SECTION – I
Number of Questions = 40

DIRECTIONS *for questions 1 to 9:* Answer the questions independently of each other.

1. There are 121 boxes of strawberries, each box containing at least 50 strawberries and at most 80 strawberries. If no five boxes have the same number of strawberries, what is the maximum number of strawberries that can be present in all the boxes together?

(1) 7910 (2) 7280 (3) 7790 (4) 7840

2. Find the remainder when 2^{1783} is divided by 73.

(1) 7 (2) 9 (3) 4 (4) 2

3. Consider the following set of equations:

$3x + 5y + 2z = 23$

$5x + 6y + 7z = 44$

$Px + 28y + 25z = 178$

If x, y and z are real, then which of the statements is/are not true?

I. The set of equations will become inconsistent (have no solution) for at least one value of P.

II. There exists a unique solution for the set of equations for every real value of P except 21.

III. The set of equations will have more than one solution for at least one real value of P.

(1) I, II and III (2) Only II and III

(3) Only I (4) None of these

4. Raghu writes the number 458 on the blackboard. Each of his friends then walks up to the board and is allowed to perform exactly one operation. The operation can be either to double the number on the board (after the erasing the earlier number) or to erase the rightmost digit of the number on the board. If after sometime, the number 14 was on the board, then what is the minimum possible number of friends that Raghu has? (Assume that no friend walks up to the board twice)

(1) 4 (2) 6 (3) 8 (4) None of these

5. Let $y = \log_2 x$ and $z = |y|^2 + 3|y| - 10$. For which of the following ranges of x is $z \geq 0$?

(1) $[1/32, 1/4] \cup [4, 32]$ (2) $(0, 1/32) \cup [4, \infty)$

(3) $[1/32, 1/4] \cup [1/4, \infty)$ (4) $(0, 1/4] \cup [4, \infty)$

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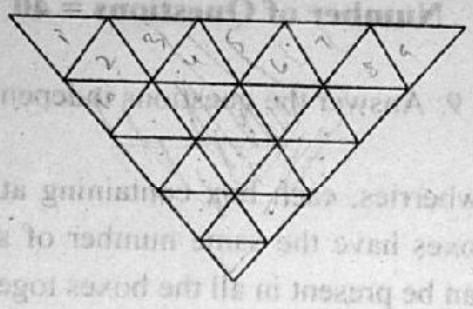
6. How many triangles are there in the figure given below?



(1) 42 (2) 44 (3) 48 (4) 45

7. If $f(x)$ is defined as the greatest integer less than or equal to $x/2$, how many of the following statements are true?

I. $f(x)$ is half the least even integer greater than or equal to x.

II. $f(x)$ is the least integer greater than or equal to $x/2 - 1$.

III. $f(x)$ is one less than half the least even integer greater than x.

(1) 0 (2) 1 (3) 2 (4) 3

8. A quadrilateral ABCD is called a kite, if AB = AD and BC = DC. In the kite ABCD, if $\angle BAC = \angle BDC$, then which of the following is true of the sum $\angle BAC + \angle BCA$?

(1) It is less than 90° (2) It is equal to 90°

(3) It is greater than 90° but less than 120° (4) It is equal to 120°

9. The inhabitants of planet Rahu measure time in hours and minutes which are different from the hours and minutes of Earth. Their day consists of 36 Rahuian hours with each hour having 120 Rahuian minutes and therefore the dials of their clocks show 36 hours. What is the angle (in Rahuian degrees) between the hour hand and the minute hand of a Rahuian clock when it shows a time of 9:48? Rahuians measure angles in degrees, the way we do on earth. But for them, the angle around a point is 720 Rahuian degrees (instead of the 360° that we have on earth).

(1) 100 (2) 112 (3) 24 (4) None of these

DIRECTIONS *for questions 10 to 12:* Answer the questions on the basis of the information given below.

```
          5 b 1
cd9)a h a h b i
    a g d e
    -------
      g 3 b
      f i 8
      -----
        c d i
        c d 9
        -----
            0
```

In the division problem given above, every letter represents a distinct digit.

10. What is the value of h?

(1) 4 (2) 5 (3) 8 (4) 9

11. What is the value of d?

(1) 4 (2) 6 (3) 7 (4) 8

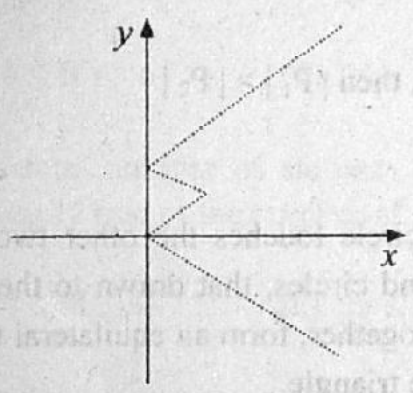
12. Find the value of c.

(1) 1 (2) 3 (3) 2 (4) 4

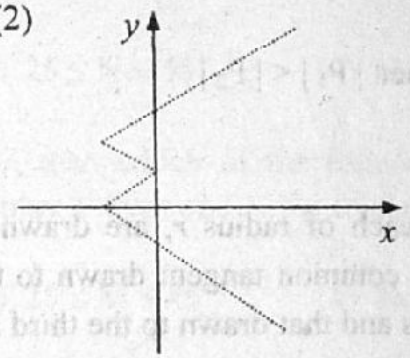
DIRECTIONS *for questions 13 to 19:* Answer the questions independently of each other.

13. Which of the following graphs best represents the function $x = ||y-1|-1|+1$?

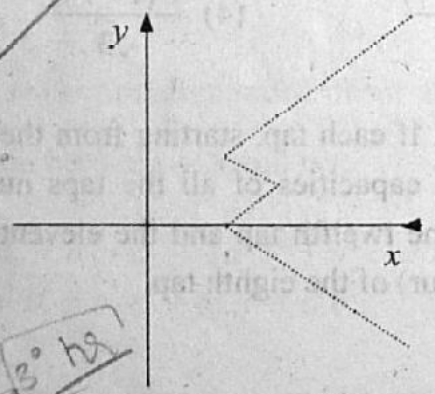
(1)



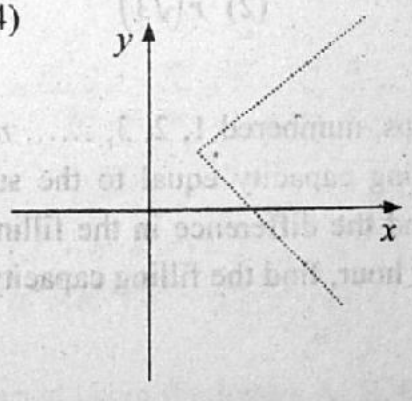
(2)



(3)



(4)



14. Rekha drew a circle of radius 2 cm on a paper containing a grid of unit-squares formed by several horizontal and vertical straight lines. The distance between any two adjacent horizontal lines or any two adjacent vertical lines is 1 cm. Rekha then calculated the approximate area of the circle by adding up only the number of full unit-squares that fell within the perimeter of the circle. If the value of the area that Rekha obtained was d sq.cm less than the actual value, then find the maximum possible value of d.

(1) 6.28 (2) 7.28 (3) 7.56 (4) 8.56

15. Bakul and Manohar start from two points P and Q respectively on a river and head towards each other. Had they been travelling in still water, they would have met at a point R, which is twice as distant from P as it is from Q. If Bakul had been travelling along the current and Manohar against it, then they would have met in 24 minutes. Find the time they would take to meet, if Bakul were to travel against the current and Manohar along the current.

(1) 12 minutes (2) 24 minutes (3) 36 minutes (4) 48 minutes

16. Let $a(x) = |4x^2 + 4x + 1|$ and $b(x) = -|6x + 3|$, where x is a real number. Find the number of points at which these two curves meet.

(1) 1 (2) 0 (3) 3 (4) None of these

17. A trader increases the selling price of an article by exactly the same amount by which the cost price of the article goes up. Which of the following statements is necessarily true regarding P_1 and P_2, which are his profit percentages before and after the price hike respectively? (Negative profit percentage indicates a loss)

(1) If $P_1 < 0$, then $|P_1| < |P_2|$
(2) If $P_1 > 0$, then $|P_1| > |P_2|$
(3) $P_1 = P_2$
(4) $P_1 \neq P_2$

18. Three circles, each of radius r, are drawn such that each circle touches the other two circles externally. The common tangent drawn to the first and second circles, that drawn to the second and third circles and that drawn to the third and first circles, together, form an equilateral triangle, enclosing the three circles completely. Find the inradius of the triangle.

(1) $\frac{2r}{\sqrt{3}}$ (2) $r(\sqrt{3})$ (3) $\frac{r(\sqrt{3}+1)}{\sqrt{3}}$ (4) $\frac{r(\sqrt{3}-1)}{\sqrt{3}}$

19. There are n taps, numbered 1, 2, 3, ... n, fitted to a tank. If each tap, starting from the second tap, has a filling capacity equal to the sum of the filling capacities of all the taps numbered less than it, and the difference in the filling capacities of the twelfth tap and the eleventh tap is 1792 litres per hour, find the filling capacity (in litres per hour) of the eighth tap.

(1) 448
(2) 896
(3) 224
(4) Cannot be determined

DIRECTIONS *for questions 20 and 21:* Answer the questions on the basis of the information given below.

The table below gives some details regarding the number of students of a class who play/do not play various games among Basketball, Football, Cricket, Volleyball and Baseball.

Students not playing	Number of students
Basketball	10
Football	13
Cricket	18
Volleyball	20
Baseball	25
any of the five games	10

20. Which of the following statements is necessarily true of the number of students, N, who do not play one or more of the five games?

(1) $24 \le N \le 46$ (2) $25 \le N \le 46$ (3) $25 \le N \le 45$ (4) None of these

21. If the total number of students in the class is 70, then which of the following statements is necessarily true of the number of students, M, who play at least one of the five games?

(1) $24 \le M \le 46$ (2) $25 \le M \le 46$ (3) $25 \le M \le 45$ (4) None of these

DIRECTIONS *for questions 22 to 27:* Answer the questions independently of each other.

22. If l, m, n are eliminated from the equations $\frac{l}{m} = \frac{a^3+1}{b^3}, \frac{m}{n} = \frac{b^3+1}{c^3}, \frac{n}{l} = \frac{c^3+1}{a^3}$, then the relation between a, b and c is

(1) $(a^3+b^3+c^3)+(a^3b^3+b^3c^3+c^3a^3) = -1$ (2) $(a^3+b^3+c^3) = 1$
(3) $a^3b^3+b^3c^3+c^3a^3 = a^3b^3c^3$ (4) $a^3+b^3+c^3 = a^3b^3c^3$

23. How many different seven-lettered words can be formed using the letters A, B, C, D, E, F and G, such that all of them start with the letter A, and no two letters of A, D and G are adjacent to each other?

(1) 480 (2) 384 (3) 308 (4) 288

24. A 12-digit number divisible by 72 consists of only 4s and 6s. Find the number of 6s in the largest possible such number.

(1) 3 (2) 4 (3) 5 (4) 6

25. The sides of a regular decagon are extended to form a star. Find the measure of the internal angle at each point of the star.

(1) 72° (2) 108° (3) 144° (4) 45°

26. The set Y consists of the following numbers. $Y = \{1, 3^{1/2}, 3, 3^{3/2}, \ldots, 3^{9}, 3^{19/2}, 3^{10}\}$. In how many ways can a pair of distinct numbers be selected from the set Y such that their product is greater than or equal to 3^{10}?

(1) 110 (2) 210 (3) 105 (4) 100

27. The road connecting Ooty and Mangalore goes only uphill or downhill, i.e., there is no stretch of road that is level. Ashish's car can do a constant 45 kmph uphill and 90 kmph downhill. Find the distance between Ooty and Mangalore, if it takes exactly 8 hours for Ashish to make a round trip.

(1) 360 km (2) 270 km
(3) 240 km (4) Cannot be determined

DIRECTIONS *for questions 28 and 29:* Answer the questions on the basis of the information given below.

A certain MP3 player is available at a duty-free shop at the Bombay international airport. It is priced in Indian rupees. The shop accepts Euros, U.S. dollars and Indian rupees at the following rates of exchange:

1 U.S. dollar = 42 rupees
1 Euro = 43 rupees

The MP3 player is priced at Rs.1230 per piece. After one MP3 player is purchased, subsequent players are available at a discount of 25%. Three friends Lallu, Neeru and Thomas together purchased three MP3 players, agreeing to share the cost equally. Thomas pays 9 U.S. dollars, Lallu pays 7 U.S. dollars and Rs.43 and Neeru pays the remaining amount in Euros.

28. How much does Thomas owe Neeru?

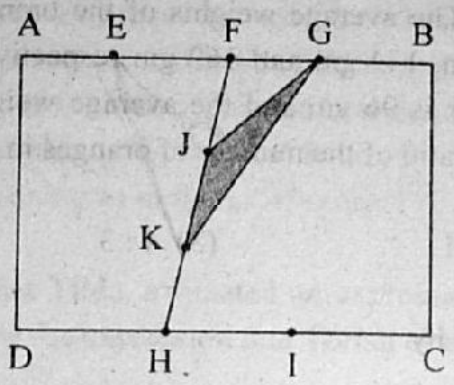
(1) Rs.647 (2) Rs.651 (3) Rs.657 (4) Rs.663

29. How much does Lallu owe Neeru?

(1) 14 Euros (2) 16 Euros (3) 18 Euros (4) 20 Euros

DIRECTIONS *for questions 30 to 38:* Answer the questions independently of each other.

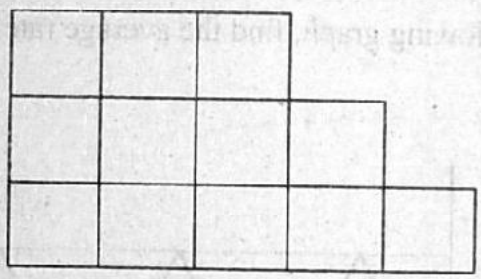
30.



In the above figure, given that FJ = JK = KH, AE = EF = FG = GB, DH = HI = IC and AB = 2AD = 3DH = 4FG, find the ratio of the area of the shaded region to that of the rectangle ABCD.

(1) 3 : 16 (2) 1 : 18 (3) 3 : 32 (4) 1 : 24

31. Seven Ps are to be placed in the cells of the figure shown below, with each horizontal row containing at least one P. How many arrangements are possible, if each cell can contain at most one P?



(1) 747 (2) 756 (3) 872 (4) 912

32. Ben was using the following algorithm

Step 1: Read p, q. Set $r = 0$, $s = 0$
Step 2: If $p > q$, then $r = p$, $p = q$, $q = r$
Step 3: $q = q - p$, $s = s + 1$
Step 4: If $p > q$, print s. Stop.
Step 5: Go to step 3.

If p and q are positive integers, what does Ben's algorithm give?

(1) HCF of p and q.
(2) Remainder after dividing the larger of the two by the smaller.
(3) Quotient after dividing the larger of the two by the smaller.
(4) None of the above.

33. There are four baskets w, x, y and z, each containing a particular variety of oranges. The number of oranges in any basket is unknown. The average weight of the oranges in the four baskets w, x, y and z put together is 120 gm. The average weights of the oranges in the baskets w, x, y and z, individually, are 90 gm, 100 gm, 144 gm and 160 gm respectively. If the average weight of the oranges in w and x put together is 96 gm and the average weight of the oranges in x and y put together is 120 gm, what is the ratio of the number of oranges in basket w to that in basket z?

