

MAHCET MOCK-2

TOTAL QUESTIONS : 100

TIME : 90 MINUTES

SECTION A : MATHS / QUANT

- $x_1, x_2, x_3 \in \mathbb{N}$. The number of solutions of the equations $x_1 \cdot x_2 \cdot x_3 = 24300$ is
(a) 480 (b) 512 (c) 560 (d) 756
- The area of the largest rectangle, whose sides are parallel to the coordinate axes, that can be inscribed in the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$
(a) 10 (b) 20 (c) 30 (d) $20\sqrt{5}$
- The sum of the infinite series $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \frac{13}{5^4} + \dots$ is
(a) $21/16$ (b) $15/16$ (c) $9/16$ (d) $35/16$
- A player is going to play a match either in the morning or in the afternoon or in the evening all possibilities being equally likely. The probability that he wins the match is 0.6, 0.1 and 0.8 according as if the match is played in the morning, afternoon or in the evening respectively. Given that he has won the match, the probability that the match was played in the afternoon is
(a) $\frac{1}{12}$ (b) $\frac{1}{15}$ (c) $\frac{2}{27}$ (d) $\frac{1}{10}$
- The solution set for real x of the equation $\log_{x^2} 4 + \log_{x^3} \frac{8}{3}$, is
(a) $\left\{\frac{1}{8}\right\}$ (b) $\{\sqrt{2}, 4\}$ (c) $\{\sqrt{12}\}$ (d) N.O.T
- The orthocenter of the triangle determined by the lines $6x^2 + 5xy - 6y^2 - 29x + 2y + 28 = 0$ and $11x - 2y - 7 = 0$ is
(a) (-4, 5) (b) (4, 4) (c) (6, 7) (d) (2, 1)
- The distance between the two foci of a hyperbola H is 12. The distance between the two directrices of hyperbola H is 3. The acute angle between the asymptotes of H in degrees is
(a) 30 (b) 40 (c) 45 (d) 60
- $a, b, c \in \mathbb{R}$. If $2a + 3b + 4c = 0$, then the line $ax + by + c = 0$ always passes through the point
(a) $\left(-\frac{1}{3}, \frac{3}{5}\right)$ (b) $\left(-\frac{2}{3}, \frac{3}{4}\right)$
(c) $\left(\frac{5}{2}, \frac{3}{7}\right)$ (d) $\left(\frac{1}{2}, \frac{3}{4}\right)$
- $P = \begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix}$ and $Q = \begin{bmatrix} \cos y & \sin y \\ -\sin y & \cos y \end{bmatrix}$ then
(a) $PQ \neq QP$
(b) $P^2Q = \begin{bmatrix} \cos(2x+y) & -\sin(2x+y) \\ \sin(2x+y) & \cos(2x+y) \end{bmatrix}$
(c) $P^2Q = \begin{bmatrix} \cos(2x-y) & -\sin(2x-y) \\ \sin(2x-y) & \cos(2x-y) \end{bmatrix}$
(d) $PQ = O$ for some $x, y \in \mathbb{R}$
- The general solution of the equation $\sin^2\theta - \sin 2\theta - 15\cos^2\theta = 0$ is given by θ equals
(a) $n\pi + \tan^{-1} 3$ or $m\pi - \tan^{-1} 5$
(b) $n\pi - \tan^{-1} 3$ or $m\pi + \tan^{-1} 5$
(c) $n\pi - \tan^{-2} 2$ or $m\pi + \tan^{-1} 6$
(d) $n\pi - \tan^{-1} 7$ or $m\pi - \tan^{-1} 3$

- $L_1 \parallel L_2$. Slope of $L_1 = 9$. Also $L_3 \parallel L_4$. Slope of $L_4 = -\frac{1}{25}$.
All these lines touch the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. The area of the parallelogram determine by these lines is
(a) 21 (b) 28 (c) 40 (d) 60
- For complex number z , $0 \leq \arg z < 2\pi$. $S = \{z : |z - 5\sqrt{3} - 5i| = 5\}$. The maximum $\{\arg z : z \in S\}$ is
(a) $\pi/3$ (b) $\pi/4$ (c) $\pi/5$ (d) $\pi/6$
- $f: \mathbb{R} \rightarrow \mathbb{R}$ is given by $f(x) = x^2 + 6x + 2$ if x is rational and $f(x) = x^2 + 5x - 4$ otherwise. F is continuous at
(a) $\forall x \in \mathbb{R}$ (b) for no $x \in \mathbb{R}$
(c) for only one value of x . (d) for two values of x
- $P(x)$ is a real polynomial of degree three. $P(x) = 0$ has a double root at $x = 2$. It has a relative extremum at $x = 1$. The remaining root of $P(x) = 0$ is
(a) $4/5$ (b) $3/4$ (c) $2/3$ (d) $1/2$
- The volume of the tetrahedron whose vertices are $P(k, k, k)$, $Q(k + 1, k + 6, k + 36)$, $R(k, k + 2, k + 5)$, $S(k, k, k + 6)$ is
(a) 1 (b) 2 (c) 4 (d) 6
- P moves on the line $y = 3x + 10$. Q moves on the parabola $y^2 = 24x$. The shortest value of the segment PQ is
(a) $\frac{7}{12}$ (b) $\frac{8}{\sqrt{10}}$ (c) $\frac{\sqrt{7}}{2}$ (d) 6
- If α is a positive integer, and the roots of the equation $7x^2 - 13x + 2\alpha$ are rational numbers, then the smallest value of α is
(a) 1 (b) 2 (c) 3 (d) 4
- The line $2x + y - 1 = 0$ cuts the curve $5x^2 + xy - y^2 - 3x - y + 1 = 0$ at P and Q . O is the origin. The acute angle between the lines OP and OQ is
(a) $\frac{\pi}{7}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{5}$ (d) $\frac{\pi}{3}$
- A container in the shape of a cube is used to store liquid nitrogen. Its length, breadth and height is 60 cm each. Let $h(t)$ denote the level, in centimeters, of liquid nitrogen above the base of the tank at time t seconds. Starting at time $t = 0$, liquid nitrogen is poured into the tank at a constant rate of 100 cc per second, and simultaneously liquid nitrogen is being removed from the container at the rate of 2.5 $h(t)$ cc per second. As $t \rightarrow \infty$, the limit of the volume of liquid nitrogen in the container is
(a) 36000 cc. (b) 144000 cc.
(c) the limit does not exist
(d) the limit exists, but cannot be determined without knowing $h(0)$.
- A student took five papers in an examination, where the full marks were the same for each paper. The marks obtained by the student in these papers were in the proportion 6:7:8:9:10. The student obtained $3/5$ of the total full marks. The number of papers in which the student obtained less than 45 per cent marks is
(a) 2 (b) 3 (c) 4 (d) N.O.T
- When you reverse the digits of the number 13, the number increases by 18. How many other two digit numbers increase by 18 when their digits are reversed?
(a) 5 (b) 6 (c) 7 (d) 8 (e) 10
- The remainder, when $(15^{23} + 23^{23})$ is divided by 19, is
(a) 4 (b) 15 (c) 0 (d) 18
- The length, breadth and height of a room are in the ratio 3 : 2 : 1. If the breadth and height are halved while the length

