution $a = 9, m = 1$,

Therefore $K = 750$, hundred place = 7 **Answer: (2)**

10. The best we can hope for is to use each digit just once, and for the larger digits to occur earlier. Any multiple of 1000 is divisible by 8, so 9876543000 is a multiple of 8. Now 210 and 201 are not multiples of 8. The next best is 120. So the number is 9876543120, with residue 120. **Answer: (3)**

11. Let the number of buses having Blue no. plate = x

Let the number of buses having white no. plates = y

Now according to question

$$\frac{x}{y/2} = \frac{12}{1} \Rightarrow \frac{x}{y} = \frac{6}{1} \Rightarrow x = 6y$$

$$\& \frac{x}{(y-2)/2} = \frac{20}{1} \Rightarrow \frac{2x}{y-4} = 20$$

$$\frac{x}{y-4} = 10 \Rightarrow \frac{6y}{y-4} = 10 \quad [\because x = 6y]$$

$$\Rightarrow 6y = 10y - 40 \Rightarrow y = 10 \quad \therefore x = 60$$

Answer: (2)

12. Let the certain number of minutes past eight O'clock = x min

Now according to Questions

$$6x + 15 = 60 + x \Rightarrow 5x = 45$$

$$x = 9$$

Hence Time is 8 : 09. **Answer: (2)**

Alternative method: Pick any option. Then subtract 15 min. from that & check whether it is six times or not. Like if you subtract 15 min from 8 : 09, you will get 7 : 54. So, 54 is the six times of Nine.

13. Let the Number of children be x.

$$\text{The total number of chocolates} = 18(x - 1) + 12$$

Now according to questions

$$\text{Total number of chocolates} - \text{Total no. of children} = 1014$$

$$\Rightarrow 18(x - 1) + 12 - x = 1014$$

$$\Rightarrow 17x - 6 = 1014 \Rightarrow x = 60$$

Answer: (3)

14. Let Rs. x be the cost of pant.

Then the cost of a shirt is Rs (x - 1) and the cost of a T-shirt is Rs. (x - 2)

Suppose he spend Rs. y on the purchase of each type of apparels.

$$\therefore \text{number of pants purchased is } \frac{y}{x}$$

$$\text{Number of shirts purchased is } \frac{y}{x-1}$$

$$\text{Number of T - Shirts purchased is } \frac{y}{x-2}$$

But total number of apparels purchased is 470.

$$\text{Hence } \frac{y}{x} + \frac{y}{x-1} + \frac{y}{x-2} = 470 \quad \dots (1)$$

$$\text{Also } \frac{y}{x-1} - \frac{y}{x} = \frac{90}{x-2} \quad (\text{by problem}) \dots (2)$$

From (2). $y = \frac{90x(x-1)}{x-2}$. Substituting this value of y in (1).

$$\text{We have } \frac{90x(x-1)}{x-2} \left\{ \frac{1}{x-1} + \frac{1}{x} + \frac{1}{x-2} \right\} = 470$$

$$\text{Or } \frac{9(x)(x-1)}{x-2} \left\{ \frac{x^2 - 2x + x^2 - 3x + 2 + x^2 - x}{x(x-1)(x-2)} \right\} = 47$$

$$\Rightarrow \frac{9}{(x-2)^2} [3x^2 - 6x + 2] = 47$$

$$\text{or } 27x^2 - 54x + 18 = 47(x-2)^2 \text{ or } 27x^2 - 54x + 18 = 47x^2 - 188x + 188$$

$$\text{or } 20x^2 - 134x - 170 = 0 \text{ or } 20x^2 - 100x - 34x - 170 = 0$$

$$\text{or } (x-5)(20x-34) = 0, \text{ i.e., } x = 5$$

The other values gives fractional number, it is inadmissible.

$$\therefore y = \frac{90 \times 5(5-1)}{5-2} = 600$$

Hence number of Pants purchased is $\frac{600}{5} = 120$

Hence number of Shirts purchased is $\frac{600}{4} = 150$

Hence number of T-Shirts purchased is $\frac{600}{3} = 200$. **Answer: (3)**

15. There are 31 square (1, 4, 961) & 10 cubes (1, 8 1000), 3 sixth power (1, 64, 729) in first 1000 positive integer. $\therefore 1000 - 31 - 10 + 3 = 962$.