(1) 9 : 1 (2) 2 : 1 (3) 4 : 3 (4) 5 : 4

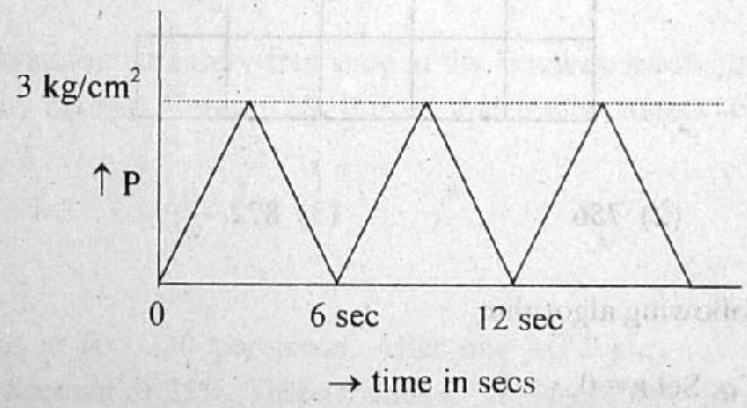
34. $44^3 - 36^3 - 8^3$ is always divisible by

(1) 17, 13 and 8 (2) 19, 13 and 6 (3) 17, 14 and 6 (4) 11, 9 and 8

35. What is the area of the quadrilateral whose vertices are $(a, a-2)$, $(a+1, a-1)$, $(a+4, a)$ and $(a-3, a+2)$?

(1) $(32a+76)/3$ (2) $(37a+11)/5$ (3) $(51a+46)/4$ (4) None of the above

36. Crude oil flows through an underwater pipeline. The rate of flow of oil through the pipeline is equal to 30P cc/sec, where P is the pressure (expressed in gm/cm^2) in the pipe. If the pressure at any point of time is given by the following graph, find the average rate of flow of oil through the pipeline. (1 ℓ = 1000 cc.)



(1) 45 ℓ/sec (2) 540 cc/sec (3) 45 cc/sec (4) 54 ℓ/sec

37. Two positive integers x and y are such that $x^2 + 12y^2 - 7xy - 4 = 0$. How many values can y assume?

(1) 2 (2) 1 (3) 3 (4) 4

38. A regular 12-sided polygon is inscribed in a circle of a radius r cm. Find the area (in sq.cm) of the region between the circle and the polygon.

(1) $(\pi - 2)r^2$ (2) $(\pi - 3)r^2$ (3) $(\pi - 1)r^2$ (4) None of these

DIRECTIONS *for questions 39 and 40:* Answer the questions on the basis of the information given below.

The inhabitants of planet Xion use a number system which is similar to the decimal number system used here on Earth, except that it has eleven distinct digits instead of the usual ten digits. The extra digit is an alien digit called Theta (θ), which is inserted between the digits 7 and 8. Now, $8 - 7 = 2$ and Theta (θ) is the digit which is equidistant from 7 and 8, i.e., $\theta - 7 = 8 - \theta = 1$. All the algebraic signs and operations carry the same meaning as in the usual sense.

39. Torian, an inhabitant of planet Tilda, evaluated an expression and arrived at an answer of '6θ'. Which of the following can be the expression that Torian evaluated?

(1) $\theta^2 + \theta - 1$ (2) $\theta^2 + \theta + 1$ (3) $\theta^2 + \theta + 2$ (4) None of these

40. What is the decimal equivalent of the two-digit number '9θ'?

(1) 118 (2) 107 (3) 98 (4) None of these

SECTION – II
Number of Questions = 40

DIRECTIONS *for questions 41 to 80:* Read the following passages and answer the questions that follow them.

PASSAGE – I

The entanglement of science and culture is particularly important to understand because there has always been an ambivalence in the way in which scientists have viewed human beings. The development of a scientific worldview has been in large part about the replacement of the idea of divine intervention as the means by which order is maintained in nature with the belief that nature proceeds according to its internal, and immutable, laws. This idea found its germ in the claims of Copernicus, Galileo and Kepler, in the fifteenth and sixteenth centuries, and fully flowered in the work of Isaac Newton, and of the Enlightenment philosophers who followed. In the opening to his monumental 'Spirit of the Laws', published in 1748, the French philosopher and jurist Montesquieu set out the new belief that natural or social phenomena were not arbitrary but were governed by specific laws which could be apprehended by humanity. 'Laws in their most general signification', he wrote, 'are the necessary relations derived from the nature of things. In this sense all beings have their laws, the Deity has his law, the material World has its law, the intelligences superior to man have their laws, the beasts their laws, man his laws'.

From one perspective, this 'naturalistic' worldview can be seen as dethroning humanity from its privileged position in the traditional Christian view of the cosmos. The arrival of the heliocentric universe displaced not just the planets, but Man too. With the Earth no longer at the centre of the universe, but merely one of the planets orbiting the sun, Man seemed to become more peripheral, an insignificant part in the order of things. 'Modern neurosis', American novelist and critic Mary McCarthy writes, 'began with the discoveries of Copernicus'.

But if Christian theology had placed Man at the centre of the cosmos, it was also ambiguous about his role there. A special place in the cosmos did not connote special virtue. Man was a fallen creature, whose aspirations to complete knowledge had been shattered by the Fall, and Earthly existence was a miserable and corrupt one. Indeed, the actual centre of the cosmos was not the Earth, but Hell. By contrast, the new naturalism may have displaced the Earth, but it also exalted Man, and accorded to him a hitherto unknown dignity. As the historian Roger Smith has put it, 'When Copernicus placed the earth in orbit, philosophers both feared he had displaced man from his central position in the universe and enthused about the elevation of man to the heavens'.

Having made humankind part of the natural order, scholars increasingly took an interest in 'natural Man' and his capacities – that is humans as they are, independently of divine grace. There was a strong tendency to laud human reason as a particularly useful instrument for the exploration of nature. Indeed, many saw science as the way to restore humanity to its pristine condition before the Fall. For the sixteenth-century English courtier and philosopher Francis Bacon, one of the principal propagandists for the new science, the main aim of knowledge was nothing less than 'the restitution and reinvesting (in great part) of man to the sovereignty and power ... which he had in his first state of creation'. Science was part of the humanist project of making Man 'the measure of all things'. Indeed, for men like Bacon and Newton, science was the highest expression of humanism, revealing

as it did Man's capacity both to know and to dominate the world. This does not mean that such philosophers and scientists were irreligious. Far from it. Bacon and Newton (like Galileo and Descartes) were deeply devout men. But their devotion expressed itself in a very different way than previously – in the glorification of Man's ability to understand the natural order in largely naturalistic terms.

Developments from the Renaissance onwards, therefore, both removed Man from his exalted position, placing him in the natural order, and celebrated his abilities to understand that order. This contradictory sentiment, from Descartes to contemporary Darwinists, has played an important role in shaping the scientific understanding of what it means to be human. One way in which this contradiction has expressed itself is in a peculiar paradox that the modern world has thrown up about the meaning of humanness. On the one hand, science has taught us to perceive nature in largely mechanistic terms, a process that has driven out magic and mysticism and 'disenchanted' the natural world. On the other, we view humans as beings possessing consciousness and agency, qualities difficult to express in physical terms. We are happy to view human bodies as machines; but what we value about our fellow humans is that they do not act as machines – as robots or zombies – but as people. And if they did act as machines we would think there was something wrong with them, that they were not quite human. Our very success in understanding nature has generated deep problems for understanding human nature. As a result, the problem of how to relate objective knowledge to subjective feelings has been a central theme for science, philosophy and ethics over the past half millennium.

In the seventeenth century the great French philosopher Rene Descartes tried to solve this conundrum by separating mind and matter into radically different realms. Matter was knowable to humans, using science and reason. Mind, however, was foreclosed to human inquiry, at least through scientific means. Cartesian dualism still shapes much of the way we think about the world and our place within it but for most scientists and philosophers it remains a highly unsatisfactory answer. The unknowable mind has no place within a materialist universe. Richard Rorty suggests that Descartes' view of the mind is 'an unfortunate bit of residual Aristotelianism', or prescientific belief. The mathematician Norman Levitt similarly describes Descartes' dualism as a 'late postmedieval attempt' to protect the mind from the fierce glare of science. The philosopher Daniel Dennett suggests that 'Descartes was a mechanist par excellence when it came to every other phenomenon in nature, but when it came to the human mind he flinched'.

Descartes flinched. He lost his nerve. He was hamstrung by his past. To view Cartesianism in this fashion is, I believe, to misread Descartes. Certainly Cartesian dualism is an unacceptable anomaly to the modern scientific mind. But Descartes was not simply stuck in the past, nor did he lack the will to see through the materialist revolution. Dualism expressed not just a failure of Descartes' science but also an assertion of his belief in humanism. Humans, for Descartes, were exceptional beings. Their possession of language and reason marked them off from every other being. Neither machines nor animals, he observed, could 'use speech or other signs as we do', nor did they possess 'universal reason'. The possession of reason allowed humans to understand the natural world. But it also separated them from that world, making them distinct from animals. Through reason, humans possessed free will which, Descartes wrote 'is in itself the noblest thing we can have because it makes us in a certain manner equal to God and exempts us from being his subjects'. Reason not only raised Man above the beasts, it also made him 'in a certain manner equal to God', and exempted him from the laws by which other creatures are governed.

For Descartes, then, the very capacity of Man to understand nature in mechanistic terms meant that he himself could not be understood in those terms. Dualism was not just an unscientific attitude, it also expressed Descartes' belief in human exceptionalism.

The tension between scientific mechanism and human exceptionalism has remained unresolved to this day. It seems crucial to think of humans as conscious agents capable of rational thought and collective action if science itself is to advance. Yet humanism appears to be an obstacle to the realisation of a fully materialist science of Man. By making humans into conscious agents we seem to separate them off from the rest of nature, and hence suggest that the language of natural science cannot fully encompass our humanness. How this tension plays itself out at any particular moment depends not just on the arguments of scientists, but also on wider cultural views of Man. So long as there remained an optimistic view of what it meant to be human, so long as humans were regarded as exceptional beings, and so long as science was seen as part of the broader project of humanity asserting control over nature, then a fully mechanistic view of Man remained unacceptable, even to most scientists. But as we have become more pessimistic about the human condition, as the exceptional status of Man has seemed a mere self-delusion, and as the idea of human domination has come to be regarded as both hubristic and dangerous, so a mechanistic view of Man, the idea that humans can be understood fully in animal or machine terms, has appeared scientifically possible and culturally acceptable. No longer burdened by ideas of human exceptionalism scientists have suddenly found the freedom to pursue a materialist vision of Man, such as they have not had for the past 500 years.

41. Which of the following is not among the contradictions referred to in the passage?

(1) The response of philosophers to the heliocentric theory of the universe.
(2) The contradictory sentiments regarding man from Renaissance onwards.
(3) The view of Man as beast and Man as divine.
(4) The view of people as machines or robots and as uniquely human.

42. The central idea of the passage can best be described as

(1) From Biblical Man to Scientific Man.
(2) Philosophers and Scientists at loggerheads over Man.
(3) The Contradictory Views Regarding Man and Nature.
(4) The Ascent of Man and the Descent of Humanity.

43. The Cartesian dualism, as inferred from the passage, refers to

(1) the concept that the mental and the physical are discrete domains.
(2) the remnant of Aristotelianism or prescientific belief and the possession of free will which makes man the equal of God.
(3) the ability to understand Nature while not being its subject.
(4) the material world that is amenable to exploration and the immaterial mind.

44. The loss of 'human exceptionalism' can be attributed to

(1) scientists who pursue a materialistic vision of man.
(2) the transformation in cultural perception.
(3) humanism playing a subservient role to scientific excellence.
(4) the proud, over confident and dangerous domination that man exercises over nature.

45. Which of the following, according to the author, is the result of the discoveries of Copernicus?

(1) It deprived man of the unique position accorded to him in the Christian tradition.
(2) It elevated man from his miserable condition which was a consequence of the Fall.
(3) It brought social phenomena within the realm of human understanding.
(4) While man was dispossessed of his pivotal status in the universe, he was able to regard himself with new found respect.

DIRECTIONS *for questions 46 to 50:* In each question, a word from the passage with its contextual usage is provided. Pick the word from among the alternatives that is the most appropriate substitute for the question word in the given context and mark its number as your answer.

46. CONNOTE: A special place in the cosmos did not connote special virtues.

(1) confer (2) signify (3) import (4) imply

47. LAUD: There was a strong tendency to laud human reason as a particularly useful instrument for the exploration of nature.

(1) magnify (2) appreciate (3) condemn (4) acclaim

48. CONUNDRUM: Descartes tried to solve this conundrum by separating mind and matter.

(1) puzzle (2) chimera (3) mystery (4) issue

49. HAMSTRUNG: He was hamstrung by his past.

(1) terrified (2) straitjacketed (3) repulsed (4) crippled

50. AMBIVALENCE: There has always been a/an ambivalence in the way in which scientists have viewed human beings.

(1) disparity (2) ambiguity (3) uncertainty (4) disparagement

DIRECTIONS *for questions 51 to 55:* In each of the following questions, a word from the passage is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

51. RESTORE

(1) The army was called to restore law and order in the communally sensitive zones.
(2) The final decision on the matter restored with the principal of the college.
(3) The police restored the stolen property to the rightful owners.
(4) The doctors were confident that in due time they would be able to restore the patient to health.

52. FLINCH

(1) Bhagat Singh did not flinch when he was told that he would be executed the next day.
(2) The angry child seized my knitting and flinched it across the room.
(3) The baby flinched when the injection needle pierced its delicate arm.
(4) The world community should not flinch in the face of terrorism that challenges them.

53. PURSUE

(1) Frequent transfers make it difficult for the spouses of army men to pursue their career.
(2) Despite several setbacks, the country has relentlessly pursued its policy of economic reforms.
(3) Don't hesitate to pursue the matter if at first your request is denied.
(4) The government intends to pursue ahead with its stringent measures to curb terrorism.

54. DEVOTION

(1) Devout Muslims perform devotion five times a day.
(2) Devotees prostrated themselves before the deity to demonstrate their devotion.
(3) You must show devotion to your work if you want to rise in the hierarchy.
(4) Mohini's folded hands and humble manner showed great devotion.

55. REALM

(1) Defence of the realm was the essential duty of the monarch.
(2) A 10% growth in the next five years is not beyond the realm of possibility.
(3) Descartes separated mind and matter into radically different realm.
(4) Students should not confine themselves to the academic realm if they want to excel in life.

DIRECTIONS *for questions 56 to 60:* Each question has a statement from the passage. Pick from the options the most appropriate restatement of the given statement. Note that all the choices may be grammatically correct but you have to select the one that is closest in meaning to the given statement.

56. So long as there remained an optimistic view of what it meant to be humans, so long as humans were regarded as exceptional beings and so long as science was seen as part of the broader project of humanity asserting control over nature, then a fully mechanistic view of man remained inacceptable, even to most scientists.