is doubled, then the total area of the four walls of the room will

- (a) remain the same (b) decrease by 13.64%
 (c) decrease by 15% (d) decrease by 18.75%
 (e) decrease by 30%

24. The rate of increase of the price of sugar is observed to be two percent more than the inflation rate expressed in percentage. The price of sugar, on January 1, 1994 is Rs. 20 per kg. The inflation rates of the years 1994 and 1995 are expected to be 8% each. The expected price of sugar price on January 1, 1996 would be
 (a) Rs. 23.60 (b) Rs. 24.00
 (c) Rs. 24.20 (d) Rs. 24.60
25. A student took five papers in an examination, where the full marks were the same for each paper. His marks in these papers were in the proportion of 6:7:8:9:10. In all papers together, the candidate obtained 60% of the total marks. Then the number of papers in which he got more than 50% marks is:
 (a) 1 (b) 3 (c) 4 (d) 5
26. The cost of diamond varies directly as the square of its weight. Once, this diamond broke into four pieces with weights in the ratio 1 : 2 : 3 : 4. When the pieces were sold, the merchant got Rs. 70000 less. Find the original price of the diamond.
 (a) Rs. 1.4 lakh (b) Rs. 2 lakh
 (c) Rs. 1 lakh (d) Rs. 2.1 lakh
 (e) None of these
27. A dealer buys dry fruits at Rs. 100, Rs. 80 and Rs. 60 per kilogram. He mixes them in the ratio 3 : 4 : 5 by weight and sells at a profit of 50%. At what price per kilogram does he sell the dry fruit?
 (a) Rs. 80 (b) Rs. 100
 (c) Rs. 95 (d) None of these
28. Fresh grapes contain 90% water by weight while dried grapes contain 20% water by weight. What is the weight of dry grapes available from 20 kg of fresh grapes?
 (a) 2 kg (b) 2.4 kg
 (c) 2.5 kg (d) None of these
29. The diameter of hollow cone is equal to the diameter of a spherical ball. If the ball is placed at the base of the cone, what portion of the ball will be outside the cone?
 (a) 50% (b) less than 50%
 (c) more than 50% (d) 100%
30. Rectangular tiles each of size 70 cm by 30 cm must be laid horizontally on a rectangular floor of size 110 cm by 130 cm, such that the tiles do not overlap. A tile can be placed in any orientation so long as its edges are parallel to the edges of the floor. No tile should overshoot any edge of the floor. The maximum number of tiles that can be accommodated on the floor is.
 (a) 4 (b) 5 (c) 6 (d) 7

REASONING

31. In a certain code 'PRISM' is written as 'OSHTL' and 'RUBLE' is written as 'QVAMB'. How will 'WHORL' be written in that code?
 (a) XIPSM (b) VINSK
 (c) UINSK (d) XGPQM

Directions (Q. Nos. 32-34): In each of the following questions find out which of the letter-series followed the given rule.

32. Number of letters skipped in reverse order in between adjacent letters in the series is constant.
 (a) SQOLJ (b) SPNLJ
 (c) SPMJG (d) WTRQ
33. Number of letters skipped in between adjacent letter decrease in order.
 (a) SYDHK (b) HNSWA
 (c) NSXCH (d) AGMRV
34. Number of letters skipped in between the adjacent letters in the series is equal.
 (a) SUXADF (b) RVZDHL

- (c) HKNGSW (d) RVZDFG

Directions (Q. Nos. 35-38): Study the following informations carefully to answer these questions.

Mr. and Mrs. Sharma has two children Asha and Shashi. Shashi has married to Radha who has daughter to Mr. Mahajan who is married to Reeta. Sonu and Rocky are the Children of Suresh and Reeta. Uma and Sudha are daughters of Shashi and Radha.

35. What is the surname of Sonu?
 (a) Mahajan (b) Sharma
 (c) Shashi (d) None of these
36. What is the relation of Suresh to Sudha?
 (a) Brother (b) Uncle
 (c) Maternal grandfather (d) Niece
37. What is the relation of Sudha to Asha?
 (a) Sister (b) Niece
 (c) Aunt (d) Daughter
38. Sherley starting from a fixed point, goes 15 m towards North and then after turning to his right, he goes 15 m. Then, he goes 10, 15 and 15 after turning to his left each time. How far is he from his starting point?
 (a) 15 m (b) 5 m (c) 10 m (d) 20 m

Directions (Q. Nos. 39-40): Three/four statements are given in each of the following questions, followed by two conclusions by three / four 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 common known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statement disregarding commonly known facts.

39. Statements Some walls are doors. Some doors are coats. Some coats are chairs.

Conclusions

- I. Some chairs are doors.
 II. Some coats are walls.
 III. No chair is door.

- (a) only II follows
 (b) Only III follows
 (c) only either I or III follows
 (d) only I follows
 (e) None of the above

40. Statements All trees are gardens. All gardens are stones. All stones are fences.

Conclusions

- I. Some fences are gardens.
 II. All gardens are fences.
 III. Some stones are trees.

- (a) I and II follows (b) I and III follows
 (c) II and III follows (d) All follows
 (e) None of the above

Directions (Q. Nos. 41-45): Study the following information and answer the questions given below.

Eight people-S, R, N, L, M, T, O and P are sitting in a circle facing the centre. All eight belong to different professions-reporter, doctor, cricketer, teacher, accountant, shopkeeper, painter and supervisor. They are not necessarily seated in the mentioned order. M is sitting third to the left of O.