963rd term of the series is 1001

1000th term of the series is 1039

(As 1024 is also a square). **Answer: (3)**

16. Assume that 50, 40 and 20 hours are available. There is no need to use 10% waste of time in this question. **Answer: (3)**

17. Earlier total combinations $X = {}^{10}C_5 = 252$

After redesigning total combinations = ${}^{10}C_1 + {}^{10}C_2 + {}^{10}C_3 + \dots + {}^{10}C_9 = 2^9 - 2 = 1022$

Increase in total combinations = $1022 - 252 = 770$

Percentage increase = $\frac{770}{252} \times 100 = 305.5$. **Answer: (2)**

18. $(n-1)n(n+1)(n+2)+1 = (n(n+1)-1)^2$
 $1+108 \times 109 \times 110 \times 111 = (109(109+1)-1)^2$
 Square root = 11989. **Answer: (1)**

19. Middle integer n, then 3n is square, so $n = 3k^2$ for some k. Also 5n is cube, so $15k^2$ is cube, so k is a multiple of 15. Smallest value 15 gives $n = 3 \times 15^2$. **Answer: (3)**

20. $16^{101} + 8^{101} + 4^{101} + 2^{101} + 1$

Can be written as $2^{404} + 2^{303} + 2^{202} + 2^{101} + 1$
 $= 2^4(2^{100})^2 + 2^3(2^{100})^3 + 2^2(2^{100})^2 + 2(2^{100}) + 1 \dots \dots (1)$

Now, we have to find remainder when (1) is divided by $2^{100} + 1$

Let $2^{100} = x$.

$16x^4 + 8x^3 + 4x^2 + 2x + 1$

Remainder when it is divided by $x + 1$

$= 16(-1)^4 + 8(-1)^3 + 4(-1)^2 + 2 \times -1 + 1$ (Put $x = -1$)

$= 11$. **Answer: (2)**

21. The graph intersects the x-axis at the real roots of $x - 2$, $2x^2 - 5x + 4$, and $2x^2 - 7x + 4$. Using the quadratic formula, one can determine the roots of the quadratics. The first quadratic has imaginary roots. The second has roots of the quadratics. The first quadratic has imaginary roots. The second has roots $\frac{7 \pm \sqrt{17}}{4}$. Therefore, the graph intersects the x-axis at 2, $\frac{7 + \sqrt{17}}{4}$, and $\frac{7 - \sqrt{17}}{4}$.

Answer: (4)

22. Lets try this problem with small sums first.

If he had counted up to 5, the sum is 15, as $1 + 2 + 3 + 4 + 5 = 15$.

(Let's say that he counted '1' thrice) i.e.

$$1 + 2 + 3 + 4 + 5 + (1 + 1) = 15 + (1 + 1).$$

Now if he doesn't count '2' then he will get the same sum 15.

(Let's say he counted '2' thrice) $1 + 2 + 3 + 4 + 5 + (2 + 2) = 15 + (2 + 2)$. Now if he doesn't count '4' then he will get the same sum 15. (Let's say that he counted '3' thrice i.e.) $1 + 2 + 3 + 4 + 5 + (3 + 3) = 15 + (3 + 3)$. Now in this case if he wants the sum to be 15 he will have to discount two numbers which is not possible. So, the total combinations are '2'. Now if the count was upto '6'. Then there would have been '3' combinations.

Hence we can say that for odd number counts the number of combinations possible are $\frac{n-1}{2}$ while for even number counts the combinations are $n/2$. We know that if one counts upto '31' then the sum will be 496.

Hence total combination possible will be $\frac{31-1}{2} = 15$. **Answer: (2)**

23. Given $\frac{2^{10} + 1}{2^{10}} = 1.0009765625 = 1 + \frac{1}{2^{10}} = 1 + \frac{1}{\left(\frac{10}{5}\right)^{10}}$

$$\therefore 1.000976525 = 1 + \frac{5^{10}}{10^{10}}$$

$$\Rightarrow 0.009765625 = \frac{5^{10}}{10^{10}} \Rightarrow 5^{10} = 10^{10} \times 0.009765625 = 9765625000$$