(1) To most scientists even a fully mechanistic view of man remained inacceptable as long as their remained an optimistic view of what it meant to a human, humans were regarded as exceptional beings and science was seen as part of the broader project of humanity asserting control over nature.
(2) As long as there remained an optimistic view of what it meant to be human, as long as humans were regarded as exceptional beings and as long as science was seen as part of the broader project of humanity asserting control over nature, to most scientists even a fully mechanistic view of Man remained unacceptable.

(3) A fully mechanistic view of Man remained unacceptable even to most scientists, till such time as there remained an optimistic view of what is meant to be human, humans were regarded as exceptional beings and science was seen as part of the broader project of humanity asserting control over nature.

(4) As there remained an optimistic view of what it meant to be human, as humans were regarded as exceptional beings, as science was seen as part of the broader project of humanity asserting control over nature, a fully mechanistic view of man remained unacceptable even to most scientists.

57. Developments from the Renaissance onwards, therefore, both removed Man from his exalted position, placing him in the natural order and celebrated his abilities to understand that order.

(1) Consequent to developments, Renaissance removed Man from his exalted position and placed him in the natural order and celebrated his abilities to understand that order.

(2) As a result of developments since the Renaissance, Man was removed from his exalted position and placed in the natural order and his abilities to understand that order was celebrated.

(3) Developments from the Renaissance onwards were ambiguous about Man, both dethroning him from his exalted position in the natural order and celebrating his abilities to understand that order.

(4) Removing Man from his exalted position and placing him in the natural order and celebrating his abilities to understand that order were the developments in the Renaissance.

58. Indeed, for men like Bacon and Newton, science was the highest expression of humanism, revealing as it did Man's capacity both to know and to dominate the world.

(1) Science was, truly, the highest expression of humanism to men like Bacon and Newton as it revealed Man's capacity both to know and to dominate the world.

(2) Science was the highest expression of humanism as in reality it revealed Man's capacity both to know and to dominate the world for men like Bacon and Newton.

(3) Truly, science is the highest expression of humanism for men like Bacon and Newton since it revealed both Man's capacity to know as well as to dominate the world.

(4) Indeed science was the highest expression of humanism for men like Bacon and Newton revealing as it does Man's capacity both to know as well as to dominate the world.

59. From one perspective, this naturalistic worldview can be seen as dethroning humanity from its privileged position in the traditional Christian view of the cosmos.

(1) In the traditional Christian view of the cosmos humanity was dethroned from its privileged position by one perspective of naturalistic view.

(2) From its privileged position in the traditional Christian view of the cosmos, humanity was dethroned by this naturalistic worldview.

(3) The traditional Christian view of the cosmos had enthroned humanity to a privileged position from where it was dethroned by one point of view.

(4) This naturalistic worldview can be seen, from one point of view, as dethroning humanity from its erstwhile privileged position in the traditional Christian view of the cosmos.

60. The development of a scientific worldview has been in large part about the replacement of the idea of divine intervention as the means by which order is maintained in nature with the belief that nature proceeds according to its internal, and immutable, laws.

(1) The replacement of the idea of divine intervention as the means by which order is maintained in nature with the belief that nature proceeds according to its internal, and immutable, laws has been, mostly, the focus of the development of a scientific worldview.

(2) The development, in large part of a scientific world view has been the substitution of the idea of divine intervention as the means by which order is maintained in nature to the belief that nature proceeds according to its internal, and immutable laws.

(3) The replacement, in large part, of the idea of divine intervention with the belief that nature proceeds according to its internal, and immutable laws, has been the development as the means by which order is maintained in nature, of a scientific worldview.

(4) The belief that nature proceeds according to its internal, and immutable, laws replaced the idea of divine intervention as the means by which order is maintained in nature and this has been the scientific worldview.

PASSAGE – II

Para 1. In 1972, for only the third time in our history we ***(A)discovered/(B)uncovered*** a new world.

Para 2. The first time was in 1492, an event that had ***(A)rapid/(B)immediate*** impact, with ultimate ***(A)results/(B)benefits*** that are incalculable. A new civilization was created and an old one ***(A)revivified/(B)recreated.***

Para 3. The second date, not quite so famous, is 1610. In the spring of that year, *Galileo turned on the moon with his primitive 'optic tube' and saw that Earth was not unique with his own eyes.* ***(A)Suspended/(B)Floating*** out there, a quarter of a million miles away, was another world of mountains, valleys and great shining plains – empty, virginal – awaiting, like Michelangelo's Adam, the touch of life. And, *362 years later life came riding, on a pillar of fire.*

Para 4. With the end of the Apollo programme, there will now be a short pause until much cheaper transportation systems are ***(A)found/(B)developed.*** Then we will return and the history of the moon will begin. But *it may quickly be, on a far more impressive stage, overshadowed by a greater drama.*

-1-

Para 5. The third new world was not ***(A)found/(B)revealed*** by sailing ship or telescope; yet like the two earlier events it was a shocking surprise that resulted in the overthrow of long-cherished - _____ . No one knew that such a place existed and *when the evidence started, early in 1972, to accumulate, many scientists were unable to believe their eyes literally.*

Para 6. *This new world nearly is twice the diameter of the moon and is almost four times larger than both Americas.* And it has the most spectacular ***(A)panorama/(B)scenery*** yet discovered anywhere in the universe. Think of the Grand Canyon, the greatest ***(A)natural/(B)geographical*** wonder of the United States. Then quadruple its depth and multiply its width five times, to an incredible seventy five miles. Finally, imagine its ***(A)covering/(B)spanning*** the whole continent, from Los Angeles to New York. Such is the scale of the canyon that is carved along its equator.

Para 7. Yet even this is not the planet's most ***(A)astounding/(B)awesome*** feature, for it is ___(i)___ by volcanoes that ***(A)dwarf/(B)outdo*** any on Earth. The mightiest, Nix Olympia – the Snows of Olympus – is almost three times the height of the Everest and more than three hundred miles across. Those volcanoes are slumbering now, but not long ago they were ***(A)spewing/(B)spurting*** into the thin atmosphere all the chemicals of life, including water: there are dried-up riverbeds that give clear indication of recent flash floods – the first ***(A)proof/(B)evidence*** ever found for running water outside our Earth. It even appears that this may be a young world, ___(ii)___ speaking; if life has not already ***(A)arisen/(B)begun***, that will be yet another surprise.

-II-

Para 8. By now, you may have guessed the identity of this new world. It is Mars – the real Mars, not the imaginary one in which we believed until Mariner 9 swept aside the ___(i)___ of decades. It will be years before we ___(ii)___ all the lessons of this, the most successful robot space mission ever flown; but already it seems that Mars, not the moon, will be our main order of extraterrestrial business in the century to come.

-III-

Para 9. Yet "where there is no vision, the people perish." Men need the mystery and romance of new horizons almost as badly as they need food and shelter. **-IV-** In the difficult years ahead, we should remember that the Snows of Olympus lie silent beneath the stars, waiting for our grand children.

DIRECTIONS *for questions 61 and 62*: At different places in the passage are the Roman numerals I, II, III and IV. Question 61 presents a part that has been removed from the passage. The sentences A to E are jumbled and are to be placed in logical order after sentence 1. From the choices pick that which presents the best sequence for the part. Thereafter, to answer question 62, choose the Roman numeral that indicates the place where the part would fit best.

61. 1. This news may be received with less than enthusiasm at this moment.

A. True, we must rebuild our cities and our societies and bind up the wounds we have inflicted on Mother Earth.

B. To do this, we will need all the marvelous new tools of space – the weather, communications and resources satellites that are about to transform the economy of mankind.

C. Even so, it will be a difficult and often discouraging task, with little glamour to fire the imagination.

D. NASA's budget is being cut to the bone and voices everywhere are calling for an attack on the evils and injustices of our own world.

E. No one can deny, though, that Columbus did more for Europe by sailing westward than whole generations of men who stayed behind.

(1) DABCE (2) DACBE (3) DEABC (4) DCABE

62. (1) **I** (2) **II** (3) **III** (4) **IV**

DIRECTIONS *for questions 63 to 67*: Paras 5, 7 and 8 present 5 blanks in all. From the choices in each question, pick that which is appropriate to fit the blank. In case of more than one blank appearing in a single para, the blanks are distinguished using the suffix (i), (ii) etc., in their respective order of appearance.

63. (for Para 5)

(1) dreams (2) beliefs (3) aspirations (4) values

64. (for Para 7-i)

(1) dominated (2) overshadowed (3) eclipsed (4) obliterated

65. (for Para 7-ii)

(1) theoretically (2) hypothetically (3) relatively (4) geologically

66. (for Para 8-i)

(1) profusions (2) pretensions (3) conclusions (4) illusions

67. (for Para 8-ii)

(1) collect (2) absorb (3) collate (4) guess

DIRECTIONS *for questions 68 to 70*: From the pairs of words marked **(A)-----/(B)-----** in the passage, pick the words appropriate to the context and mark the correct sequence from the choices provided below.

68. (from Para 1, 2 and 3)

(1) BBAAB (2) ABBAB (3) AABAB (4) ABAAB

69. (from Para 4, 5 and 6)

(1) BABAB (2) BAABB (3) BAAAB (4) BABBB

70. (from Para 7)

(1) BAABB (2) AAABB (3) ABABB (4) ABAAB

DIRECTIONS *for questions 71 to 75*: The passage contains, in italics, various sentences/parts of sentences which may contain errors of grammar, construction, punctuation or contextual usage. From the choices provided for each question, pick that which would best replace the italicised sentence/part. One of the choices is a repetition of the italicised sentence/part. Pick this if you think there is no error.

71. (from Para 3)

(1) Galileo turned towards the moon with his primitive 'optic tube' and saw with his own eyes that Earth was not unique.
(2) Galileo turned on the moon with his primitive 'optic tube' and saw that Earth was not unique with his own eyes.
(3) Galileo turned his primitive 'optic tube' on the moon and saw, with his own eyes, that Earth was not unique.
(4) Galileo turned his primitive 'optic tube' towards the moon and saw with his own eyes that Earth was not unique.

72. (from Para 3)

(1) 362 years later on a pillar of fire, life came riding
(2) 362 years later, life came, riding on a pillar of fire
(3) 362 years later life came riding, on a pillar of fire
(4) life came riding, on a pillar of fire, 362 years later

73. (from Para 4)

(1) it may be quickly overshadowed by a greater drama, on a far more impressive stage
(2) it may quickly be overshadowed, by a greater drama, on a far more impressive stage
(3) it may quickly be, on a far more impressive stage, overshadowed by a greater drama
(4) it may quickly be overshadowed on a far more impressive stage, by a greater drama

74. (from Para 5)

(1) when the evidence literally started to accumulate, early in 1972 many scientists were unable to believe their eyes.
(2) when the evidence started to accumulate, early in 1972, many scientists were literally unable to believe their eyes.
(3) when the evidence started, early in 1972, to accumulate, many scientists were unable to believe their eyes literally.
(4) early in 1972, when the evidence started to accumulate, many scientists were literally unable to believe their eyes.

75. (from Para 6)

(1) This new world nearly is twice the diameter of the moon and is almost four times larger than both Americas.
(2) This new world is nearly two times larger in diameter than the moon and is almost four times larger than both Americas.
(3) This new world has nearly twice the diameter of the moon and is almost four times as large as both Americas.
(4) This new world is nearly twice the diameter of the moon, and is almost four times as large as both Americas.

DIRECTIONS *for questions 76 to 80:* These questions are based on the passage, including the part in question 61.

76. When, in discussing Galileo, the author says that 'Earth was not unique' he means that

(1) there are other planetary bodies that orbit the sun.
(2) there are other planetary bodies that could have supported life.
(3) there are other celestial bodies that accompany Earth in its orbit around the sun.
(4) there are other celestial bodies that have certain features similar to some on Earth.

77. While discussing the moon and Mars, the author brings out details that enable us to infer all the following EXCEPT:

(1) There was no similarity in the manner whereby we first learnt about them.
(2) People had not known about the existence of either until the events referred to in the passage.
(3) In both cases, the knowledge first gathered was in contradiction of views earlier held.
(4) While one has shown the inherent potential for the beginnings of life, the other has not.

78. According to the passage, the most significant difference between Mars, on one hand, and the moon and Earth, on the other, is in

(1) the size of the bodies.
(2) the types of the geographical features that they have.
(3) the extent of benefit we have derived from the studies of these bodies.
(4) the relative sizes of their features.

79. The author says 'this news may be received with less than enthusiasm' because, at present

(1) our major focus is on restoration.
(2) our infrastructural capabilities are low.
(3) we have far more important things to do.
(4) we do not derive any tangible benefits from space exploration.

80. From the concluding paragraph we can infer that the author's view is that man should always remain

(1) a dreamer. (2) an explorer. (3) an adventurer. (4) a pragmatist.

SECTION – III
Number of Questions = 40

DIRECTIONS *for questions 81 to 84*: Answer the questions on the basis of the information given below.

The island of Kya-Kya has only one telephone service provider, KyaTel Co. The monthly telephone bill for any subscriber of KyaTel Co., depends on the slab in which the number of calls made by him falls and is calculated as follows:

Slab	Number of calls (Range)	Bill Amount
Slab 1	0 to 100	Rs.125
Slab 2	101 to 200	Bill for first 100 calls + 50 paise per call for calls in excess of 100
Slab 3	201 to 300	Bill for first 200 calls + 75 paise per call for calls in excess of 200
Slab 4	301 to 400	Bill for first 300 calls + Rs.1.00 per call for calls in excess of 300
Slab 5	401 to 500	Bill for first 400 calls + Rs.1.25 per call for calls in excess of 400
Slab 6	501 or more	Rs.1000 + Rs.1.50 per call

81. In a month, if a subscriber has made 465 calls, his bill amount is

(1) Rs.706.25 (2) Rs.560.25 (3) Rs.465 (4) Rs.431.25

82. In a month, if a subscriber paid an average of exactly Rs.0.95 per call, then which of the following can be the number of calls that he made?

(1) 400 (2) 500 (3) 300 (4) 600

83. If a subscriber made 275 calls in a month, what is his approximate average cost per call?

(1) 0.84 paise (2) 0.75 paise (3) 0.90 paise (4) 0.95 paise

84. If the basic charge of Rs.125, for slab 1, remains unchanged, but in every other slab the per call rates are increased by 25 paise, then what will be the percentage increase in the bill amount for a subscriber who makes a total of 350 calls in a month?

(1) 6.25% (2) 8% (3) 9.76% (4) 20.83%

DIRECTIONS *for questions 85 to 89:* Answer the questions on the basis of the information given below.

As part of reviewing the performance of its employees, the management of XYZ Co. rated the overall performance of all its employees, based on which each employee was assigned one of four grades – Excellent, Good, Average and Poor. The employees of each of its four departments – Marketing, Finance, Administration and Production – were given salary increments based on their grades as per the following table:

	Grade			
	Excellent	Good	Average	Poor
Increment	25%	15%	10%	5%

The following table gives, for each grade, the percentage wise distribution of the number of employees from different departments who were assigned that grade.

Department	Grade			
	Excellent	Good	Average	Poor
Marketing	20% 20	32%	19%	$3\frac{1}{3}$% 10
Finance	10% 10	12%	9%	10% 30
Administration	40% 40	36%	24%	$33\frac{1}{3}$% 100
Production	30% 30	20%	48%	$53\frac{1}{3}$% 160
Total	100% 100	100%	100%	100% 300

The following table gives, for each department, the percentage wise distribution of the number of employees of that department who were assigned different grades.