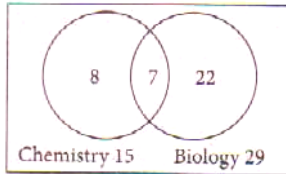
The doctor is to the immediate right of M and M is not reporter. R is sitting fourth to the right of P. Neither R nor P is an immediate neighbor of M. T is a teacher and is sitting third to the right of the doctor. The shopkeeper is sitting second to the left of the teacher. The painter is sitting second to the left of M. S the cricketer, is sitting exactly between T and P. The accountant is sitting second to the right of the cricketer. N is sitting third to the left of T.

41. Who amongs the following is a reporter?
 (a) 0 (b) L (c) N (d) R
42. What is S's position with respect of R?
 (a) third to the right (b) Second to the right
 (c) Third to the left (d) Second to the left
43. How many people are sitting between P and N when counted in an anti-clockwise direction from N?
 (a) One (b) Two

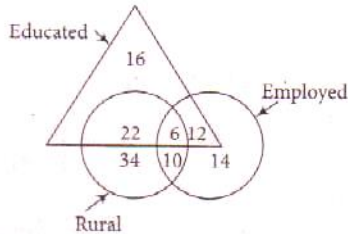
- (c) Three (d) Four
44. Four of the following five pairs are alike in a certain way based on their position in the above arrangement and so form a group. Which of the following does not belong to the group?
 (a) Teacher-painter
 (b) Supervisor-shopkeeper
 (c) Cricketer-Reporter
 (d) Shopkeeper-Doctor
45. Which one of the following statements is false according to the above mentioned arrangement?
 (a) N is to the immediate right of the supervisor
 (b) The cricketer is third to the right of the shopkeeper
 (c) The doctor is sitting exactly between the supervisor and the accountant
 (d) L is neither a teacher nor a supervisor

Directions (Q. Nos. 46-49): Study the diagram given below to answer these questions.

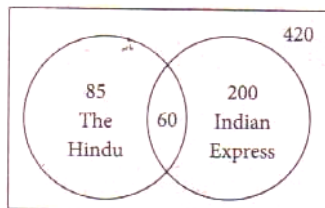
46. How many students are taking Chemistry or Biology?



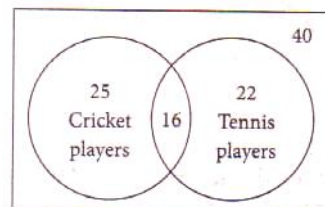
- (a) 30 (b) 15
 (c) 29 (d) 22
47. How many educated people are employed?



- (a) 18 (b) 26
 (c) 24 (d) 16
48. From the details, find out the number of people who do not read any newspaper.



- (a) 195 (b) 135
 (c) 175 (d) 75
49. Find out the number of people who do not play any game.



- (a) 9 (b) 24
 (c) 18 (d) 15
50. How is Nisha related to Nidhi? If
 I. Nisha's mother is sister of Nidhi's father.
 II. Nidhi is the daughter of Nisha's grandmother's only son.
51. Who among P, Q, S, T, V and W is the shortest? If
 I. S is taller than T, P and W and is not the tallest.
 II. T is shorter than Q but is not the shortest
52. Which of the following means 'very' in a certain code language? If
 I. 'pit jo ha' means 'very good boy' in that code language.

- II. 'jo na pa' means 'she is good' in that code language.
53. Town Q is towards which direction of town R? If
 I. Town R is towards East of town Q.
 II. Town B is towards North of town Q.
54. What is the value of $144\$16*7\#9$? If
 I. '\$' means '÷', '*' means '×' and '#' means '+'.
 II. $16\$4*2\#2 = 10$

Directions (Q. 55-60): A word arrangement machine, when given a particular input, rearranges it following a particular rule. The following is the illustration of the input and the steps of arrangement:

Input	87	321	293	47	176	409	215
Step I	47	321	293	87	176	409	215
Step II	47	321	293	87	176	215	409
Step III	47	87	293	321	176	215	409
Step IV	47	87	293	215	176	321	409
Step V	47	87	176	215	293	321	409

This is the final arrangement and step V is the last step for this input.

55. How many steps will be required to get the final output from the following input?
 Input: 181 317 67 249 417 91 293
 (a) 3 (b) 4 (c) 5 (d) 6 (e) N.O.T
56. What will be the fourth step for the following input?
 Input: 76 172 372 43 243 361 165
 (a) 43 76 165 172 243 361 372
 (b) 43 172 165 76 243 361 372
 (c) 43 172 372 76 243 361 165
 (d) Can't be determined
 (e) N.O.T
57. If following is the second step for an input, what will be the fourth step?
 Step II: 46 122 343 48 56 212 415
 (a) 46 122 212 48 56 343 415
 (b) 46 48 212 122 56 343 415
 (c) 46 48 343 122 56 212 415
 (d) 46 48 212 122 56 343 415
 (e) N.O.T
58. Which of the following is the last step for the following input?
 Input: 26 12 68 36 46 87 9
 (a) 9 12 26 36 68 46 87 (b) 9 12 36 26 46 68 87
 (c) 9 12 26 36 46 68 87 (d) 9 12 26 46 36 68 87
 (e) N.O.T
59. Following is the step III for an input. What will be the second step for the input?
 Step III: 45 47 342 121 55 211 414
 (a) 45 121 342 47 55 211 414
 (b) 45 55 342 121 47 211
 (c) 45 211 342 121 55 47 414
 (d) N.O.T
60. If 23, 142, 348, 96, 400, 410 is the second step of an input, which of the following steps will be 23, 96, 142, 348, 200, 400, 410?
 (a) Third (b) Fourth
 (c) Fifth (d) Can't be determined
 (e) N.O.T

SECTION C: COMPUTERS

61. The sequence of events that happen during a typical fetch operation is
 (a) PC → Mar → Memory → MDR → IR
 (b) PC → Memory → MDR → IR
 (c) PC → Memory → IR
 (d) PC → MAR → Memory → IR
62. The Boolean expression $AB + AB' + A'C + AC$ is unaffected by the value of the Boolean variable
 (a) A (b) B (c) C (d) None of these
63. Negative numbers cannot be represented in
 (a) signed magnitude form (b) 1's complement form
 (c) 2's complement form (d) None of these
64. $(10110011100011110000)_2$ in base 32 is