\therefore Sum of digits = 40. **Answer: (2)**

24. $f(14, 52) = 26/19$ $f(14, 38) = (26/19) (19/12)$ $f(14, 24) = (26/12) (12/5)$ $f(14, 10) = (26/5) (7/2)$ $f(10, 4) = (91/5) (5/3)$ $f(4, 6) = (91/3) 3$ $f(4, 2) = 91 \times 2$ $f(2, 2) = 91 \times 2 \times 2 = 364$. **Answer: (4)**

25. Probability of getting a tail = p

$$\begin{aligned} \text{Probability of getting one tail in five tosses} &= {}^5C_1 p (1-p)^4 \\ &= 5p (1-p)^4 \end{aligned}$$

$$\begin{aligned} \text{Probability of getting two tails in five tosses} &= {}^5C_2 p^2 (1-p)^3 \\ &= 10 p^2 (1-p)^3 \end{aligned}$$

$$\text{Given : } 5p (1-p)^4 = 10 p^2 (1-p)^3$$

$$\Rightarrow 1-p = 2p$$

$$\Rightarrow p = 1/3.$$

Probability of getting 3 tails

$$= {}^5C_3 p^3 (1-p)^2$$

$$= 10 \times \left(\frac{1}{3}\right)^3 \times \left(\frac{2}{3}\right)^2 = \frac{40}{3^5}.$$

Answer: (1)

SECTION – B

26. The maximum percentage reduction in peak rates is fro the 200 – 500 category. **Answer: (4)**
27.
$$\frac{(4 \times 11.6 + 3 \times 17.56 + 3 \times 17.56) - (4 \times 4.8 + 3 \times 9 + 3 \times 9)}{4 \times 11.6 + 3 \times 17.56 + 3 \times 17.56}$$
 Answer: (2)
28. **Answer: (1)**

Solutions 29 – 31:

29. Profit of Tata in 90-91 = $0.07 \times 160.1 = 11.207$
 Profit of Banks & Mutual funds in 93-94 = $0.0417 \times 180.8 = 7.539$
 Difference = Rs. 3.66 crores. **Answer: (1)**
30. $(42.84 - 40.29) \times 100/3 = 9.18^\circ$. **Answer: (3)**
31. $(3352.1/12135.5 - 1) \times 100/3 = 19\%$. **Answer: (1)**
32. The possible routes and their lengths are as follows:

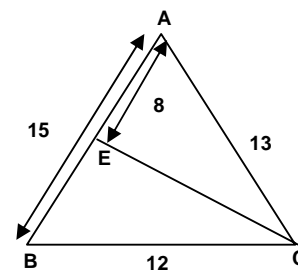
Route	Length in km
BACDB	$15 + 13 + 21 + 28 = 77$
BADCB	$15 + 24 + 21 + 12 = 72$
BCADB	$12 + 13 + 24 + 28 = 77$
BCDAB	$12 + 21 + 24 + 15 = 72$
BDACB	$28 + 24 + 13 + 12 = 77$
BDCAB	$28 + 21 + 13 + 15 = 77$

- The least distance is 72 km along B A D C B or B C D A B. **Answer: (2)**
33. The two villages may be A, B; A, C; A, D; B, C; B, D OR C, D.
 Distance from the two other villages to the above pairs of villages are:
 AB : Residents of C will prefer to go to B instead of A since B is nearer (12 km) Than A (13 km). Similarly residents of D will prefer to go to A instead of B Since A is nearer (24 km) than B (28 km).
 \therefore Total distance to be covered by residents of C and D = $12 + 24 = 36$ km.
 Similarly for other combinations of villages we can obtain the total minimum distances as follows.
 A, D : $BA + CA = 15 + 13 = 28$
 B, C : $AC + DC = 13 + 21 = 34$
 B, D : $CB + AB = 12 + 15 = 27$
 C, D : $AC + BC = 13 + 12 = 25$
 The least total distance is for C, D.
 \therefore Suitable villages will be C and D. **Answer: (4)**

34. $AB = 15$
 $AC = 13$
 and $BC = 12$
 $AE = 8$ (given)

Using the cosine formula, we have
 $BC^2 = AB^2 + AC^2 - 2 AB \cdot AC \cos A$
 $12^2 = 15^2 + 13^2 - 2 \times 15 \times 13 \times \cos A$

$$\therefore \cos A = \frac{15^2 + 13^2 - 12^2}{2 \times 15 \times 13} = \frac{225 + 169 - 144}{2 \times 15 \times 13} = \frac{250}{30 \times 13} = \frac{25}{39}$$



In $\triangle AEC$, again

$$EC^2 = AE^2 + AC^2 - 2 \times AE \times AC \cos A = 8^2 + 13^2 - 2 \times 8 \times 13 \times \frac{25}{39} = 64 + 169 - \frac{400}{3}$$

$$= \frac{192 + 507 - 400}{3} = \frac{299}{3} = 99\frac{2}{3} = 100 \text{ (approx).}$$

$\therefore EC = 10$ km nearly.

