

CAT Sample Paper 1

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Quantitative Ability

DIRECTIONS for questions 1 to 7: Answer the questions independently of each other.

1. The total cost of 2 pencils, 5 erasers and 7 sharpeners is Rs.30, while 3 pencils and 5 sharpeners cost Rs.15 more than 6 erasers. By what amount (in Rs.) does the cost of 39 erasers and 1 sharpener exceed the cost of 6 pencils?

- (1) 20
- (2) 30
- (3) It does not exceed
- (4) Cannot be determined

2. If the roots of the equation $(x + 1)(x + 9) + 8 = 0$ are a and b , then the roots of the equation $(x + a)(x + b) - 8 = 0$ are

- (1) 1 and 9
- (2) -4 and -6
- (3) 4 and 6
- (4) Cannot be determined

3. What is the remainder when 7^{700} is divided by 100?

- (1) 1
- (2) 61
- (3) 41
- (4) 21

4. Balram, the local shoe shop owner, sells four types of footwear - Slippers (S), Canvas Shoes (C), Leather Shoes (L) and Joggers (J). The following information is known regarding the cost prices and selling prices of these four types of footwear:

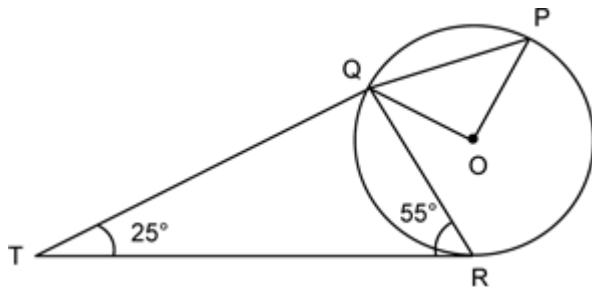
- (i) L sells for Rs.500 less than J, which costs Rs.300 more than S, which, in turn, sells for Rs.200 more than L.
- (ii) L costs Rs.300 less than C, which sells for Rs.100 more than S,

which, in turn, costs Rs.100 less than C.

If it is known that Balram never sells any item at a loss, then which of the following is true regarding the profit percentages earned by Balram on the items L, S, C and J represented by l , s , c and j respectively?

- (1) $l \geq c \geq s \geq j$
- (2) $c \geq s \geq l \geq j$
- (3) $l \geq s \geq c \geq j$
- (4) $s \geq l \geq j \geq c$

5. In the figure below, P, Q and R are points on a circle with centre O. The tangent to the circle at R intersects secant PQ at T. If $\angle QRT = 55^\circ$ and $\angle QTR = 25^\circ$, find $\angle POQ$.



- (1) 110°
- (2) 100°
- (3) 90°
- (4) 50°

6. A sequence of 4 digits, when considered as a number in base 10 is four times the number it represents in base 6. What is the sum of the digits of the sequence?

- (1) 7
- (2) 6
- (3) 9
- (4) 8

7. Some friends planned to contribute equally to jointly buy a CD player. However, two of them decided to withdraw at the last minute. As a result, each of the others had to shell out one rupee more than what they had planned for. If the price (in Rs.) of the CD player is an integer between 1000 and 1100, find the number of friends who actually contributed?

- (1) 21
- (2) 23
- (3) 44
- (4) 46

DIRECTIONS for questions 8 and 9: Answer the questions on the basis of the information given below.

A robot is designed to move in a peculiar way and it can be set in motion by a microprocessor program. The program can be initiated by assigning a positive rational value to its variable n . The program directs the robot to move in the following way. As soon as the program is started, the robot starts from the point O, moves $2n$ metres northward and changes its direction by n° to the right. It then moves $2n$ metres forward and again changes its direction by n° to the right and continues in this manner till it reaches the starting point O, or till it covers a total distance of 1000 m, whichever happens first, and then it stops.

8. I assigned a value for n and started the program. If the robot finally came back to O and stopped, what is the total distance that it has covered?

- (1) 180 m
- (2) 360 m
- (3) 720 m
- (4) Cannot be determined

9. For how many values of n in the intervals $[1, 60]$ does the robot cover less than 1000 m, before it stops?

- (1) 19
- (2) 60
- (3) 355
- (4) Infinite

DIRECTIONS for questions 10 to 20: Answer the questions independently of each other.