- (a) 22 14 7 16 (b) 11 9 23 31
(c) 11 9 7 16 (d) 11 14 23 16
65. The XOR operator \oplus is
(a) commutative
(b) associative
(c) distributive over AND operator
(d) None of these
66. Which of the following units can be used to measure the speed of a computer?
(a) SYPS (b) MIPS (c) BAUD (d) FLOPS
67. A decimal number has 25 digits. The number of bits needed for its equivalent binary representation is, approximately.
(a) 50 (b) 60 (c) 70 (d) 75
68. If memory access takes 20 ns with cache and 110 ns without it, then the hit-ratio, (cache uses a 10 ns memory) is,
(a) 93% (b) 90% (c) 87% (d) 88%
69. If the cache needs an access time of 20 ns and the main memory 120 ns, then the average access time of a CPU is (assume hit-ratio is 80%)
(a) 30 ns (b) 40 ns (c) 35 ns (d) 45 ns
70. The binary equivalent of the Gray code 11100 is
(a) 10111 (b) 00111 (c) 01011 (d) 10101
71. Which of the following is termed minimum error code?
(a) Binary code (b) Gray code
(c) Excess 3 code (d) Octal code
72. Two's complement of 1011.01 is
(a) 0100.10 (b) 0100.11
(c) 1011.10 (d) 0100.01
73. The sum of weights in self complementing BCD code must be
(a) 7 (b) 9 (c) 10 (d) 8
74. The square of octal number 23 is
(a) 529 (b) 539 (c) 550 (d) 650
75. The result of the addition $A0_{16} + 6B_{16}$ is,
(a) 10 B₁₆ (b) 16 B₁₆ (c) AOB₁₆ (d) A6B₁₆
76. The hardware in which data may be stored for a computer system is called
(a) register (b) memory
(c) chip (d) peripheral
77. The specialized storage element in the processor unit of a computer which is used as a "Scratch Pad" during processing operations is called
(a) storage register (b) primary memory
(c) cache memory (d) accumulator
78. The memory which is programmed at the time it is manufactured is
(a) ROM (b) RAM (c) PROM (d) EPROM
79. The seek time of a disk is 30 ms. It rotates at the rate of 30 rotations / second. The capacity of each track is 300 words. The access time is (approximately)
(a) 62 ms (b) 60 ms (c) 50 ms (d) 47 ms
80. How many RAM chips of size (256 K × 1 bit) are required to build 1M Byte memory?
(a) 8 (b) 10 (c) 24 (d) 32

SECTION D : ENGLISH

SET-1

For a time, the television industry comforted itself with the theory that children listened to children's programs and that, if by any chance they saw programs for adults, violence would serve as a safety value, offering a harmless outlet for pent-up aggressions: the more violence on the screen, the less in life. Alas, this turns out not to be necessarily so. As Doctor Wilbur Schramm, director of the Institute of Communication Research at Stanford has reported, children, even in the early elementary school years, view more programs designed for adults than for themselves: "above all, they prefer the more violent type of adult program including the Western, the adventure program, and the crime drama." Experiments show that such programs, far from serving as safety valves for aggression attract children with high levels of aggression and stimulate them to seek overt means of acting out their aggressions. Evidence suggests that these programs work the same incitement on adults and televiolence does more than condition emotion and behavior. It also may attenuate people's sense of reality. Men murdered on the television screen ordinarily spring to life after the episode is over

all death are therefore diminished. A child asked a man last June where he was headed in his car. "to Washington," he said. "Why?" He asked. "To attend the funeral of Senator Kennedy." The child said, "Oh yeah – they shot him again." And such shooting may well condition the manner in which people approach the perplexities of existence. On television the hero too glibly resolves his problems by shooting somebody. The Gunsmoke ethos, however is not necessarily the best way to deal with human or social complexity. It is hardly compatible with any kind of humane or libertarian democracy.

81. The primary purpose of the passage is to
(a) show how televiolence attenuates people's sense of reality
(b) show that violence on TV has similar effects, both on adults and children
(c) illustrate the consequences of televiolence on adults
(d) none of the above
82. Initially it was believed that
(a) only children watched children's programs
(b) violence in children's programs would serve as a safety valve
(c) more violence in children's programs would offer an outlet for pent-up aggressions
(d) none of the above
83. Which of the following statement is/are not true?
I. Televiolence makes aggressive children look for overt means of acting out aggression.
II. Televiolence incites adults into behaving childishly.
III. Children watch adult programs more than adventure programs.
(a) I only (b) II only (c) III only (d) I, II & III
84. In the last line the author wishes to say that
(a) humane and libertarian democracy are hardly compatible
(b) social complexity is not comparable with humane or libertarian democracy
(c) the Gunsmoke ethos should be made compatible with the principles of humane or social complexity
(d) the idea that shooting can resolve problems is too glib to be in tune with ideas of humane or libertarian democracy
85. The child's statement shows
(a) a casual acceptance of death as a fact of nature
(b) instant awareness of Kennedy's second assassination
(c) an almost casual dismissal of death because of disbelief in its reality
(d) a larger than life awareness of death

Set-2

It is natural to suppose but wrong to conclude that the use of the term the edge of history implies that its user has a clear picture and sharp definition of what history is. History deals with happenings in the past. The history of a period is an account of that period based on a selective sampling of dates and facts from a pool of information which, it is safe to assume, is incomplete. The selective factor is necessary as well as unavoidable subjective. Therefore one cannot speak of the history of a period. An historian can definitely be wrong but often cannot be sure of being right. That much is clear. Also, the knowledge of selected facts and dates is necessary but not sufficient if one is not content – and one should not be – with some insight into what happened but wishes to inquire further how 'it' happened. In the case of the history of discovery, questions like, why did A create what he did, why did B readily accept what A created, why did C resist A's new ideas? are fascinating. In my many years of immersion in theoretical physics I have known A's, B's and C's. though their concerns may not have been as profound as relativity, I often found it baffling to answer such questions as those just raised. Creation, acceptance, and resistance, whether in science or in other areas, are acts and attitudes the whys of which can be grasped only if one knows, along with facts, how the minds of A and B and C work. Who knows whether he knows?