Grades	Department			
	Marketing	Finance	Administration	Production
Excellent	10% 20	10% 10	$13\frac{1}{3}$% 40	$7\frac{1}{2}$% 15
Good	40% 80	30% 30	30% 90	$12\frac{1}{2}$% 25
Average	$47\frac{1}{2}$% 95	45% 45	40% 120	60% 120
Poor	$2\frac{1}{2}$% 5	15% 15	$16\frac{2}{3}$% 50	20% 40
Total	100% 200	100% 100	100% 300	100% 200

85. What percentage of the company's employees were given a salary increment of only 5%?

(1) 10% (2) 15% (3) 20% (4) 25%

86. What percentage of the company's employees were given a salary increment of at least 15%?

(1) 10% (2) 15% (3) 25% (4) 35%

87. What is the ratio of the total number of employees in the marketing department and the total number of employees who were graded as 'Good' but are from a department other than marketing?

(1) 8 : 5 (2) 10 : 7 (3) 20 : 17 (4) 18 : 15

88. What is the ratio of the total number of employees who were graded as 'Excellent' and those who were graded as 'Poor'?

(1) 3 : 5 (2) 2 : 3 (3) 5 : 3 (4) 3 : 2

89. What was the percentage increase in the total salary bill of the Finance department due to the salary increments?

(1) 11.5% (2) 12.25%
(3) 17.75% (4) Cannot be determined

DIRECTIONS *for questions 90 to 93:* Answer the questions on the basis of the information given below.

The Central Road Research Institute carries out cost studies for road users on a periodic basis. The following tables and graph represent the survey results for the year 2007. The survey studied the cost savings involved, for different categories of vehicles, in shifting from a previously existing 'two-lane bad road' to a new 'four-lane good road' in Mehrauli, Uttar Pradesh.

This new four-lane good road is 100 km long and has no other routes connecting into it. In other words a vehicle that enters into this road from one end can exit only from the other end of the road (i.e., after 100 km). The same was the case for the previously existing two-lane bad road. However, after moving to the new four-lane good road, the government set up Toll-gates, to collect toll from the road users every time they use the road. Toll is charged according to the category of the vehicle.

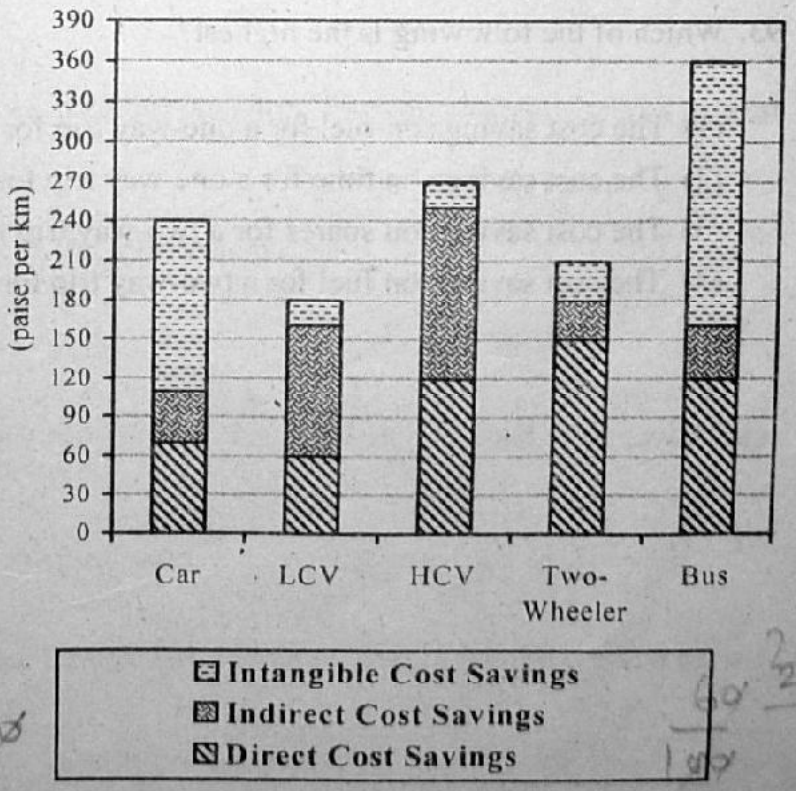
Note : Total Cost Savings are the cost savings due to using the new four-lane good road over the previously existing two-lane bad road.

Distribution of Total Cost Savings

Type of Savings		
A – Direct Cost Savings	B – Indirect Cost Savings	C – Intangible Cost Savings
Fuel : 60%	Spares : 50%	Time : 60%
Tyres : 15%	Maintenance : 50%	Commodity : 40%
Oil : 25%	–	–

In the above table, for example, of the total direct cost savings, the money saved due to the decreased consumption of fuel forms 60%.

Total Cost Savings
(in paise per km for different categories of vehicles)



Toll Charged as a percentage of the Total Cost Savings for different categories of vehicles

Category of vehicle	Percentage
Car	50
LCV	80
HCV	90
Two – Wheeler	30
Bus	45

Net Cost Savings = Total Cost Savings – Toll Charged

90. If one uses a two-wheeler on the new road, then what are the savings on fuel for a to and fro journey?

(1) Rs.126 (2) Rs.252 (3) Rs.180 (4) Rs.90

91. The users of which of the following categories of vehicles will have the highest net cost savings by using the new road?

(1) Car (2) Two-Wheeler (3) HCV (4) Bus

92. What is the difference in the sum of the Indirect and Intangible cost savings on using a HCV on the new road and on using a Bus on the new road?

(1) 60 paise/km (2) 75 paise/km (3) 80 paise/km (4) 90 paise/km

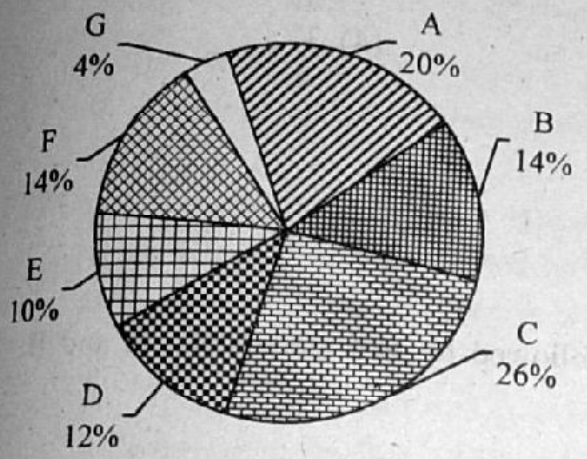
93. Which of the following is the highest?

(1) The cost savings on fuel for a one-way trip for a two-wheeler.
(2) The cost savings on time for a one-way trip for a bus.
(3) The cost savings on spares for a two-way trip for a HCV.
(4) The cost savings on fuel for a two-way trip for a HCV.

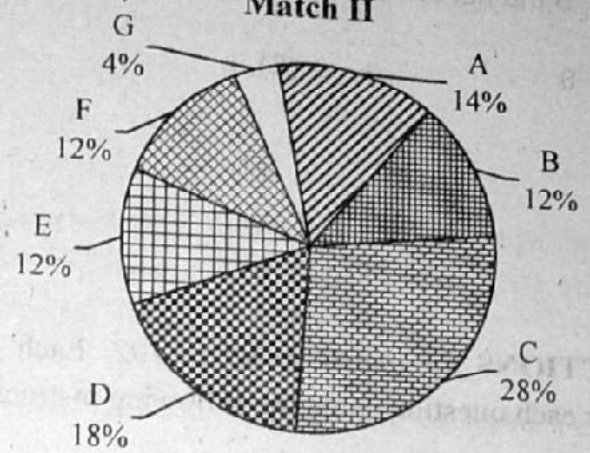
DIRECTIONS *for questions 94 to 97:* Answer the questions on the basis of the information given below.

The following pie charts give the break up of points scored by all the seven players – A, B, C, D, E, F and G – of a basketball team, in all the four matches of a tournament.

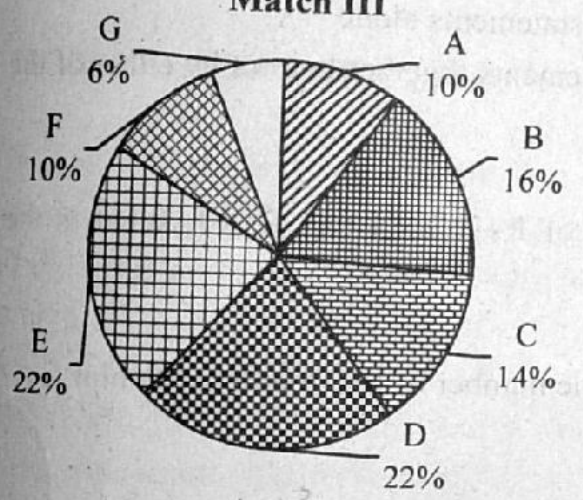
Match I



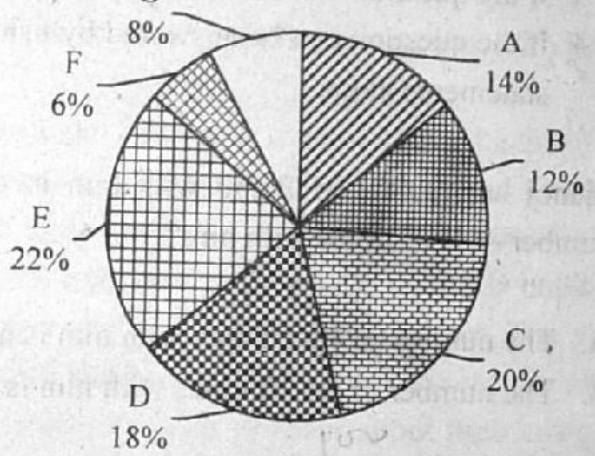
Match II



Match III



Match IV



The total points scored by the team in all the four matches was 400. Further, the team scored at least 50 points and at most 150 points in any match.

94. At most how many points did player B score in the tournament?

(1) 50 (2) 52 (3) 57 (4) 58

95. In the tournament, the sum of the total points scored by A and C, forms at least what percentage of the total points scored by the team?

(1) 30% (2) 31.5% (3) 32% (4) 32.75%

96. In the tournament, the difference between the total points scored by D and the total points scored by F is at most

(1) 32 (2) 35 (3) 38 (4) 40

97. At most how many of the given statements can be simultaneously true?

(a) E scored the highest number of points for the team in the tournament.

(b) No player in the team scored less than 25 points in the tournament.

(c) C scored a total of 98 points in the tournament.

(d) B did not score more than 55 points in the tournament.

(1) 0 (2) 1 (3) 2 (4) 3

DIRECTIONS *for questions 98 to 102:* Each question is followed by two statements, A and B. Answer each question using the following instructions:

Mark 1 if the question can be answered by using statement A alone but not by using statement B alone.

Mark 2 if the question can be answered by using statement B alone but not by using statement A alone.

Mark 3 if the question can be answered by using either of the statements alone.

Mark 4 if the question can be answered by using both the statements together but not by either of the statements alone.

98. Manoj has a total of Rs.50 with him in denominations of Rs.2, Rs.5 and Rs.10. What is the number of Rs.5 notes with him?

A. The number of Rs.5 notes with him is not more than the number of Rs.10 notes with him.

B. The number of Rs.10 notes with him is two.

99. In a class of 125 students, if 20 students failed in all the three subjects – Physics, Chemistry and Mathematics – then how many students passed in only Physics?

A. 65 students passed in Mathematics and 105 students passed in Chemistry.

B. 65 students passed in Chemistry as well as Mathematics, 60 students passed in Physics as well as Chemistry.

100. Five persons – A, B, C, D and E – got the top five ranks in four subjects – P, Q, R and S – with no two of them getting the same rank in any subject and none of them getting the same rank in any two of the subjects. It is known that A got the third rank in R, while D got the fourth rank in P and C got the second rank in S. Who got the first rank in S?

A. For each of the five persons, the sum of the ranks obtained by him in all the four subjects put together is distinct.

B. In each of the four subjects, B got a better (i.e., numerically lower) rank than D.

101. Five Boxers – A, B, C, D and E – contended for the World Heavy Weight Boxing Championship (WHWBC). In WHWBC, each boxer fights against every other boxer exactly once. No match ended as a draw and no two boxers have the same number of wins at the end of the championship. Further, it is known that A won against E, while D won against every other boxer. Who is the boxer who lost all his fights?

A. B won against every boxer except D.
B. C did not lose more than two fights.

102. A cube is painted using the six colours – Red, Blue, Green, Yellow, Violet and Orange, in such a way that each face is painted in a single colour and each colour is painted on only one face. Is the face coloured Blue opposite to the face coloured Yellow?

A. The face coloured Red is adjacent to that coloured Blue, and the face coloured Yellow is adjacent to the face coloured Red.
B. The face coloured Green is adjacent to the face coloured Violet as well as the face coloured Orange, while the face coloured Violet is not adjacent to the face coloured Orange.

DIRECTIONS *for questions 103 to 106:* Answer the questions on the basis of the information given below.

Four friends, A, B, C and D, got the top four ranks in their class in a certain exam. Each of them belongs to one of the categories among truth-tellers, liars and alternators. Truth-tellers are those who always make true statements, liars always make false statements and alternators alternate between making true and making false statements, in any order. At least one among A, B, C and D belongs to each of these categories. The ranks in the exam were awarded in the following manner. The person with the highest marks got the first rank, the person with the second highest marks got the second rank, and so on. The following are the two statements made by each of them about their categories and their ranks in the exam.

A: Exactly two of us are truth-tellers.
B got the first rank and C got the third rank.

B: D got the fourth rank.
Exactly one of us is an alternator.

C: The difference between B's rank and mine is two.
D is not a liar.

D: Exactly one of us is a liar.
I am an alternator.

$2 \times n + 5 \times y + 10n = 50$

$2n + 5y + 10 \cancel{20} = 50$

$2x + 5y = 30$

4 10

4 + 10 + 20

6 15 30

20 90

103. Who got the first rank?

(1) A (2) B (3) C (4) D

104. In total, how many of the given eight statements are true?

(1) 3 (2) 4 (3) 5 (4) 6

105. What is the sum of the ranks of A and C?

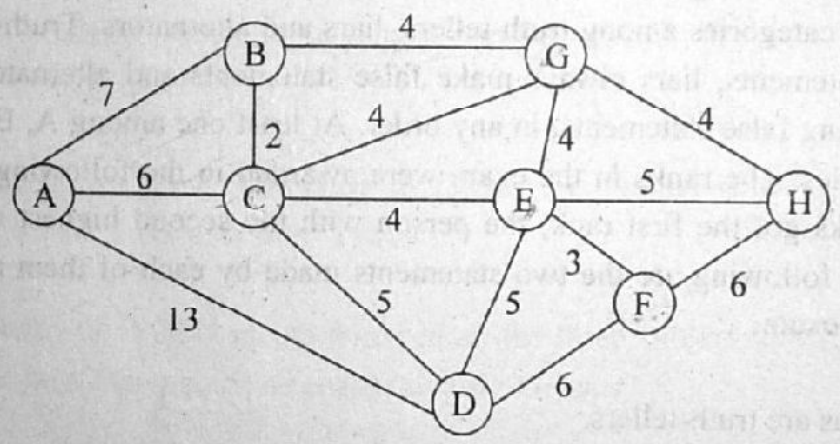
(1) 3 (2) 4 (3) 5 (4) 6

106. Which of the following statements is definitely true?

(1) The total marks scored by A and B is more than that scored by C and D.
(2) The total marks scored by A and B is less than that scored by C and D.
(3) The total marks scored by A and D is less than that scored by B and C.
(4) The total marks scored by B and D is more than that scored by A and C.