Answer: (1)

35. Bus fare on route ABD = Rs. $(15 + 28) \times 0.25$
 = Rs. 43×0.25
 = Rs. 10.75

Bus fare on route ACD = Rs. $(13 + 21) \times 0.18 = \text{Rs. } 34 \times 0.18 = \text{Rs. } 6.12$

Route ACD is less expensive by Rs. $(10.75 - 6.12) = \text{Rs. } 4.63$. **Answer: (2)**

36. Consider $\triangle ABC$

From key to question (164), $\cos A = \frac{25}{39}$

$$\therefore \sin A = \frac{30}{39} = 0.76$$

\therefore Distance of the village from A is "R" where R is circumradius, given by the

Formula $\frac{BC}{2 \sin A}$ (Using the sine formula viz $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$)

$$= \frac{12}{2 \times 0.76} = 7.89 = 8 \text{ km.}$$

Answer: (3)

Solutions 37 – 41:

37. Time taken by each machine to manufacture 70 A, 30 B and 60 C:

Machine X = $\left(70 + 30 \times \frac{1}{4} + 60 \times \frac{1}{3}\right)$ hrs

$$= \left(70 + 7\frac{1}{2} + 20\right) \text{ hrs} = 97\frac{1}{2} \text{ hrs.}$$

Machine Y = $\left(70 \times \frac{1}{2} + 30 \times \frac{3}{8} + 60 \times \frac{1}{8}\right)$ hrs

$$= \left(35 + \frac{90}{8} + \frac{15}{2}\right) \text{ hrs.} = 53\frac{3}{4}.$$

Answer: (2)

38. Number of parts A, produced by each machine in 10 hrs.

Machine X : 10 Machine Y : 20

Balance to be produced : 40 A, 30 B, and 60 C

Machine X = $\left(40 + 30 \times \frac{1}{4} + 60 \times \frac{1}{3}\right)$ hrs = $67\frac{1}{2}$ hrs.

Machine Y = $\left(20 + 30 \times \frac{3}{8} + 60 \times \frac{1}{8}\right)$ hrs = $38\frac{3}{4}$ hrs.