86. One implication of the passage is
(a) there is no edge to history
(b) history must be judged contemporaneously
(c) the selective factor in history further distorts the incomplete information
(d) none of the above
87. We can infer that

- (a) historians can never be fully right
 (b) history is, in a sense, unnecessary
 (c) the incompleteness of history is fascinating
 (d) history repeats itself
88. History cannot be sharply defined because of all the below except
 (a) the sampling of dates and facts from the past is incomplete
 (b) knowledge of sampled facts is not sufficient for insight
 (c) the pool of information for the sampling of facts is incomplete
 (d) men are men, inscrutable.
89. A clear definition of the 'edge of history' would be
 (a) somewhere between the questions and the answers lies history's edge
 (b) the edge of history is the dull blurring of facts
 (c) the edge of history is the acute insight into man
 (d) the edge of history, in the final analysis, is a collection of facts and dates
90. This passage may have been used to
 (a) justify a famous person's folly
 (b) show the commonality between history and science
 (c) differentiate between the profundity of science and the banality of history
 (d) expound on the bafflement of one who cannot explain
91. The driver was _____ injured; he died within an hour.
 (a) significantly (b) fatally
 (c) fatefully (d) vitally
92. Lata Mangeshkar was _____ with a natural talent for music.
 (a) given (b) found
 (c) endowed (d) entrusted
93. Students of St. Xavier's _____ all the prizes.
 (a) bear of (b) bore away
 (c) bore on (d) bear on
94. With danger _____ the door, you cannot sit idle.
 (a) at (b) in

- (c) of (d) near
95. My servant _____ with all my money.
 (a) have escaped (b) was run away
 (c) has run off (d) running away

Directions : In these questions, choose the word opposite in meaning to the given word:

96. Plummet
 (a) Stagnate (b) Fall (c) Soar (d) Equate
97. Volatile
 (a) Fresh (b) Stable (c) Angry (d) Favourable

Directions : In these questions out of the four alternatives, choose the one which best expresses the meaning of the given word:

98. Futile
 (a) Fruitful (b) Difficult (c) Useless (d) Productive
99. Exotic
 (a) Simple (b) Exorbitant (c) Attractive (d) Dangerous
100. Mount Abu is a part
 P. of the Aravelli
 Q. its highest peak is
 R. range in Rajasthan and
 S. the Guru Sikhara
 6. About 16856 meters above sea level
 (a) PQRS (b) SRQP (c) RSQP (d) PRQS

ANSWERS
MAHCET MOCK-1
SECTION A : MATHS/QUANTS

1	2	3	4	5	6	7	8	9	10
D	C	D	B	D	D	D	D	B	B
11	12	13	14	15	16	17	18	19	20
D	A	C	D	B	D	C	D	B	D
21	22	23	24	25	26	27	28	29	30
D	C	E	C	C	C	D	C	C	C

SECTION B : REASONING

31	32	33	34	35	36	37	38	39	40
B	C	A	B	A	C	B	C	C	D
41	42	43	44	45	46	47	48	49	50
A	A	D	E	C	C	B	D	E	A
51	52	53	54	55	56	57	58	59	60
C	D	B	B	A	E	B	C	D	B

SECTION C : COMPUTERS

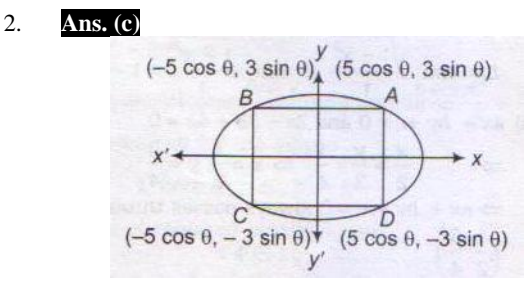
61	62	63	64	65	66	67	68	69	70
A	B	D	A	Ab	Bd	D	B	B	A
71	72	73	74	75	76	77	78	79	80
B	B	B	C	A	B	C	A	D	D

SECTION D: ENGLISH

81	82	83	84	85	86	87	88	89	90
A	C	B	D	B	D	A	D	A	B
91	92	93	94	95	96	97	98	99	100
B	C	B	A	C	C	B	C	C	D

MAHCET MOCK-2

1. **Ans. (d)** $x_1 x_2 x_3 - 24300 = 3^5 \times 2^2 \times 5^2 \dots(i)$
 As number of ways of distributing n identical items among r persons is $n^{r-1} C_{r-1}$
 So, here powers of prime factors will be distributed among 3 variables x_1, x_2 and x_3 .
 So, number of solutions of Eq. (i) is
 $(5+3-1)C_{3-1} (2+3-1)C_{3-1} (2+3-1)C_{3-1}$
 $= ({}^7C_2) ({}^4C_2) ({}^4C_2) = (21) (6) (6) = 756$



For ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$, the vertices of rectangle inscribed will be $(\pm a \cos \theta, \pm b \sin \theta)$, i.e., $(\pm 5 \cos \theta, \pm 3 \sin \theta)$. So, sides of rectangle are $10 \cos \theta$ and $6 \sin \theta$, so area of rectangle,
 $A = (10 \cos \theta) (6 \sin \theta) = 30 \sin 2\theta$
 $A = (10 \cos \theta) (6 \sin \theta) = 30 \sin 2\theta$
 As, maximum value of $\sin 2\theta$ is 1, so maximum value of area $A = 30$.

3. **Ans. (d)** $S = 1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \frac{13}{5^4} + \dots \dots(i)$
 $\Rightarrow \frac{1}{5} S = \frac{1}{5} + \frac{4}{5^2} + \frac{7}{5^3} + \frac{10}{5^4} + \dots \dots(ii)$
 Subtracting Eq. (ii) from Eq. (i), given
 $\frac{4}{5} S = 1 + \frac{3}{5} + \frac{3}{5^2} + \frac{3}{5^3} + \dots$
 $= 1 + \frac{3}{5} \left(1 + \frac{1}{5} + \frac{1}{5^2} + \dots \right)$
 $= 1 + \frac{3}{5} \left(\frac{1}{1 - \frac{1}{5}} \right) = 1 + \frac{3}{4} = \frac{7}{4} \Rightarrow S = \frac{35}{16}$