DIRECTIONS *for questions 107 to 110:* Answer the questions on the basis of the information given below.

A, B, C, D, E, F, G and H are eight places which are interconnected by roads as given in the figure below.



The value given alongside each road represents the distance (in km) between the two places connected by that road. No roads other than those given above exist between any two of these eight places.

107. What is the longest distance (in km) one has to travel for going from A to H, if no place can be visited more than once?

(1) 35 (2) 36 (3) 38 (4) 37

108. If no journey can be undertaken on the direct road from A to C, due to road repairs, and no journey is possible through E as there is a procession going on, then in how many ways can one travel from A to C without visiting any place more than once?

(1) 8 (2) 5 (3) 6 (4) 7

109. If all the roads to each of E and G are blocked, then what is the shortest distance (in km) from A to H?

(1) 26 (2) 25 (3) 24 (4) None of these

110. If each place can be visited at most once, then in how many ways can one travel from A to H by definitely visiting C and G en route?

(1) 8 (2) 10 (3) 12 (4) More than 12

DIRECTIONS *for questions 111 to 115:* Answer the questions on the basis of the information given below.

As a part of selecting his team for the Indian Premier League, Sharukh Khan had shortlisted ten players – Ishant, Ponting, Akthar, Sourav, Warne, Lee, Dhoni, Symonds, Harbhajan and Sreesanth – from among all the players who were to be auctioned in the first stage. His idea was to select only players from among the shortlisted ten, subject to the following conditions:

- If the team includes one among Symonds, Sreesanth and Harbhajan, it must also include the other two.
- The team must include either Akthar or Lee, but not both.
- If the team includes Ishant, then it must also include Ponting, and vice versa.
- Ponting and Harbhajan cannot be selected together.
- The team must include exactly one among Warne, Dhoni and Symonds.
- Ponting and Sourav cannot be selected together.

111. If exactly five of the ten players were selected, who among the following must be selected?

(1) Ponting (2) Dhoni (3) Warne (4) Sourav

112. If it is known that Ishant was one of the players selected, then how many of the other nine players were selected?

(1) 2 (2) 3 (3) 4 (4) 5

113. If only three of the ten players were selected, then who among the following is definitely not selected?

(1) Warne (2) Sourav (3) Ponting (4) Lee

114. Among the ten players, at most how many can be selected together?

(1) 4 (2) 5 (3) 6 (4) 7

115. If Sourav was elevated to the status of an icon player, which means that he had to definitely be selected in the team, then which of the following can be the number of players selected from among the other nine, all other conditions remaining the same?

(1) Only 2 (2) Only 3 (3) Only 4 (4) 2 or 4

DIRECTIONS *for questions 116 to 120:* **Answer the questions independently of each other.**

116. Zhong Lin Wang and his colleagues at the Georgia Institute of Technology in Atlanta have made a yarn out of nano-fibres that produce electric charge when rubbed against one another. A square metre of material made from such yarn could produce between 2 to 3 watts of power from brisk mechanical movements such as walking and jogging. It would not be long before we see clothing that would enable the wearers to power flashlights or mobile phones.

Which of the following weakens the conclusion drawn above?

(1) Commercial production of such material would be possible only in 3 years or so.
(2) The material would not be able to harvest energy from tiny movements such as a heartbeat or a breath.
(3) Many mobile phones need more than 3 watts of power to function effectively.
(4) The developers are working on the possibilities of making the material flexible and foldable.

117. Many Indians and other non-European Union nationals took the crucial decision of migrating to the U.K. based on London's earlier promises of fair treatment. They are now in a flap over the sudden and unfair changes in the U.K.'s immigration policy.
U.K.'s Minister of State for trade and investment, Digby Jones, told journalists that the new immigration rules would not be an obstacle for skilled Indian professionals wishing to move to the U.K.

Which one of the following statements reveals the absurdity of the Minister's claim?

(1) The issue of immigration for highly skilled Indians to the U.K. is intrinsically linked with investments and growing business links between the two countries.
(2) U.K. is facing skill shortages coupled with an ageing population and this will help in creating avenues for skilled Indians in the U.K.
(3) Various trade bodies in the U.K. have criticised the changes in immigration policy as being discriminatory.
(4) The quota system in jobs for people from the E.U. countries would impact the skilled Indian professionals in the U.K.

118. The tiny trees used in the Japanese art of bonsai may live for centuries, but the ancient traditions that produce them are being given a modern twist by female artist Kaorvi Yamada. Bonsai – the art of cultivating miniature trees – has long been seen in Japan as a hobby for elderly men. But Yamada, who hails from a family of bonsai artists with a history spanning more than 150 years, has managed to make it trendy.

Which of the following most supports the observation made above?

(1) Yamada hated the idea of joining the family business but the lure of the bonsai proved too strong.

(2) Bonsai is undergoing a bit of a boom over the past few years with the internet helping to boost interest among younger people.
(3) Saika bonsai uses flowers and grasses along with the trees, usually in a container small enough to be held in two hands.
(4) Bonsai became popular in the early 20th century as a way of bringing nature inside for many Japanese where small houses made gardens impossible.

119. It has been found that there is a genetic link that makes people more prone to getting hooked to tobacco, smoke more cigarettes and develop deadly lung cancer. The discovery, by three separate teams of scientists, makes the strongest case so far for the biological underpinnings of the addiction to smoking and how genetics and cigarettes combine in cancer.

Which of the following could conclude the paragraph above?

(1) The scientists differ on whether the connections directly increase the risk of lung cancer, or do so indirectly, causing more smoking that leads to cancer.
(2) The scientists surveyed genetic markers in more than 35000 people in Europe, Canada and the U.S.A., zeroing in on the same set of genetic differences.
(3) The scientists are not sure if what they found is a set of variations in one gene or on three closely connected genes.
(4) The possibilities, for 'tailored' quit-smoking treatments, are immense.

120. There's a storm in the baby-bottle. This has brewed over the chemical BPA, which is used to make polycarbonate plastic. Last August, a scientific panel convened by the National Institute of Health concluded that BPA has the potential to impact the health of infants. Most brands of feeding bottles are made of polycarbonate plastics. While health administrators believe that this is cause for alarm, paediatricians and neo-natal specialists are not overly concerned.

Which of the following would be the reason for the sanguine attitude of the medical practitioners?

(1) There is no hard science, yet, that shows that BPA can leach out of bottle-walls at levels high enough to be fatal.
(2) Worldwide, and especially in developing and under developed countries, only the upper crust can afford polycarbonate feeding bottles.
(3) Mothers, the world over are increasingly being drawn to nursing children right through their infancy, in view of the emotional bonds that this is believed to build.
(4) Chemical researchers are doing their best to develop a safer form of plastic that could be used for baby-bottles.

(KEY AND SOLUTIONS FOR AIMCAT0914)

Key

1.	1	13.	3	25.	2	37.	2	49.	4	61.	3	73.	1	85.	2	97.	3	109.	4
2.	4	14.	4	26.	1	38.	2	50.	3	62.	3	74.	2	86.	4	98.	1	110.	4
3.	3	15.	2	27.	3	39.	3	51.	2	63.	2	75.	3	87.	3	99.	1	111.	4
4.	3	16.	1	28.	1	40.	1	52.	2	64.	1	76.	4	88.	2	100.	2	112.	2
5.	4	17.	2	29.	2	41.	3	53.	4	65.	4	77.	2	89.	4	101.	4	113.	3
6.	3	18.	3	30.	4	42.	4	54.	1	66.	4	78.	4	90.	3	102.	4	114.	2
7.	2	19.	3	31.	1	43.	1	55.	3	67.	2	79.	1	91.	4	103.	3	115.	4
8.	2	20.	2	32.	3	44.	2	56.	3	68.	2	80.	2	92.	4	104.	1	116.	4
9.	1	21.	4	33.	3	45.	4	57.	2	69.	1	81.	4	93.	4	105.	1	117.	4
10.	3	22.	1	34.	4	46.	4	58.	1	70.	1	82.	2	94.	3	106.	3	118.	2
11.	1	23.	4	35.	4	47.	4	59.	4	71.	4	83.	1	95.	4	107.	4	119.	1
12.	2	24.	1	36.	1	48.	1	60.	1	72.	2	84.	4	96.	3	108.	3	120.	3

Solutions

SECTION – I

Solutions for questions 1 to 9:

1. We have (80 – 50 + 1) = 31 different numbers to fill the boxes with.
Each number can go into a maximum of 4 boxes. Out of the 121 boxes (30 numbers) 30 × 4 = 120 can be used for 4 boxes each and 1 number can be used for the remaining each one box.
For maximum strawberries to be present, we should use the least number box the minimum number of times.
∴ Total number of strawberries

$$= 4 \times \frac{30}{2}[51+80] + 50 = 60\,[131] + 50 = 7910$$

Choice (1)

2. $(2^{1783}) / (73) = (2^{1783})\,(7) / 73(7)$
$= (2^9)^{198}\,(2)\,(7) / (2^9 - 1) = (14)\,(2^9)^{198} / (2^9 - 1)$
Using remainder theorem, the remainder of the above division is 14. As we have multiplied the dividend and the divisor by 7, the remainder will also be multiplied by 7.
Actual remainder = 14/7 = 2 Choice (4)

3. If the three equations are named as (1), (2) and (3) respectively, then (1) × 2 + (2) × 3 = (3)
Hence, if P = 21, the system of equations becomes dependent and then they will not have a unique solution. For every other real value of P, a unique solution will exist. Further there is no value of P for which the equations become inconsistent. Hence statements II and III are true, while only statement I is not true.
Choice (3)

4. The required result '14' can be achieved in a minimum of 8 steps as shown below

$$458 \xrightarrow{①} 45 \xrightarrow{②} 90 \xrightarrow{③} 180 \xrightarrow{④} 360 \xrightarrow{⑤} 720 \xrightarrow{⑥} 72 \xrightarrow{⑦} 7 \xrightarrow{⑧} 14$$

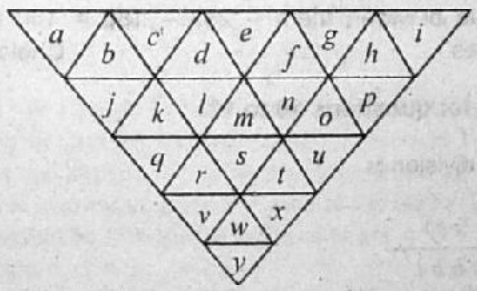
Choice (3)

5. Given $x, y, z \in R$, $y = \log_2(x)$.
$z = |y|^2 + 3|y| - 10$.
$\Rightarrow (|y| + 5)(|y| - 2)$
As $z \geq 0$, $|y| \leq -5$ and $|y| \geq 2$
$|y| \leq -5$ is not possible.
$\therefore |y| \geq 2 \Rightarrow y \leq -2$ or $y \geq 2$
The values of y and the corresponding values of x are tabulated below

y	$-\infty$	-2	2	∞
x	0	$1/4$	4	∞

∴ The required range of x is $(0, 1/4] \cup [4, \infty)$
Choice (4)

6.



The number of triangles pointing upward with a side of 1 unit = 4 in top row (b, d, f, h) + 3 in 2nd row (k, m, o) + 2 in 3rd row (r, t) + 1 in 4th row (w) = 10
Similarly, number of triangles pointing upward with a side of 2 units = 3
The number of triangles pointing downward with a side of 1 unit = 1 + 2 + 3 + 4 + 5 = 15
Number of triangles pointing downward with a side of 2 units = 1 + 2 + 3 + 4 = 10
Number of triangles pointing downward with a side of 3 units = 1 + 2 + 3 = 6
Number of triangles pointing downward with a side of 4 units = 1 + 2 = 3

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Number of triangles pointing downward with a side of 5 units = 1

Total number of triangles is

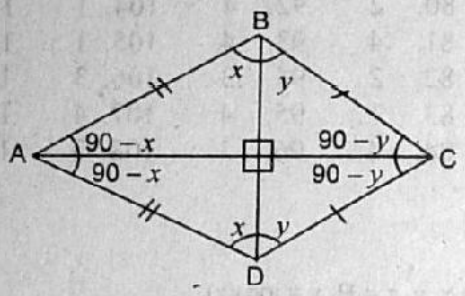
$10 + 3 + 15 + 10 + 6 + 3 + 1 = 48$ Choice (3)

7. The values of the given function and the functions given in the choices are tabulated below for $2 \le x < 4$

	$x = 2$	$2 < x < 4$
$f(x)$	1	1
Statement I	1	2
Statement II	0	1
Statement III	1	1

We see that only statement III is true. Choice (2)

8.



Let ABCD be the kite.

If we join AC and BD, then let $\angle ABD = \angle ADB = x$ and $\angle DBC = \angle BDC = y$

Then given $\angle BAC = \angle BDC$

$\Rightarrow 90 - x = y$

$\Rightarrow (x + y) = 90°$

To find $\angle BAC + \angle BCA = (90 - x) + (90 - y)$

$= 180 - (x + y) = 90°$ Choice (2)

9. In Rahuian degrees the minutes hand travels a full circle in 1 hour, i.e., 120 minutes

i.e. 720° in 120 minutes, i.e., 6° per min

and the hours hand travels 720/36 = 20° per hour

and 20°/120 = 1/6° minutes

At 9 : 48, the hours hand will be at a position $9 \times 20 + 48/6 = 188°$ and minutes hand at $48 \times 6 = 288°$

∴Angle between them = 288 − 188 = 100 Rahuian degrees. Choice (1)

Solutions for questions 10 to 12:

The given division is

```
        5 b 1
cd9)a h a h b i
    a g d e
    -------
      g 3 b
      f i 8
      ------
        c d i
        c d 9
        ------
            0
```

There are 3 multiplications and 3 subtractions shown above. From the first multiplication $e = 5$

($\because agde = cd9 \times 5$, which ends in the digit 5).

$\therefore h = 8$ and $g = 7$

From the second multiplication, $b = 2$ ($\because g\,3\,b = 732$)

From the third subtraction, $i = 9$

$\therefore 9\,3\,b - f\,i\,8 = 732 - 698 = 34$, i.e., $cdi = 349$

The complete division is

```
        5 2 1
349)181829
    1745
    -------
      732
      698
      ------
        349
        349
        ------
            0
```

10. $h = 8$ Choice (3)

11. $d = 4$ Choice (1)

12. $c = 3$ Choice (2)

Solutions for questions 13 to 19:

13. Since x = some non-negative quantity + 1

⇒ The graph cannot touch the line $x = 0$

i.e., the y-axis (it must be completely to the right of y-axis)

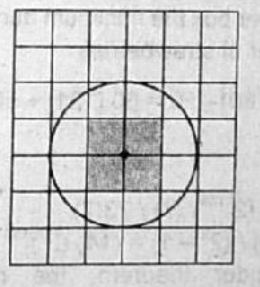
∴ Choices (1) and (2) are eliminated.