Machine Y takes less time by $28\frac{3}{4}$ hrs. **Answer: (3)**

39. Let the number of hours that X works be x . Then number of hours that Y works = $(40 - x)$. Number of parts C, produced by X in x hrs = $3x$.
 Number of Parts C, produced by Y in $(40 - x)$ hrs = $(40 - x)8$ hrs
 $\therefore 3x + (40 - x)8 = 180$; or $5x = 140$ Or $x = 28$.
 \therefore X works for 28 hrs. **Answer: (3)**
40. Time taken by X to produce the required items = $\left(40 \times \frac{1}{4} + 120 \times \frac{1}{3}\right)$ hrs = 50 hrs.
 Time taken by Y to produce the required items = $\left(40 \times \frac{3}{8} + 120 \times \frac{1}{8}\right)$ hrs
 $= (15 + 15)$ hrs = 30 hrs.
 Hire charges for Y is twice that of X.
 It is less expensive to hire X by $\frac{10}{60} \times 100 = 16.7\%$. **Answer: (1)**
41. The number of articles produced during the first 3 hours:
- | | A | B | C |
|-----------|---|---|---|
| First hr | 1 | - | - |
| Second hr | - | 4 | - |
| Third hr | - | - | 3 |
- In 48 hrs the articles produced are 16×1 A, 16×4 B and 16×3 C (i.e.) 16 A, 64 B and 48 C
 In the 49th and 50th hrs, 1A and 4 Bs respectively are produced.
 \therefore Total articles produced in $2\frac{1}{2}$ days or 50 hrs = 17 A, 68 B, 48 C. **Answer: (1)**
- Note:** Each machine works only for 20 hrs a day.
42. There are three possible combinations fulfilling (1) : $-2 + (-)$
 $= (-6)$; $-2 + 2 = 0$; and $2 + 4 = 6$. Of these, only the last satisfies property (2). **Answer: (3)**
43. For the last digit of the total weight to be 7, there must be either four 3's or none 3's or more. Nine or more are impossible, so there must be four 3's. This leaves four weights chosen from the 5's and 10's to make up 35 lbs. The only possible way to do this is by using three 10's and one 5.
Answer: (1)
44. If (1) is true, then T may or may not be divisible by 15; for example, T could be 555, which is divisible by 15 (divisible means that the result of dividing is an integer with no remainder, or an integer rather than an integer plus a proper fraction), or T could be 348, which is not divisible by 15. (2) tells you that T is definitely not divisible by 15, because in order for an integer to be divisible by 15 it must also be divisible by 5 (since 5 is a factor of 15). An integer divisible by 5 must end in 5 or 0. Since in (2) the units digit is 3 (not 5 or 0), the integer is not divisible by 5 and hence not by 15. Thus, given (2) only, the answer to the question is "no". **Answer: (2)**
45. The team that lost the greatest number of games lost the two games it played (there were three losers and the teams could not have each lost one game). So the team that lost the greatest number of games did not score 6 and did not score 5 and 4 together. The highest total of two scores achieved by this team is greater than the total of at least 7 (6 and at least 1) achieved by some other team. So this team scored 5 and 3 for a total of 8.
 Then the 5 score lost to the 6 score and the 3 score lost to the 4 score. So the 1 score and the 2 score go together and the 6 and the 1 were scored by the same team. Let the teams be X, Y, and Z temporarily; then in summary:

Z	Y
1	2

X	Y
3	4

X	Z
5	6

From inspection of the team scores, any two higher scores differ by at least one and at most two; any two lower scores differ by at least one and at most two. So, A's higher score and B's higher score differ by two and the B's lower score and the C's lower score differ by one. So the A must be Z, the B must be Y, and the C must be X. Then the C achieved the highest total of its two scores. **Answer: (3)**

46.

Bag	A	B	C
Balls	1	2	3

Now, Aman can't pick all the balls from bag B or bag C, because if Aman picks all the balls from bag B, then balls left are

Bag	A	B	C
Balls	1	-	3

Then Raman will pick all the three balls from bag C and win the game. Similarly if Aman picks all from bag C, Raman will pick all the balls from bag B and will win.

If Aman picks one ball from bag A, the game will go like this:-

Bag	A	B	C
Balls	1	2	3
Aman's turn (1 from A)	-	2	3
Raman's turn (1 from C)	-	2	2

Now if Aman picks 2 balls from bag B, Raman will pick 1 ball from bag C and win the game. If Aman picks one ball from any bag, then Raman will pick all the balls from other bag and win the game.

Similarly if Aman picks 1 ball from C, then game will go like this

Bag	A	B	C
Balls	1	2	3
Aman's turn	1	2	2
Raman's turn	-	2	2 (same situation as in above case)

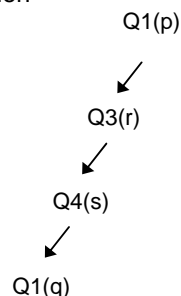
Hence Aman can win only if he picks 1 ball from B. **Answer: (2)**

Solutions 47 – 50: Refer to the following for the following solutions.

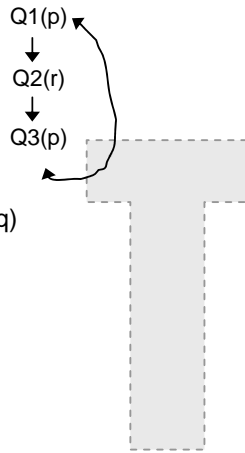
To solve this problem we have to first understand that this problem can be solved by using hit & trial method. Assume one of the options as correct for Q1 & find out from answer of Q1 the correct answer for next question & so on.

The set of answer which are consistent are our choice.

Now lets try out one of the option



But this falsifies our basic assumption so this is wrong. Now try out other options.
The following is the only consistent solution possible



And now Q4 has answer as (q)

- 47. **Answer: (4)**
- 48. **Answer: (3)**
- 49. **Answer: (1)**
- 50. **Answer: (2)**