4. **Ans. (b)**
 W : Win
 M : Morning
 A : Afternoon
 E : Evening
 Given, $P(M) = P(A) = P(E) = \frac{1}{3}$
 $P\left(\frac{W}{M}\right) = 0.6, P\left(\frac{W}{A}\right) = 0.1,$
 $P\left(\frac{W}{E}\right) = 0.8$
 \therefore By using Bay's theorem

$$P\left(\frac{A}{W}\right) = \frac{P\left(\frac{A}{W}\right) \cdot P(W)}{P\left(\frac{W}{A}\right) \cdot P(A) + P\left(\frac{W}{M}\right) \cdot P(M) + P\left(\frac{W}{E}\right) \cdot P(E)}$$

$$= \frac{0.1 \times \frac{1}{3}}{\frac{1}{3}(0.1 + 0.6 + 0.6)} = \frac{1}{15}$$

5. **Ans. (d)** $\log_{x^2} 4 + \log_{x^3} 2 = \frac{8}{3}$
 $\Rightarrow \log_x 2 + \log_x 2^{1/3} = \frac{8}{3} \Rightarrow \log_x 2^{1+1/3} = \frac{8}{3}$
 $\Rightarrow \frac{4}{3} \log_x 2 = \frac{8}{3} \Rightarrow x^2 = 2 \Rightarrow x = \sqrt{2} \Rightarrow x = \{\sqrt{2}\}$

6. **Ans. (d)** $6x^2 + 5xy - 6y^2 - 29x + 2y + 28 = 0 \dots(i)$
 represents pair of straight lines perpendicular to each other, so orthocenter will be the point of intersection of pair of lines represented by Eq. (i).
 Now, Eq. (i)
 $(2x + 3y) (3x - 2y) - 29x + 2y + 28 = 0$
 $\Rightarrow (2x + 3y - 7) (3x - 2y - 4) = 0$
 Point of intersection of $2x + 3y - 7 = 0$ and $3x - 2y - 4 = 0$ is (2, 1)
 So, orthocenter is (2, 1).

7. **Ans. (d)** For hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
 Foci are $(\pm ae, 0)$ and directrices are $x \pm \frac{a}{e}$.

We have, $2ae = 12$ and $\frac{2a}{e} = 3 \Rightarrow e^2 = 4$
 $\Rightarrow e = 2$
 So, as $a^2(e^2 - 1) = b^2 \Rightarrow 3a^2 = b^2 \dots(ii)$
 Now, asymptotes of hyperbola in Eq. (i) is given by
 $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0 \Rightarrow y = \pm \frac{b}{a} x$

So, angle between them will be

$$\tan^{-1} \left| \frac{\frac{b}{a} - \left(-\frac{b}{a}\right)}{1 + \left(\frac{b}{a}\right)\left(\frac{-b}{a}\right)} \right| = \tan^{-1} \left| \frac{\frac{2b}{a}}{\frac{a^2 - b^2}{a^2}} \right|$$

$$= \tan^{-1} \left| \frac{2ab}{a^2 - b^2} \right| = \tan^{-1} |-\sqrt{3}|$$

$$= \tan^{-1} \sqrt{3} = 60^\circ \quad [\text{from Eq. (i)}]$$

8. **Ans. (d)** $ax + by + c = 0$ and $2a + 3b + 4c = 0$
 $\Rightarrow \frac{x}{2} = \frac{y}{3} = \frac{1}{4} \Rightarrow x = \frac{1}{2}; y = \frac{3}{4}$
 $\Rightarrow ax + by + c = 0$ always passes through point $\left(\frac{1}{2}, \frac{3}{4}\right)$

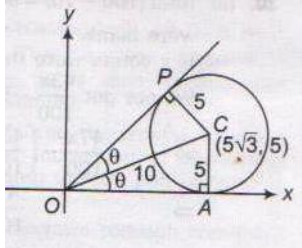
9. **Ans. (b)** $P = \begin{bmatrix} \cos x & -\sin x \\ \sin x & \cos x \end{bmatrix}$
 $\Rightarrow P^2 = \begin{bmatrix} \cos 2x & -\sin 2x \\ \sin 2x & \cos 2x \end{bmatrix}$
 $Q = \begin{bmatrix} \cos y & -\sin y \\ \sin y & \cos y \end{bmatrix}$
 $P^2 Q = \begin{bmatrix} \cos 2x & -\sin 2x \\ \sin 2x & \cos 2x \end{bmatrix} \begin{bmatrix} \cos y & -\sin y \\ \sin y & \cos y \end{bmatrix}$

$$= \begin{bmatrix} \cos(2x+y) & -\sin(2x+y) \\ \sin(2x+y) & \cos(2x+y) \end{bmatrix}$$

10. **Ans. (b)** $\sin^2\theta - \sin 2\theta - 15\cos^2\theta = 0$
 $\Rightarrow \tan^2\theta - 2\tan\theta - 15 = 0$
 (by dividing both sides by $\cos^2\theta$)
 $\Rightarrow (\tan\theta - 5)(\tan\theta + 3) = 0 \Rightarrow \tan\theta = 5, -3$
 $\theta = m\pi + \tan^{-1}5, n\pi - \tan^{-1}3$

11. **Ans. (d)** Area of parallelogram enclosing an ellipse
 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to $4ab$, so for the ellipse
 $\frac{x^2}{25} + \frac{y^2}{9} = 1$. here $a^2 = 25, b^2 = 9$
 The area of required parallelogram = $4(5)(3) = 60$

12. **Ans. (a)** The complex number z satisfying
 $|z - (5\sqrt{3} + 5i)| = 5$
 represents a circle with centre $C(5\sqrt{3}, 5)$ and radius = 5
 Now, maximum argument of $z = 2\theta$
 In ΔOAC ,
 $\sin\theta = \frac{5}{10} = \frac{1}{2} \Rightarrow \theta = \frac{\pi}{6}$



\therefore Maximum arg (z) = $\frac{\pi}{3}$

13. **Ans. (c)** $f(x)$ will be continuous at those points where it takes same values for rational as well as irrational number i.e.,
 $x^2 + 6x + 2 = x^2 + 5x - 4$
 $\Rightarrow x = -6$
 So, $f(x)$ is continuous at $x = -6$. Only i.e., at only one point.