Further, if $y = 0$, then $x = 1$, and if $x = 1$, then $y = 0$ or 2 hence the graph cuts or touches $x = 1$ at two places.

Also, (by observation) the least possible value of $x = 1$.

⇒ Choice (4) is also eliminated. Choice (3)

14. For the value of d to be the maximum, the number of full unit-squares that Rekha counts must be the minimum, which is 4 unit-squares. (i.e., 4 full unit-squares will always fall within the circle as shown in the figure)



$\therefore d = \pi r^2 - 4 = 4\pi - 4 = 4(\pi - 1)$

$= 4(3.142 - 1) = 4(2.142) \cong 8.56$ Choice (4)

15. In the calculation of relative speeds, the effect of the speed of current will be nullified. Hence, it will be similar to the situation of them travelling on the ground.

∴The time taken by them, even when they swap their directions, is 24 minutes only. Choice (2)

16. $a(x) = |(2x + 1)^2|$ which is always non-negative while $b(x) = -|6x + 3|$ which is always non-positive.

$a(x) = b(x)$ is possible only if each equals 0.

$|(2x + 1)^2| = 0 \Rightarrow 2x + 1 = 0 \Rightarrow x = -1/2$

Hence, the two curves intersect at only one point (−1/2, 0). Choice (1)

17. Let initial Cost price = C

and initial Selling price = S

i.e. $P_1 > 0$

$\therefore$ if $\frac{S}{C} > 1$, then $\frac{S+x}{C+x}$

is always less than $\frac{S}{C}$ (where x is the increase in cost price that the seller passes on to the buyer.)

$\therefore$ Choice (2) is correct.

While if $P_1 < 0$

then the ratio

$\frac{S}{C} < 1 = \frac{S+x}{C+x} > \frac{S}{C}$

$\Rightarrow$ He makes lesser loss percentage in second case

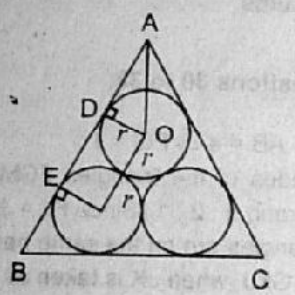
$\Rightarrow |P_2| < |P_1|$

$\therefore$ Choice (1) is incorrect.

While choices 3 and 4 are not necessarily true always. (Because, if the sales price is the same as the cost price, $P_1 = P_2 = 0$. But this need not be the case always).

Choice (2)

18.



$DE = 2r$

$AD = \sqrt{3}r$

Length of each side of triangle ABC

$a = AD + DE + EB = \sqrt{3}r + 2r + \sqrt{3}r = 2r(\sqrt{3}+1)$

Inradius of equilateral triangle ABC

$= \frac{a}{2\sqrt{3}} = \frac{2r(\sqrt{3}+1)}{2\sqrt{3}} = \frac{r(\sqrt{3}+1)}{\sqrt{3}}$. Choice (3)

19. If capacity of 11th tap = C, then the combined capacity of all taps numbered below it = C.

$\Rightarrow$ Capacity of 12th tap = Sum of all taps numbered below it = C + C = 2C

But it is given that 2C – C = 1792

$\Rightarrow$ C = 1792

Now capacity of 10th tap will be (capacity of 11th tap) / 2.

Similarly, capacity of 8th tap = $\frac{\text{Capacity of 11th tap}}{2\times2\times2}$

$= \frac{1792}{8} = 224$ litres/hr. Choice (3)

Solutions for questions 20 and 21:

20. For the number of those who do not play one or more games (of the five given games) to be maximum, the students who do not play any given game should be as distinct as possible from those not playing an other game. Hence, the students who do not play any game at all (i.e. play none) = 10, must be first subtracted (as this is common) from all the other five numbers given in the table. The sum of this 10 and all the remaining numbers will then give the maximum possible total number of students not playing one or more of the five games.

$\Rightarrow$ maximum = 10 + (10 – 10) + (13 – 10) + (18 – 10) + (20 – 10) + (25 – 10) = 46

For minimum, we can accommodate all the students not playing one or more game within the 25 students who don't play Baseball (i.e., maximum overlap is required in this case)

$\Rightarrow$ minimum = 25 $\Rightarrow 25 \le N \le 46$. Choice (2)

21. As is obvious in the data given, exactly 10 students play none of the five games.

$\Rightarrow$ All the other students play at least one game.

$\Rightarrow$ Number of students playing at least one game.

= Total number of students – Number of students playing none of the games = 70 – 10 = 60

None of the ranges given satisfy. Choice (4)

Solutions for questions 22 to 27:

22. $l/m = \frac{a^3+1}{b^3}$ -------- (i)

$m/n = \frac{b^3+1}{c^3}$ -------- (ii)

$n/l = \frac{c^3+1}{a^3}$ -------- (iii)

multiplying eqs (i), (ii) & (iii) we get :-

$\frac{(a^3+1)(b^3+1)(c^3+1)}{a^3\,b^3\,c^3} = 1$

$\Rightarrow (a^3+1)(b^3+1)(c^3+1) = a^3 b^3 c^3$

$\Rightarrow (a^3+b^3+c^3) + (a^3b^3 + b^3c^3 + c^3a^3) = -1$.

Choice (1)

23. We mark the 7 places as shown

1	2	3	4	5	6	7
A	–	–	–	–	–	–

1 has to be filled by A.

2 can be filled by B, C, E or F i.e., in 4 ways.

The other five letters can be arranged in places 3 to 7 in 5! Ways. In (2!) (4!) of these ways, D and G came together. Therefore, there are 5! – 4!2! words of the specified kind.

As 2 can be filled up in 4 ways, and for each of these ways there are 5! – 4!2! words, we have a total of 4[5! – 4!2!] = 4[120 – 48] = 288 words. Choice (4)

24. As the 12-digit number, say N, is divisible by 8 and has only 4s and 6s, the last two digits have to be 64. (If the last two digits are 44, the hundreds digit has to be odd). As N is divisible by 9, the sum of the digits (S) has to be divisible by 9. If all the digits of N are 4, $S = S_{min} = 48$. If all are 6, $S = S_{max} = 72$.

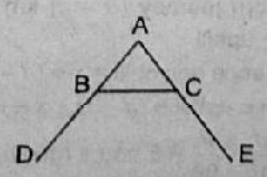
S is the sum of 4s and 6s (i.e., S is even). The only even multiplies of 9 in the above range are 54 and 72. (72 is not possible, as the last digit is 4).

$\therefore$ S = 54 and there are three 6s in N. (Each 6 increases the value of S from the S_{min} by 2.

($\therefore$ An increase of 6 is achieved by three 6s).

Choice (1)

25.



Internal angle of a decagon

$= \frac{[2(10)-4](90°)}{10} = 9(16)° = 144°$

$\angle CBD = 144°$ and $\angle BCE = 144°$

$\therefore \angle ABC = \angle ACB = 180° - 144° = 36°$.

$\angle BAC = 180° - (36° + 36°) = 108°$ Choice (2)

26. Given $Y = \{1, 3^{\frac{1}{2}}, 3, 3^{\frac{3}{2}}, \ldots\ldots 3^9, 3^{\frac{1}{2}}, 3^{10}\}$

We can observe that the given numbers are in G.P. we want the number of ways of selecting 2 numbers such that their product is not less than 3^{10}.

When one number is m let k be the number of ways of selecting the other numbers such that $m < n$.

m	k	n
1	1	3^{10}
$3^{1/2}$	2	$3^{19/2}, 3^{10}$
3	3	$3^9, 3^{19/2}, 3^{10}$
$3^{5/2}$	4	$3^{17/2}, 3^9, 3^{19/2}, 3^{10}$
.		
.		
.		
.		
$3^{9/2}$	10	$3^{1/2}, 3^6, \ldots, 3^{10}$
3^5	10	$3^{1/2}, 3^6, \ldots, 3^{10}$
$3^{11/2}$	9	$3^6, 3^{13/2}, \ldots, 3^{10}$
.		
.		
.		
.		
3^9	2	$3^{19/2}, 3^{10}$
$3^{19/2}$	1	3^{10}

$\therefore$ The total number of ways of selecting two numbers from Y such that their product is greater than or equal to 3^{10}.

$= (1 + 2 + 3 + \ldots\ldots + 10) + (10 + 9 + \ldots\ldots + 2 + 1)$

$= 2 \times \frac{10(11)}{2} = 110$

Alternative solution:

There are a total of 21 elements in the set S. The largest element, i.e., 3^{10}, can be paired with 20 other elements. The next largest element, i.e., $3^{19/2}$, can be paired with 18 other elements (not counting that with 3^{10}). Similarly 3^9 can be paired with 16 other elements, and so on. Hence a total of 20 + 18 + 16 + ... 2 (for $3^{11/2}$) = 110 ways.

Choice (1)

27. Let the road from Ooty to Mangalore be downhill for a distance of x km, and uphill for a distance of $(d - x)$ km. Where d = distance between the two towns.

Now on the return journey $(d - x)$ km will be downhill and x km will be uphill.

Hence total distance downhill $= x + (d - x) = d$

and total distance uphill $= (d - x) + x = d$

$\therefore$ total time $= \frac{d}{45} + \frac{d}{90} = 8$ hours (given) given

$\therefore 3d = 90 \times 8$

$\Rightarrow d = 240$ km.

Choice (3)

Solutions for questions 28 and 29:

Total amount for the purchase of three pieces of MP3 player

$= 1230 + (1230 + 1230) \times \left(\frac{3}{4}\right)$

$= 1230 + 1845 =$ Rs.3075.

Share of each person is $\frac{3075}{3} =$ Rs. 1025

Thomas paid 42 US dollars i.e., 9 (42) = Rs.378.

Lallu paid 7 US dollars and 50 rupees i.e. 7 (42) + 43 = Rs.337.

28. The amount that Thomas owes Neeru

= 1025 – 378 = Rs.647. Choice (1)

29. The amount that Lallu owes Neeru

= 1025 – 337 = Rs.688

$= \frac{688}{43} = 16$ Euros. Choice (2)

Solutions for questions 30 to 38:

30. Let AD = 2 ⇒ AB = 4 ⇒ FG = 1

and the altitudes of the triangles FGM, FGK and FGJ will be in the ratio 3 : 2 : 1 (Since FJ = JK = KM)

and these triangles are on the same base of FG = 1

⇒ altitude of GKJ, when JK is taken as base,

= 1/3 of AD = 2/3

$\therefore$ Area of the shaded region $= \frac{1}{2} \times 1 \times \frac{2}{3} = \frac{1}{3}$

Area of ABCD = 4 x 2 = 8

$\therefore$ Required ratio = 1/3 : 8 i.e., 1 : 24. Choice (4)

31. Let there be x, y, z. P's in the first, second, third rows respectively.

$\therefore x + y + z = 7$. We need the different positive solutions for this equation. The number of positive solutions is

$^{7-3+2}C_2 = {}^6C_2 = 15$

The number of P's in the first, second and third rows and the number of ways in which they can be arranged is tabulated below. The max number of P's in any row is given in the top row of the table below.

3	4	5			No. of ways
1	1	5	3(4) (1)	=	12
1	2	4	3(6) (5)	=	90
2	1	4	3(4) (5)	=	60
1	4	2	3(1) (10)	=	30
2	4	1	3(1) (5)	=	15
1	3	3	3(4) (10)	=	120
3	1	3	1(4) (10)	=	40
3	3	1	1(4) (5)	=	20
2	2	3	3(6) (10)	=	180
2	3	2	3(4) (10)	=	120
3	2	2	1(6) (10)	=	60
					747

Alternative solution:

In this problem, it is a bit simpler to count the selections of 7 cells, which have to be left out. The total number of ways of selecting 7 cells out of the 12 is $^{12}C_7 = 792$.

From this total, we have to leave out those selections which are from only two rows (There is no selection of 7 cells from only 1 row).

The number of selections from the top and middle rows is ${}^7C_7 = 1$

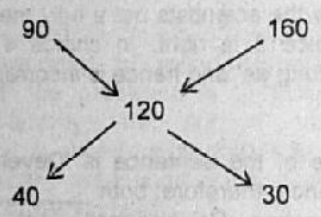
The number of selections from the top and bottom rows is ${}^8C_7 = 8$

The number of selections from the middle and bottom rows is ${}^9C_7 = 36$

$\therefore$ The required number of selections is 792 – (1 + 8 + 36) = 747 Choice (1)

32. If $p > q$, then step 2 swaps p into q and q into p.
For example, if $p = 10$ and $q = 3$, then $r = p = 10$
$p = q = 3$
$q = r = 10$
$p = 3; q = 10$
In step 3, q is subtracted by p and s is incremented by 11, which gives the number of times p is subtracted from q.
In step 4, when p is greater than q, s is given as output, which is number of times p is subtracted from q, i.e. quotient, when 10 is divided by 3. Choice (3)

33. On careful observation, it can be seen that the average weights of oranges in all the 4 baskets and also in baskets x and y are the same. So the average weight of oranges in baskets w & z will also be the same.



$\therefore$ The required ratio is 4 : 3. Choice (3)

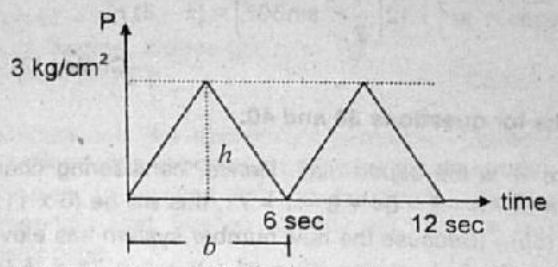
34. The given number is of the form
$(a + b)^3 - a^3 - b^3 = 3.a.b.(a + b)$
Here $a = 36$ and $b = 8$.
$\Rightarrow$ Number = 3 x 36 x 8 x 44 = $2^7 \times 3^3 \times 11$.
From the choices, only 11, 9 and 8 will always divide.
Choice (4)

35. In the given problem, since a occurs in all the co-ordinates with the same sign i.e., +ve sign, both the shape and size of the figure are independent of a this can otherwise be shown as follows:
In terms of the x, y coordinates of the vertices of a triangle, the area of the triangle is

$$\frac{1}{2}\begin{vmatrix}(x_1-x_2)\times(x_2-x_3)\\(y_1-y_2)\times(y_2-y_3)\end{vmatrix}$$

If ABCD is the quadrilateral,
Quad ABCD = ΔABD + ΔDBC.
As all the coordinates given contain 'a' as one of the terms of the expression indicating the coordinate, when the above formula is used, the result will be a matrix of pure numbers independent of 'a'. Hence, area of ABCD is a pure number. (Alternately, substituting $a = 0$, gives the vertices as (0, –2), (1, –1), (4, 0) and (–3, 2). The area of this quadrilateral can be calculated. Now, the area does not change if we add 'a' to all the co-ordinates, i.e., only the figure is moved in the co-ordinate plane. Hence, the area is independent of 'a'). None of the first three options satisfy this condition.
Choice (4)

36. The total volume of oil pumped in one full cycle will be equal to 30 x average value of P for that cycle.



Average value of P for one cycle = area of one triangle in the P vs time graph divided by the time period of one cycle $= \frac{1/2 \times b \times h}{b} = \frac{1}{2}h = \frac{1}{2} \times 3$ kg/cm^2.
Now 3 kg/cm^2 = 3000 gm/cm^2 (since P is in gm/cm^2)
$\therefore$ Average P in gm/cm^2 = 1500 gm/cm^2 and hence the average rate of flow = 30 × Avg.P cc/sec
= 30 × 1500 = 45000 cc/sec = 45 ℓ/sec Choice (1)

37. $x^2 - 7xy + (12y^2 - 4) = 0$

$$x = \frac{7y \pm \sqrt{(7y)^2 - 4(12y^2 - 4)}}{2} = \frac{7y \pm \sqrt{y^2 + 16}}{2}$$

$0 \le y \le 9$
$\therefore 16 \le y^2 + 16 \le 97$
For x to be an integer, $y^2 + 16$ must be a perfect square.
$\therefore y^2 + 16 = 16$ or 25 or 36 or 49 or 64 or 81. Among these values of $y^2 + 16$, y has a feasible value only when $y^2 + 16 = 16$ or 25.
When $y^2 + 16 = 16$, $y = 0$.
When $y^2 + 16 = 25$, $y = 3$. But, as $y > 0$
y has only 1 possible value.