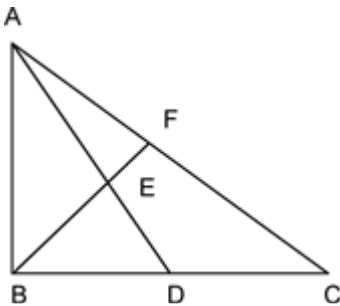
10. If $N = 888\dots$ up to 100 digits, what is the remainder when N is divided by 625?

- (1) 128
- (2) 138
- (3) 338
- (4) 388

11. If $[\log_{10}1] + [\log_{10}2] + [\log_{10}3] + [\log_{10}4] + \dots + [\log_{10}n] = n$, where $[x]$ denotes the greatest integer less than or equal to x , then

- (1) $96 \leq n < 104$
- (2) $104 \leq n < 107$
- (3) $107 \leq n < 111$
- (4) $111 \leq n < 116$

12. In the figure below, $BD = 8$ cm and $DC = 6$ cm. $AE : ED = 3 : 4$. If $AF = 12$ cm, find AC (in cm).



- (1) 28
- (2) 38
- (3) 44
- (4) 40

13. A regular polygon has an even number of sides. If the product of the length of its side and the distance between two opposite sides is $\frac{1}{4}$ th of its area, find the number of sides it has.

- (1) 6
- (2) 8
- (3) 20
- (4) 16

14. There are three cities A, B and C, not on the same straight road. Two buses P and Q start simultaneously from A and B respectively towards C. By the time Q reaches C, P is exactly halfway to C. Immediately after Q reaches C, it starts travelling towards A and it

crosses P at a point 165 km from A. The ratio of the speeds of P and Q is 3 : 5. Assume that the roads joining A to C, B to C and B to A are all straight roads. If B is twice as far as from A as it is from C

and P would take to cover the distance from A to B, how much time would Q take to cover the distance from C to A?

- (1) $2\frac{2}{5}$ hours
- (2) 3 hours
- (3) $3\frac{3}{5}$ hours
- (4) 4 hours

15. Two positive real numbers, a and b , are expressed as the sum of m positive real numbers and n positive real numbers respectively as follows:

$$a = s_1 + s_2 + \dots + s_m \text{ and}$$

$$b = t_1 + t_2 + \dots + t_n$$

If $[a] = [s_1] + [s_2] + \dots + [s_m] + 4$ and $[b] = [t_1] + [t_2] + \dots + [t_n] + 3$, where $[x]$ denotes the greatest integer less than or equal to x , what is the minimum possible value of $m + n$?

- (1) 6
- (2) 10
- (3) 8
- (4) 9

16. Consider two figures A and D that are defined in the co-ordinate plane. Each figure represents the graph of a certain function, as defined below :

$$\text{A: } |x| - |y| = a$$

$$\text{D: } |y| = d$$

If the area enclosed by A and D is 0, which of the following is a possible value of (a, d) ?

- (1) (2, 1)
- (2) (-2, 1)
- (3) (-2, 3)
- (4) (2, 3)

17. A natural number n is such that $120 \leq n \leq 240$. If HCF of n and 240 is 1, how many values of n are possible?

- (1) 24
- (2) 32
- (3) 36
- (4) 40

18. If $S = \frac{2}{10} + \frac{6}{10^2} + \frac{12}{10^3} + \frac{20}{10^4} + \frac{30}{10^5} + \frac{42}{10^6} + \dots$, find the value of S ?

- (1) 24/90
- (2) 242/900
- (3) 245/900
- (4) 200/729

19. If the sum to infinity of the series $2 + (2 - d)2/3 + (2 + d)4/9 + (2 + 3d)8/27 + \dots$ is $5/2$, what is the value of d ?

- (1) 7/12
- (2) -7/12
- (3) -5/12
- (4) 5/12

20. The first n natural numbers, 1 to n , have to be arranged in a row from left to right. The n numbers are arranged such that there are an odd number of numbers between any two even numbers as well as between any two odd numbers. If the number of ways in which this can be done is 72, then find the value of n .

- (1) 6
- (2) 7
- (3) 8
- (4) More than 8

Logical & Data Interpretation

DIRECTIONS for questions 21 to 23: Answer the questions on the basis of the information given below.