14. **Ans. (d)** As $p(x)$ has double root at $x = 2$, so
 It will be, $p(x) = (x - 2)^2(x - \alpha)$
 $\Rightarrow p'(x) = 2(x - \alpha) + (x - 2)^2$
 As $p(x)$ has extreme value at $x = 1$
 So, $p'(1) = 0 \Rightarrow 2(1 - \alpha) + 1 = 0$
 $\Rightarrow 1 - \alpha = 1/2 \Rightarrow \alpha = 1/2$
 \Rightarrow other root (α) = $\frac{1}{2}$

15. **Ans. (b)** The volume of the tetrahedron = $\frac{1}{6}(PQ PR PS)$
 where $PQ = 1 + 6j + 36k$
 $PR = 0i + 2j + 5k$
 $PS = 0i + 0j + 6k$
 $\therefore v = \frac{1}{6} \begin{vmatrix} 1 & 6 & 36 \\ 0 & 2 & 5 \\ 0 & 0 & 6 \end{vmatrix}$

$$v = \frac{1}{6} \times (1 \cdot 2 \cdot 6) = 2$$

16. **Ans. (b)** Parabola is $y^2 = 24x$
 $\Rightarrow 2y \frac{dy}{dx} = 24 \Rightarrow \frac{dy}{dx} = \frac{12}{y}$
 Given line is $y = 3x + 10$
 $\frac{dy}{dx} = 3$

For the shortest distance, $\frac{12}{y} = 3 \Rightarrow y = 4$
 and for which corresponding point on
 $y^2 = 24x$ is $(\frac{2}{3}, 4)$

$$\therefore \text{Required shortest distance} = \left| \frac{3 \times \frac{2}{3} - 4 + 10}{\sqrt{9+1}} \right| = \frac{8}{\sqrt{10}}$$

17. **Ans. (c)** $7x^2 - 13x + 2a = 0$
 $\Rightarrow 7\left(x^2 - \frac{13}{7}x + \frac{2a}{7}\right) = 0$
 $\Rightarrow \left(x - \frac{13}{14}\right)^2 + \frac{2a}{7} - \left(\frac{13}{14}\right)^2 = 0$
 $\Rightarrow \left(x - \frac{13}{14}\right)^2 = \frac{169 - 56a}{196} \Rightarrow x - \frac{13}{14} = \frac{\pm\sqrt{169 - 56a}}{14}$
 $\Rightarrow x = \frac{13 \pm \sqrt{169 - 56a}}{14}$

$\Rightarrow a = 3$ to get rational roots, as for $a = 3$; $169 - 56a = 1$ (approx) is a perfect square.

18. **Ans. (d)** Equation of pair of lines joining origin to points of intersection of line $2x + y - 1 = 0$ and $5x^2 + xy - y^2 - 3x - y + 1 = 0$ is obtained by homogenous equation of pair of straight lines with help of equation of line $2x + y - 1 = 0$ i.e., $2x + y = 1$
 $\Rightarrow 5x^2 + xy - y^2 - (3x + y)(2x + y) + (2x + y)^2 = 0$
 $3x^2 - y^2 = 0$

$$\Rightarrow y = \pm\sqrt{3}x$$

 $\Rightarrow \text{Angle between them} = \tan^{-1} \left| \frac{\sqrt{3} + \sqrt{3}}{1 - \sqrt{3}\sqrt{3}} \right|$
 $= \tan^{-1} \sqrt{3} = \frac{\pi}{3}$

19. **Ans. (b)** The rate at which nitrogen is poured and nitrogen is removed coincides it $25h = 100 \Rightarrow h = 40$
 So, when $h = 40$ nitrogen in container becomes constant.
 So, as $t \rightarrow \infty$ volume of nitrogen
 $= 60 \times 60 \times 40 = 1440000$ cc

20. **Ans. (d)** If each paper is of 100 marks, then marks obtained by the students with ratio $6 : 7 : 8 : 9 : 10$ is
 $6x + 7x + 8x + 9x + 10x = \frac{3}{5} \times 500$
 $\Rightarrow 40x = 300 \Rightarrow x = \frac{15}{2}$
 So, marks are $6x, 7x, 8x, 9x, 10x$.

i.e., 45, 52.5, 60, 67.5, 75
So, in no paper less than 45% marks were obtained.

21. **Ans. (d)** Let the number be $(10x + y)$, so when the digits of number are reserved the number becomes $(10y + x)$.
According to the question, $(10y + x) - (10x + y) = 18$
 $\Rightarrow 9(y - x) = 18 \Rightarrow y - x = 2$
So, the possible pairs of (x, y) are $(1, 3), (2, 4), (3, 5), (4, 6), (5, 7), (6, 8)$ and $(7, 9)$.
But we want the number other than 13. Thus, there are 6 possible numbers, i.e. 24, 35, 46, 57, 68, 70.
So, total number of possible numbers are 6.

22. **Ans. (c)** $a^n + b^n$ is always divisible by $a + b$ when n is odd.
 $\therefore 15^{23} + 23^{23}$ is always divisible by $15 + 23 = 38$. As 38 is a multiple of 19, $15^{23} + 23^{23}$ is divisible by 19.
 \therefore We get a remainder of 0.

23. **Ans. (e)** Let the length, breadth and height of the room be 3, 2 and 1 unit respectively.
Area of the four walls of the room = $2(l + b)h$
 $= 2(3 + 2) \times 1 = 10$ sq units
Now length, breadth and height of the room will be 6, 1 and $\frac{1}{2}$ unit respectively.

\therefore New area of the four walls of the room
 $= 2(6 + 1) \times \frac{1}{2} = 7$ sq. unit
Percentage decrease = $\frac{10 - 7}{10} \times 100\% = 30\%$

24. **Ans. (c)** Increase in price of sugar = $(8 + 2) = 10\%$
 \therefore Price of sugar on Jan. 1, 1996
 $= 20 \times 1.1 \times 1.1 = \text{Rs. } 24.20$

25. **Ans. (c)** Let the marks scored in five subjects be $6x, 7x, 8x, 9x$ and $10x$
Total marks in all the five subjects = $40x$
Max marks of the five subjects = $\frac{40x}{0.6}$
($\because 40x$ is 60% of total marks)
 \therefore Max marks in each subject
 $= \frac{40x}{0.6 \times 5} = 13.33x$.

Hence, percentage in each subject = $\frac{6x}{13.33x} \times 100$,

$\frac{7x}{13.33} \times 100, \frac{8x}{13.33x} \times 100, \frac{9x \times 100}{13.33x}, \frac{10x \times 100}{13.33x}$
or 45.01%, 52.51%, 60.01%, 67.51% and 75.01%.
 \therefore Number of papers in which he got more than 50% marks is 4.