Alternative solution 1:

$x^2 - 7xy + 12y^2 = 4$
$\Rightarrow (x - 3y)(x - 4y) = 4(1) = (-1)(-4)$
[we need not consider 2(2) or (–2) (–2) since $x > 0$ and $y > 0$, $\Rightarrow x - 3y > x - 4y$]
$\therefore$ The possible solutions are given by
$x - 3y = 4, x - 4y = 1$ or $x - 3y = -1, x - 4y = -4$
$\Rightarrow x = 13, y = 3$ or $x = 8, y = 3$
$\therefore$ In either case $y = 3$

Alternative solution 2:

We can rewrite the terms in terms of a perfect square by rearranging the terms as $x^2 - 7xy + \left(\frac{49}{4}\right)y^2 = 4 + y^2/4$

i.e., $\left(x - \frac{7y}{2}\right)^2 = \frac{(16 + y^2)}{4}$

$\Rightarrow (2x - 7y)^2 = (16 + y^2)$
Now, since, x and y are both positive integers, the LHS of the above equation would be a perfect square.
$\Rightarrow 16 + y^2 = (4)^2 + y^2$ = a perfect square.
$\Rightarrow$ Now the only pythagorean triplet with 4 is $5^2 = 4^2 + 3^2$.
Hence, y can take only one value, i.e., 3.
Choice (2)

38. The area of the region between the circle and the polygon = Area of the circle – Area of the polygon. Given the radius of the circle = r. The polygon has 12 triangles each with an angle of $\frac{360}{12} = 30°$ included at the centre. ∴The area between the circle and the polygon = $\pi r^2 - 12\left(\frac{1}{2}r^2 \sin 30°\right) = (\pi - 3)\, r^2$.

Choice (2)

Solutions for questions 39 and 40:

39. Here '0' is the eighth digit. Hence, considering choice (1) = $\theta^2 + \theta - 1 = 64 + 8 - 1 = 71$, this will be $(6 \times 11) + 5 = (65)_{11}$ (Because the new number system has eleven digits). Similarly choice (2) = $\theta^2 + \theta + 1 = 73 = (67)_{11}$, and choice (3) = $\theta^2 + \theta + 2 = 74 = (6\theta)_{11}$.

Choice (3)

40. $(90)_{11} = (10 \times 11 + 8)_{10} = (118)_{10}$ Choice (1)

Difficulty level wise summary- Section I	
Level of Difficulty	Questions
Very Easy	–
Easy	8, 19, 25, 28, 29, 34
Medium	1, 3, 7, 10, 11, 12, 14, 15, 17,
	18, 20, 21, 22, 23, 24, 26, 27, 30,
	31, 32, 33, 35, 36, 37, 38, 39, 40
Difficult	2, 4, 5, 6, 9, 13, 16
Very Difficult	–

SECTION – II

Solutions for questions 41 to 80:

Number of words and Explanatory notes for RC:

Passage I : 1,524
Passage II : 560

41. Choice 1 is supported by para 2, choice 2 by para 5 beginning, choice 3 finds no mention in the passage. Choice 4 finds support in para 5. Choice (3)

42. The beginning of the passage discusses the ascent of man, the concluding para the descent of humanity. Hence the theme is best described by choice 4.

Choice (4)

43. Refer to para 6. Descartes separated the mind and matter into different realms. Choice (1)

44. Refer to the last para – man had traditionally been regarded as unique, superior to everything else in nature but as we grow pessimistic about man, the view that he can be understood in animal or machine terms seems possible and culturally acceptable.

Choice (2)

45. Refer to the last sentence of para 3 'when Copernicus placed the earth in orbit .... elevation of man to heavens'.

Choice (4)

46. 'Connote' is used in the sense of 'mean'. 'Imply' is the appropriate choice. Choice (4)

47. 'Laud' means to praise enthusiastically and publicly – also the meaning of 'acclaim'. Choice (4)

48. 'Conundrum' means puzzle difficult to solve 'Mystery' would mean difficult to explain. Choice (1)

49. 'Hamstrung' means crippled and refers to incapacity. 'Straitjacketed' refers to restraints. Choice (4)

50. 'Ambivalence' means uncertainty while 'ambiguity' would refer to unclear meaning. Choice (3)

51. The usage in choice 5 is incorrect. The right word here would be 'rested' not restored. Choice (2)

52. In choice 2 the word is wrongly used. It should be 'flung' here not 'flinched'. Choice (2)

53. The word is wrongly used in choice 4. Here the right word is 'push' not 'pursue'. Choice (4)

54. In choice 1 the word should be 'devotions' meaning prayer and not 'devotion'. Choice (1)

55. In the third option it should be the plural 'realms' since we are talking of two. Choice (3)

56. The structure of the sentence is 'so long as _____ so long as _____ so long as _____ then _____ 'So long as' means the same as 'as long as' or 'till such time'. Choice 1 and 2 are incorrect because 'even' should qualify the scientists not a fully mechanistic view of man. Choice 3 is right. In choice 4 'as' (reason) replaces 'so long as' and hence is incorrect.

Choice (3)

57. The structure of the sentence is 'Developments from the Renaissance, therefore, both _____ and _____.' Choice 1 makes Renaissance (not development) the agent. Choice 2 is right – 'as a result' replaces 'therefore'. Choice 3 errs in saying that the developments were 'ambiguous'. Choice 4 errs in making it developments in Renaissance choice 4 errs in making it developments in Renaissance. Choice (2)

58. In choice 2 the phrase 'for men like Bacon and Newton' is wrongly positioned. In choice 3 and 4, the use of 'both' and 'as well as' makes it grammatically incorrect. Further in 3 the present tense (is) is incorrect. Similarly, the use of 'does' in 4, changes the tense inappropriately.

Choice (1)

59. The given sentence says that 'this naturalistic world view 'this naturalistic world view can be seen as dethroning humanity'. Choice 1 errs in making the dethroning a part of the traditional Christian view. Choice 2 errs in making 'the naturalistic world view' the agent of dethroning. In choice 3 it is 'one point of view' that is the agent. Choice 4 is right. Choice (4)

60. The structure of the given sentence is. The development of a scientific worldview has been . . . about the replacement of _____ with _____. Choice 1 restates it appropriately. In choice 2 'in large part' wrongly qualifies 'development'. Choice 3 is totally mixed up. Choice 4 errs in saying that the replacement is the scientific worldview. Choice (1)

61. In sentence 1, 'this news' clearly refers to a prior statement, and the sentence then proceeds to tell us that this would not be looked at with much enthusiasm. Only D is phrased in the manner of information or

reason and therefore follows 1, providing the reason for the lack of enthusiasm. A, B, C are clearly in sequence – A acknowledging the perception of a task on hand, B presenting the resources needed for such a task, and C summing up with 'even so'. Since the author uses 'true' in line A to acknowledge the task, this implies that he had a different opinion of his own before this, which is in E and should therefore precede A. Thus the appropriate sequence after sentence 1 would be DEABC.

Choice (3)

62. The reasons for lack of enthusiasm are 'NASA's budget being cut to the bone" (meaning reduced funds for space exploration) and 'voices calling for an attack on the evils and injustices of our own world' (as against exploration of other worlds). Therefore 'this news' at the beginning of the paragraph would refer to the prospect of continued or increased space exploration. Such a view is presented in para 8. Thus, the appropriate position for this para is between paras 8 and 9.

Choice (3)

63. While the adjective 'long-cherished' could be used with all the choices, the context refers to new knowledge replacing old perceptions. 'Beliefs' is therefore appropriate. Choice (2)

64. The reference is to a geographical feature on the planet, more significant than the canyon referred to in the previous para. 'Dominated' is therefore appropriate.

Choice (1)

65. The word relatively is usually used to denote 'in relation to' or 'in proportion to' something else, whereas, in this context, the reference is to evidence of recent geological activity, and not to any comparison. 'Geologically' is therefore appropriate. 'Hypothetically' and 'theoretically' are inappropriate, since the statement is based on evidence seen. Choice (4)

66. The reference is to the 'imaginary' Mars that we had believed in. 'Illusions' is therefore appropriate.

Choice (4)

67. The reference is to the lessons of a completed space mission, and the indication that the import may be understood only after years. 'Absorb' is therefore appropriate. Choice (2)

68. A new world is 'discovered' not 'uncovered' – A
Impact is 'immediate' not 'rapid' – B
'Results' are not calculated or calculable, 'benefits' are – B
An old civilization is not 'recreated' but given new life or 'revivified' – A
'Suspended' would imply a connection to something above. 'Floating' is appropriate – B
Hence ABBAB

Choice (2)

69. Transportation systems would be 'developed' not 'found' – B
A new world would be 'found' not 'revealed' – A
A 'panorama' is a wide (or bird's-eye) view, while 'scenery' would be natural features considered in terms of their appearance – more suitable in this case – B
The normal collocation for a natural feature of significance is 'natural wonder' – whether it is geographical, botanical, zoological, or any other – A
'Covering' would mean over an entire area, while 'spanning' would mean reaching across from one side to the other – more suitable in this case B.
Hence BABAB.

Choice (1)

70. 'Astounding' would mean shocking or greatly surprising, 'Awesome' would mean causing wonder – more suitable in this case - B
In size, large 'dwarfs' small, 'outdo' is inappropriate – A
Expelled forcibly and in large quantities would be 'spewed' – more suitable in the context. 'Spurt' would mean gushing out in a stream – not appropriate – A
Indications of something would be 'evidence' not 'proof' – B
Life 'begins', it does not 'rise' – B
Hence BAABB

Choice (1)

71. Choice 4 is the appropriate sentence – meaning that Galileo focused on the moon using his telescope.
Choice 1 – turned with his telescope – conveys the meaning that Galileo turned, not that he used the telescope.
Choice 2 – to turn on – would mean to attack suddenly.
Choice 3 – turn his telescope on the moon – is inappropriate. 'Focus on' or 'train on' would have worked.

Choice (4)

72. The previous sentence ends with 'awaiting the touch of life'. Choice 2 continues with the thought of how and when life came, appropriately worded. Choices 1, 3, 4 use the thought 'life came riding' which is inappropriate since it personifies life in the act of riding (as in 'the highwayman came riding'). Choice (2)

73. Since 'quick' refers to the rapidity of the 'over-shadowing', and this is what the sentence seeks to convey, the best construction would need 'quickly overshadowed' as in Choice 1. 'Quickly be overshadowed', as in the other choices, would give the sense of the 'overshadowing' being part of a larger sequence of happenings. This makes Choice 1 appropriate. In addition, the basic idea is 'over-shadowed by a greater drama' – thus any insertion between 'overshadowed' and 'by a greater drama' can only be of the manner of the 'overshadowing'.

Choice (1)

74. The use of 'literally' is to emphasise the extent of the scientists' disbelief and the appropriate phrasing would be 'literally unable to believe their eyes' as in choices 2, 4, 5. 1972 is presented as the year when the evidence started to accumulate, as in choice 2, and not when scientists disbelieved (as is the impression given by choices 4). Thus choice 2 is appropriate.

Choice (2)

75. 'Diameter', being a noun, would be preceded by 'has' and not 'is', which would precede an adjective such as 'large'. Thus choices 1 and 4 are ruled out (apart from the misplacement of 'nearly' in 1). Choice 2 is wrong since appropriate phrasing would be 'two times (or) four times as large', not 'times larger'.

Choice (3)

76. The phrase appears in para 3 and is followed by the author's idea of the similarities between Earth and the moon – geographical similarities. Choice (4)

77. Choice 1 – can be inferred from paras 3 and 5.
Choice 2 – cannot be inferred – para 3 speaks of Galileo focusing on the moon to learn something new about it, while para 5 refers to the discovery of Mars.
Choice 3 – can be inferred from the phrase 'overthrow of long-cherished beliefs' in para 5.

Choice 4 can be inferred – the potential of Mars to support life is referred to in para 7, while no such mention is made with reference to the moon.

Choice (2)

78. Paras 6 and 7 show how the geographical features (or 'scenery') on Mars is the most spectacular yet discovered anywhere in the universe. Thus, choice 4 is the appropriate answer. Choice (4)

79. This line is from the paragraph to be inserted into the passage. The paragraph indicates that the view generally prevailing is that we need to pay attention to our cities, societies and to Earth. Choice 1 is thus the appropriate answer. Choice (1)

80. The line 'men need mystery and romance of new horizons almost as badly as they need food and shelter' points to the author's belief that, while man needs adventure, he needs the fruits of discovery more. Thus 'explorer' is appropriate. Choice (2)

Difficulty level wise summary- Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	51, 52, 55,
Medium	42, 48, 49, 50, 53, 54, 60, 62,
	63, 64, 66, 67, 71, 74, 76, 78
Difficult	41, 43, 44, 45, 46, 47, 56, 57,
	58, 59, 61, 65, 68, 69, 70, 72,
	73, 75, 77, 79, 80
Very Difficult	–

SECTION – III

Solutions for questions 81 to 84:

81. $125 + 100 \times 0.5 + 100 \times 0.75 + 100 \times 1 + 65 \times 1.25$
$= \text{Rs.}431.25$ Choice (4)

82. It cannot be less than 100 as the average is more than Re.1.
It cannot be between 200 and 400 as the average is less than Rs.0.90
If it is between 100 and 200; let it be $100 + x$.

$$\therefore \frac{125 + \frac{x}{2}}{100 + x} = 0.95$$

$$\Rightarrow 0.45x = 30 \Rightarrow x = \frac{3000}{45} = 66\frac{2}{3}$$

As x is an integer, it cannot be $66\frac{2}{3}$

So, check for 500 or 600.
For 500, bill is
$125 + 100 \times 0.5 + 100 \times 0.75 + 100 \times 1 + 100 \times 1.25$
$= ₹475$

Average per call $= \frac{475}{500} = 95$ paise Choice (2)

83. For a person who makes 275 calls,
Bill $= 125 + 100 \times 0.5 + 75 \times 0.75 = 231.25$

$\therefore$ The required percentage $= \frac{231.25}{275} \times 100 \simeq 84$ paise.