After facing yet another World Cup debacle, the Board of Cricket Control in India (BCCI) is in search of a new coach for the team. It shortlisted five persons - Anshuman, Buchanen, John, Whatmore and Chappel. Each of them is from a different country among Australia, India, Japan, Pakistan and Canada, not necessarily in that order. At present, each of them is coaching the team of a different country among Australia, Bangladesh, China, Wales and Bermuda, not necessarily in that order. The following details were also observed about their particulars:

- (i) For any person, each of his three particulars - his name, the name of the country from which he is and the name of the country that he is coaching at present, starts with a different letter.
- (ii) Whatmore is coaching Australia and John is from neither Australia nor Pakistan.
- (iii) Buchanen is not coaching China and the person who is coaching Bermuda is from Canada.
- (iv) Anshuman is neither from Canada nor from Pakistan and also the person from Pakistan is coaching Bangladesh.

21. Whatmore is from which country?

- (1) India
- (2) Japan
- (3) Canada
- (4) Cannot be determined

22. Who is the person from Australia?

- (1) Buchanen
- (2) John
- (3) Whatmore
- (4) Cannot be determined

23. The person from Japan is definitely not coaching

- (1) China.

- (2) Wales.
- (3) Australia.
- (4) More than one of the above

DIRECTIONS for questions 24 to 27: Answer the questions on the basis of the information given below.

Mr Suzuki, a car dealer, sold cars of only two brands, A and B, in the previous year. This year, he introduced a new brand, C. The number of cars of brand A and brand B sold in the previous year were in the ratio 3 : 2, and the ratio of the number of cars sold in the previous year to that sold in this year is 2 : 3 for brand A and 2 : 5 for brand B. Further, the number of cars of brand C sold this year forms 81% of the total number of cars sold this year.

24. Find the number of cars of brand C sold this year, given that a total of 24 cars of brand A were sold in the previous year.

- (1) 324
- (2) 648
- (3) 162
- (4) 243

25. What is the percentage increase in the total number of cars sold this year when compared to the total number of cars sold in the previous year?

- (1) 400%
- (2) 600%
- (3) 900%
- (4) 1000%

26. In the next year, Mr.Suzuki wants to increase the total sales by 80%, compared to the total sales this year, by keeping the sales of each of A, B and C at the same level as that in this year and introducing a new brand D. By what percent will the number of cars of brand D (to be sold next year) be more than the total number of cars sold last year?

- (1) 400%
- (2) 600%
- (3) 900%
- (4) 700%

27. If a total of 380 cars were sold this year, and the sales of C this year were nil, instead of 81% of total sales, then how many cars of brand A were sold in the previous year?

- (1) 140
- (2) 120
- (3) 100
- (4) 160

DIRECTIONS for questions 28 and 29: The question given below is followed by two statements, I and II. Study the information given in the two statements and assess whether the statements are sufficient to answer the question and choose the appropriate option from among the choices given below:

28. Two of the three cricketers Pavan, Rajan and Tarun are selected to the national team. Each of these three persons scored a different number of centuries and a different number of runs. Further, among these three, Tarun scored the highest number of centuries. Who among Pavan, Rajan and Tarun is not selected to the national team?

- I. The person with the higher number of runs between Tarun and Pavan, is the person who scored the lesser number of centuries between the two persons selected.**
- II. The person with the least number of runs between Rajan and Tarun, is the person who scored the higher number of centuries between the two persons selected.**

- (1) The question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.
- (2) The question can be answered by using either statement alone.
- (3) The question can be answered by using both statements together, but cannot be answered using either statement alone.
- (4) The question cannot be answered even by using both statements together.