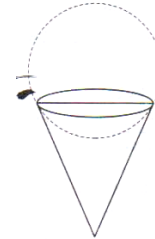
26. **Ans. (c)** Let the weight of the diamond be $10x$, then price of the diamond will be $k(10x)^2 = k \cdot 100x^2$, where k is a constant.
Weight of each piece = $x, 2x, 3x$ and $4x$. Therefore their price will be $kx^2, 4kx^2, 9kx^2$ and $16kx^2$
Total price of pieces = $kx^2(1 + 4 + 9 + 16) = 30kx^2$.
Given, $k100x^2 - k30x^2 = 70,000$ or $kx^2 = 1,000$
 \therefore Original price of diamond
 $= k100x^2 = 1000 \times 100 = 100000$

27. **Ans. (d)** Cost price of $d(3 + 4 + 5) = 12$ kg of fruits
 $= \text{Rs. } (300 + 320 + 300) = \text{Rs. } 920$.
SP at a profit of 50% = Rs. 1380.

\therefore SP of fruits per kg = $\frac{1380}{12} = \text{Rs. } 115$.

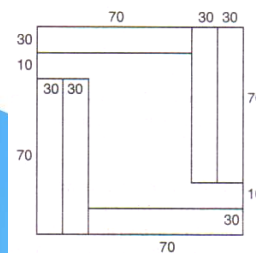
28. **Ans. (c)** let x kg of dry grapes is obtained.
Then, solid part in fresh grapes = solid part in dry grapes
 $0.10 \times 20 = 0.8 \times x \Rightarrow x = 2.5$ kg

29. **Ans. (c)** Though it is given that diameter of the cone is equal to the diameter of the spherical ball. But the



ball will not fit into the cone because of its slant shape. Hence, more than 50% of the portion of the ball will be outside the cone.

30. **Ans. (c)**



31. (b) given, P R I S M
 -1 +1 -1 +1 -1
 O S H T L

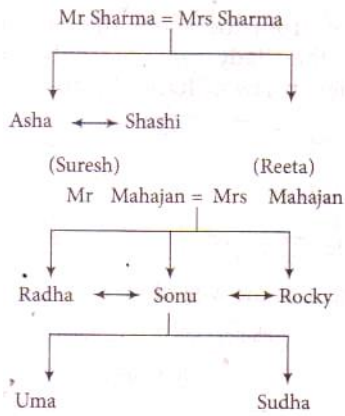
and R U B L E
 -1 +1 -1 +1 -1
 Q V A M D
Then, W H O R L
 -1 +1 -1 +1 -1
 V I N S K

32. (c) S P M J G
 ↑ ↑ ↑ ↑
 Q, R N, O K, L H, I

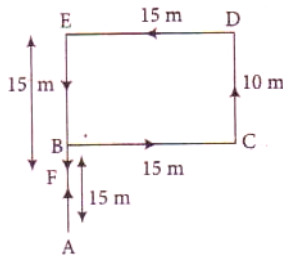
33. (A) S Y D H K
 ↑ ↑ ↑ ↑
 T, U, V, W, X Z, A, B, C E, F, G I, J

34. (b) R V Z D H L
 ↑ ↑ ↑ ↑
 S, T, U W, X, Y A, B, C E, F, G I, J, K

Solutions (Q. Nos. 7-9)



35. **Ans. (a)** It is clear from the above graph that the surname of Sonu is Mahajan.
36. **Ans. (c)** It is clear from the above graph that Suresh is maternal grandfather of Sudha.
37. **Ans. (b)** It is clear from the above graph that Sudha is niece of Asha.
38. **Ans. (c)** From figure, A is the starting point and F is the ending point of Sherley.



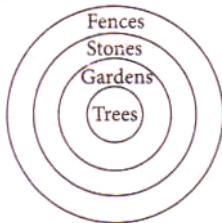
$\because AE = AB + BE$
 $= 15 + 10$
 $= 24 \text{ m}$
 Now, $AF = AE - EF$
 $= 25 - 15 = 10 \text{ m}$
 Hence, Sherley is 10 m far from his starting point.

39. **Ans. (c)**



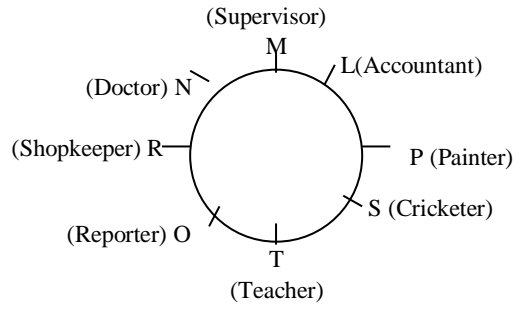
Clearly, only either I or III follows.

40. **Ans. (d)**



Clearly, all given conclusions follow.

Solutions. (Q. Nos. 41-45):



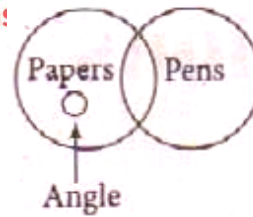
41. **Ans. (a)**
42. **Ans. (a)**
43. **Ans. (d)**
44. **Ans. (e)**
45. **Ans. (c)**
50. **Ans. (a)**



Hence, only Conclusion I follows.

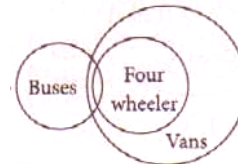
51. **Ans. (c)**

infomath:



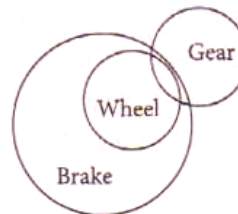
This is a special case. So either Conclusion I or II follows.

52. **Ans. (d)** As per the question,



Conclusions I. \checkmark II. \checkmark
 Hence, both conclusions I and II follow.

53. **Ans. (b)**



So, only Conclusion II follows.

54. **Ans. (b)**



So, only Conclusion II follows.

- 55. **Ans. (a)** Only 3 steps are required to get the final output from the input
Input – 181 317 67 249 417 91 293
- 56. **Ans. (e)** None of these.
- 57. **Ans. (b)** step II – 46 122 343 48 56 212 415

Step III – 46 48 33 122 56 212 415
Step IV 46 48 212 343 56 212 415

- 58. **Ans. (c)** Input 26 12 68 36 46 87 9
Last step 9 12 26 36 46 68 87
- 59. **Ans. (d)** NOT – as we cant determined the previous steps, as input is not given.
- 60. **Ans. (b)** Step 2nd – 23 142, 348, 96, 400, 410
Step III 23, 96, 348, 142, 400, 410
Step IV 23, 96, 142, 348, 400, 410