Choice (1)

84. According to the old rates
Bill $= 125 + 0.5 \times 100 + 0.75 \times 100 + 1.00 \times 50 = 300$
According to the new rates
Bill $= 125 + 0.75 \times 100 + 1.00 \times 100 + 1.25 \times 50$
$= 362.50$
$\therefore$ The percentage increase $= 20.8\%$ Choice (4)

Solutions for questions 85 to 89:

Looking at the second table, it can be said that 20% of the employees who had an Excellent grade were from the Marketing department while from the third table we get that only 10% of the employees of the Marketing department had an Excellent grade.

$\therefore$ 20% of Excellent = 10% of Marketing.

$$\frac{\text{Excellent}}{\text{Marketing}} = \frac{1}{2}$$

Similarly the ratios of the number of employees who got Excellent grade and when compared to that in Finance, when compared to that in Administration and when compared to that in Production departments would be 1 : 1, 1 : 3 and 1 : 4 respectively.

$\therefore$ Ratio of the number of employees in Marketing, Finance, Administration and Production is 2 : 1 : 3 : 4.

Similarly 32% of the employees who obtained the grade 'Good' were in Marketing while 40% of the employees in the Marketing department obtained the grade 'Good'.

32% of good = 40% of Marketing

$$\therefore \frac{\text{Marketing}}{\text{Good}} = \frac{4}{5}$$

Similarly the ratios of employees in the Marketing department when compared to that who got the grade Average and when compared to that who got the grade Poor are 2 : 5 and 4 : 3 respectively.

$\therefore$ Ratio of employees who got grades Excellent, Good, Average and Poor = 2 : 5 : 10 : 3

Now, let the number of employees with their grade as Excellent be $2k$. Therefore, the number of employees with other grades are $5k$, $10k$ and $3k$. Similarly, by comparing with above ratios, the number of employees in different departments are $4k$, $2k$, $6k$ and $8k$.

This is tabulated as follows:

Marketing	$4k$	Excellent	$2k$
Finance	$2k$	Good	$5k$
Administration	$6k$	Average	$10k$
Production	$8k$	Poor	$3k$

85. $\frac{3}{20} \times 100 = 15\%$ of the company's employees, who were graded 'Poor' were given a salary hike of only 5%.

Choice (2)

86. All employees who were graded 'Excellent' or 'Good' got a salary hike of 15% or more, i.e. 35%.

Choice (4)

87. Assume number of employees in the company is 2000.
$\therefore$ Number of employees in the Marketing Section = 400
Number of employees who were graded 'Good' = 500
32% of all employees who were graded 'Good' were from the marketing section.
$\therefore$ Number of employees other than from the marketing section who were graded 'good' = 500 – 160 = 340
$\therefore$ Required ratio = 400 : 340 = 20 : 17 Choice (3)

88. Choice (2)

89. Though the distribution of the number of employees getting different increments is known, the actual total salary of each of the four groups of employees is not known.
Hence the overall percentage increase in the salary bill cannot be determined. Choice (4)

Solutions for questions 90 to 93:

90. As per the given graph a two-wheeler has a direct cost saving of 150 paise per km, and of this Fuel accounts for 60%.
∴Total Direct Cost Saving for a to and fro journey
$= 150 \times 100 \times 2 =$ Rs.300
∴Savings on Fuel $= \frac{300 \times 60}{100} = 180$ Choice (3)

91. Total Cost Savings on Car $= 240 \times 100 =$ Rs.240
Toll paid for travel by Car $= 240 \times \frac{50}{100} =$ Rs.120
∴ Net Cost Savings = 240 – 120 = Rs.120
Similarly the Net Cost Savings for other categories can be found.
Net cost savings – LCV = Rs.36
Net cost savings – HCV = Rs.27
Net cost savings – Two wheeler = Rs.147
Net cost savings – Bus = Rs.198
∴Bus has the highest net cost savings. Choice (4)

92. This question can be answered by simple observation of the cost savings graph. Indirect and Intangible cost savings are denoted by B and C respectively.
∴Indirect + Intangible cost savings for a HCV
= 270 – 120 = 150 paise/km.
Indirect + Intangible cost savings for a Bus
= 360 – 120 = 240 paise/km
∴ Difference is 240 – 150 = 90 paise/km.
Choice (4)

93. The cost savings on fuel for a one-way trip for a two-wheeler $= 1.50 \times \frac{60}{100} \times 100 =$ Rs.90
The cost savings on time for a one-way trip for a bus
$= 2.00 \times \frac{60}{100} \times 100 =$ Rs.120
The cost savings on spares for a two-way trip for a HCV
$= 1.30 \times \frac{50}{100} \times 200 =$ Rs.130
The cost savings on fuel for a two-way trip for a HCV
$= 1.20 \times \frac{60}{100} \times 200 =$ Rs.144 Choice (4)

Solutions for questions 94 to 97:

94. For the points scored by B in the tournament to be maximum, we have to assume that in matches where B's share of points was higher, the team's total points was maximum, i.e. in matches I and III the team scored 150 points each and in the other matches the team scored only 50 points each.
∴ Points scored by B
$= \frac{14}{100} \times 150 + \frac{12}{100} \times 50 + \frac{16}{100} \times 150 + \frac{12}{100} \times 50$
$= 21 + 6 + 24 + 6 = 57$ Choice (3)

95. The share of points scored by A and C in the matches are
Match I – 46%
Match II – 42%
Match III – 24%
Match IV – 34%
For the points scored by A and C together to be the least we have to assume that the team scored the maximum (150) points in matches where the contribution of A and C together was minimum, i.e. in matches III and IV.
∴ Points scored by A and C
$= \frac{46}{100} \times 50 + \frac{42}{100} \times 50 + \frac{24}{100} \times 150 + \frac{34}{100} \times 150$
$= 23 + 21 + 36 + 51 = 131$
Required percentage $= \frac{131}{400} = 32.75\%$
Choice (4)

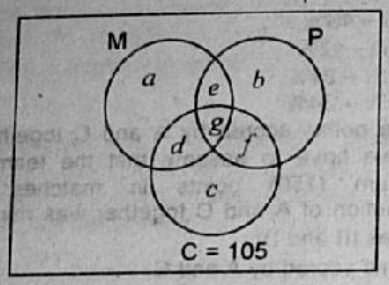
96. The difference between the share of points of D and F (D – F) in different matches are
Match I = –2%
Match II = 6%
Match III = 12%
Match IV = 12%
To have the maximum difference, the team's score in matches III and IV must be 150 each and that in matches I and II must be 50 each.
∴ The required difference
$= \frac{12}{100} \times 150 + \frac{12}{100} \times 150 + \frac{6}{100} \times 50 - \frac{2}{100} \times 50$
$= 18 + 18 + 3 - 1 = 38$ Choice (3)

97. E could not have scored the highest number of points in the tournament as even if we assume the team scored 150 points in matches III and IV, C would have scored more than that of E.
∴ a is always false.
G scored the minimum number of points in the tournament and the points scored by G could be 2 + 2 + 9 + 12 = 25, if the team's points in matches III and IV were 150 each.
C could have scored 98 points in the tournament only if the team had scored 150 points each in matches I and II.
At most one of b and c is true.
When b is true, d is true and B would have scored 55 points. When C is true, d is true and B would have scored a total of 53 points.
∴ Statements b and d (or) c and d can be simultaneously true. Choice (3)

Solutions for questions 98 to 102:

98. Let the number of Rs.2, Rs.5 and Rs.10 notes be a, b and c respectively.
Given, $2a + 5b + 10c = 50$
∴ a must be a multiple of 5 and b must be a multiple of 2.
∴ If $a = 5$, then $(b, c) = (2, 3)$ or $(4, 2)$ or $(6, 1)$
If $a = 10$, then $(b, c) = (2, 2)$ or $(4, 1)$
If $a = 15$, then $(b, c) = (2, 1)$
From A, $b \le c$
∴ $(b, c) = (2, 3)$ or $(2, 2)$
∴ b = 2
∴ A alone is sufficient.
From B, $c = 2$
∴ $b = 2$ or 4
∴ B alone is not sufficient. Choice (1)

99. From A alone,



As C = 105 and n = 20

$C + n = 125$

$\therefore a = e = b = 0$

$\therefore$ A alone is sufficient.

From B alone we cannot find out the value of 'b' as it gives partial information. Choice (1)

100. From statement A, we can only say that the sum of their ranks are 10, 11, 12, 13 and 14.

$\therefore$ Statement A alone is not sufficient.

From statement B, the ranks of B are 1, 2, 3 and 4 and the corresponding ranks of D are 2, 3, 4 and 5 respectively.

$\therefore$ B's rank in P is 3.

As C got the second rank in S, B did not get the first rank in S.

$\therefore$ B got the fourth rank in S.

$\Rightarrow$ D got the fifth rank in S.

As A got the third rank in R, he must have got the first rank in S.

$\therefore$ Statement B alone is sufficient. Choice (2)

101. From the given data, the player who lost all his fights cannot be D or A.

From statement A alone:

The player who lost all the fights cannot be B.

$\therefore$ It can be either C or E.

From statement B alone: The player who lost all his fights cannot be C. $\therefore$ It must be either B or E.

Using both the statements, the person who lost all his fights is E.

$\therefore$ Both the statements are required. Choice (4)

102. Using statement A alone, Blue can be either adjacent or opposite to Yellow. From statement B alone, Violet is opposite to Orange, and Green is between Violet and Orange. But this information is not sufficient to answer the question.

From both the statements Blue and Yellow have to be opposite to each other. Choice (4)

Solutions for questions 103 to 106:

Consider the second statement made by D. If it is true, then his first statement must be false. In case if D's second statement is false, his first statement would definitely be false.

$\Rightarrow$ D's first statement is definitely false.

$\Rightarrow$ There is more than one liar i.e., two liars and hence one truth teller and one alternator.

$\Rightarrow$ A's first statement is false and B's second statement is true.

If D is an alternator, then C's second statement will be true, in which case, these will be at most one liar.

$\therefore$ D is a liar.

If A's second statement is true, then C cannot be a liar.

$\therefore$ A is also a liar.

$\therefore$ C's second statement is false.

$\Rightarrow$ B is the truth teller and C is an alternate with first statement is true.

$\Rightarrow$ D got the fourth rank.

As the difference in the ranks of B and C is two and A's second statement is true, B and C got the third and the first rank respectively.

$\Rightarrow$ A got the second rank.

	I	II	Rank
A	F	F	2
B	T	T	3
C	T	F	1
D	F	F	4

103. Choice (3)

104. Choice (1)

105. Choice (1)

106. The order of marks scored is C > A > B > D

$\therefore$ C + A > B + D and also

C + B > A + D Choice (3)

Solutions for questions 107 to 110:

107. The longest route from A to H, without visiting any place twice is A – D – C – B – G – E – F – H, i.e. 37 km. Choice (4)

108. The possible routes are ABC, ABGC, ABGHFDC, ADC, ADFHGC, ADFHGBC - a total of 6 routes. Choice (3)

109. By observation, we find it is ACDFH, i.e. 23 km. Choice (4)

110. If the first place to visit is B or C, then the possible routes are:

ABCGH, ABCEGH, ABCDEGH, ABCDEGH, ABCDFEGH, ACGH, ACEGH, ACDEGH, ACDFEGH, ABGCEH, ABGCDEH, ABGCDFH, ABGCDEH, ABGECDFH.

If the fist place to visit is D, then we will get at least two routes. Therefore, the number of routes are much more than 12. Choice (4)

Solutions for questions 111 to 115:

111. Only one of Warne, Dhoni and Symonds can be selected and only one of Akthar and Lee can be selected. So also Ponting and Harbhajan or Ponting and Sourav cannot be selected together.

$\therefore$ The team of five can be Symonds, Sreesanth, Harbhajan, Sourav and one among Akthar or Lee. Choice (4)

112. If Ishant was selected, then definitely Ponting has to be selected, which means that Sourav, Harbhajan, Symonds, Sreesanth, one of Akthar and Lee and one of Warne and Dhoni cannot be selected.

$\therefore$ A total of four players or three players other than Ishant can be selected. Choice (2)

113. One of Akthar and Lee and one of Warne and Dhoni must be definitely selected. Symonds cannot be selected as the players selected would exceed three in that case. Sourav can be selected while Ponting cannot be selected in which case Ishant also has to be selected and the number of players selected becomes four. Choice (3)

114. As all of Symonds, Sreesanth and Harbhajan must be selected or none of them must be selected, to have the largest number of players selected, all the three must be selected. In that case Warne, Dhoni, Ponting, Ishant and one of Akthar or Lee cannot be selected.
∴ At most five players can be selected.

Choice (2)

115. If Sourav is definitely selected, Ponting and Ishant cannot be selected. So also one of Akthar and Lee cannot be selected. The teams selected can be as follows Sourav, Akthar or Lee, Warne or Dhoni (3 members). Sourav, Akthar or Lee, Symonds, Sreesanth, Harbhajan (5 members). Choice (4)

Solutions for questions 116 to 120:

116. Choice 1, though it provides a lead-time is not the choice since "it would not be long" only provides a relative time frame, not a specific one.

Choice 2 is easily ruled out since the situation, in any case, requires "brisk movements".

Choice 3 indicates that many (also a relative quantifier) phones need more than 3 watts of power. However, this leaves the possibility of some needing less than 3 watts which will, then, work.

Choice 4 is appropriate – if the material is not yet foldable or flexible, then its being used for clothing is contingent on such development actually taking place, and the probability of this is not known.

Choice (4)

117. The first two options go on to support the conclusion that immigration laws may not be an obstacle for skilled Indian professional migrants wishing to move to the U.K. The third option speaks of criticism of the laws and this does not directly impact the skilled Indian professional migrant, but the quota system for E.U. countries definitely does. Choice (4)

118. The given paragraph says that while bonsai was generally popular with older people Yamada has made it trendy (meaning fashionable). Choice 2 supports this by saying that bonsai is undergoing a boom with the internet rousing interest among the youth.

Choice (2)

119. Choice 2, providing how the study was carried out provides information that is not in the same line of thought as the paragraph (the significance of the discovery).
Choice 3, which inserts an element of uncertainty in the understanding of the findings would not conclude a para that conveys significance.

Choice 4, though it points at an effect, is not appropriate. Treatment possibilities would be spoken of if the causal features and connections are established, whereas the situation is still in the stage of hypothesis – as seen from the words "the strongest case so far".
Choice 1 is appropriate since it tells us of the area of difference in the way the three teams interpret the findings.

Choice (1)

120. Choice 1 is inappropriate – the situation is not of the possibility of fatality, but of possible harm.
Choice 2 is inappropriate – even if only the upper crust use these bottles, their infants would be effected.
Choice 3 is appropriate – if mothers are moving from bottle-feeding to nursing, there is reason to feel less anxious.
Choice 4 is not appropriate – the probability of success is not indicated. Choice (3)

Difficulty level wise summary- Section III	
Level of Difficulty	Questions
Very Easy	–
Easy	81, 82, 83, 90, 91, 92, 99
Medium	84, 85, 86, 87, 88, 89, 93, 94, 95,
	98, 101, 102, 103, 104, 105, 106,
	107, 108, 109, 110, 111, 112,
	113, 114, 115, 117, 118
Difficult	96, 97, 100, 116, 119, 120
Very Difficult	–