29. Triangle ABC is right angled at B. What is the value of $AB + BC$?

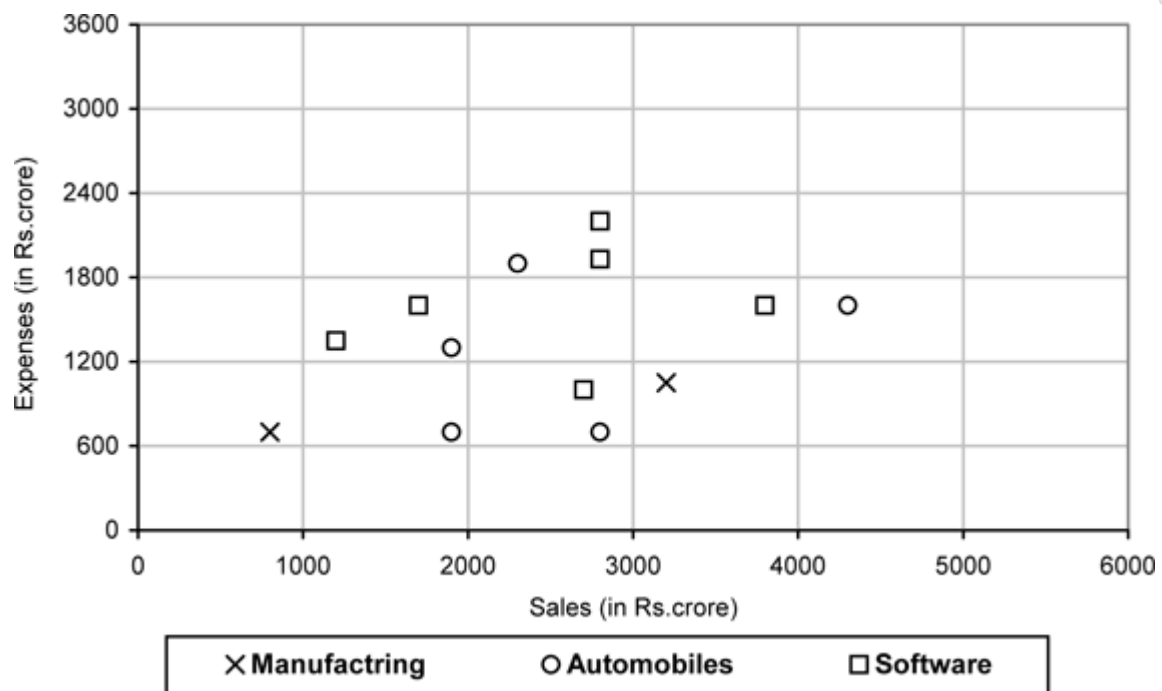
- I. Diameter of the circle inscribed in the triangle ABC is 10 cm.**
- II. Diameter of the circle circumscribing the triangle ABC is 27 cm.**

- (1) The question can be answered by using one of the statements alone, but cannot be answered using the other statement alone.
- (2) The question can be answered by using either statement alone.

- (3) The question can be answered by using both statements together, but cannot be answered using either statement alone.
- (4) The question cannot be answered even by using both statements together.

DIRECTIONS for questions 30 and 31: Answer the questions on the basis of the information given below.

Each point in the graph below shows the sales and expenses of a company. Each company belongs to one of the three sectors among manufacturing, automobiles and software.



30. For how many of the companies, is the profit more than 40% of the sales (Profit = Sales - Expenses)?

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

31. For how many software companies are the sales more than Rs.2500 crore but the expenses less than Rs.2100 crore?

- (1) 2
(2) 3
(3) 4
(4) 6

DIRECTIONS for questions 32 to 35: Answer the questions on the basis of the information given below.

A team must be selected from ten probables - A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and J are forwards, B, G and H are point guards and D, F and I are defenders.

Further the following conditions need to be observed:

- The team must have at least one forward, one point guard and one defender.
- If the team includes J, it must also include F.
- The team must include E or B, but not both.
- If the team includes G, it must also include F.
- The team must include exactly one among C, G and I.
- C and F cannot be members of the same team.
- D and H cannot be members of the same team.
- The team must include both A and D or neither of them.

There is no restriction on the number of members in the team.

32. What could be the size of the team that includes G?

- (1) 4
- (2) 5
- (3) 6
- (4) More than one of the above

33. What would be the size of the largest possible team?

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

34. Who cannot be included in a team of size 6?

- (1) A

- (2) H
- (3) J
- (4) E

35. What can be the size of the team that includes C?

- (1) 3
- (2) 4
- (3) 5
- (4) More than one of the above

DIRECTIONS for questions 36 and 37: The question given below is followed by two statements, I and II. Study the information given in the two statements and assess whether the statements are sufficient to answer the question and choose the appropriate option from among the choices given below:

36. What percentage of the questions were attempted by Ramya in the exam?

- I. 30% of the questions are attempted by both Ramya and Swathi.**
- II. The number of questions attempted by Ramya but not by Swathi is $(5/8)$ th of the total number of questions attempted by Ramya.**

- (1) The question can be answered by using one of the statements alone but not by the other.
- (2) The question can be answered by using either statement alone.
- (3) The question can be answered by using both the statements together, but cannot be answered by using either statement alone.
- (4) The question cannot be answered even by using both the statements together.

37. Each of Ankit and Bhanu belong to one of the tribes between truth tellers i.e., those who always speak the truth, and liars i.e., those who always lie. Do both of them belong to the same tribe?

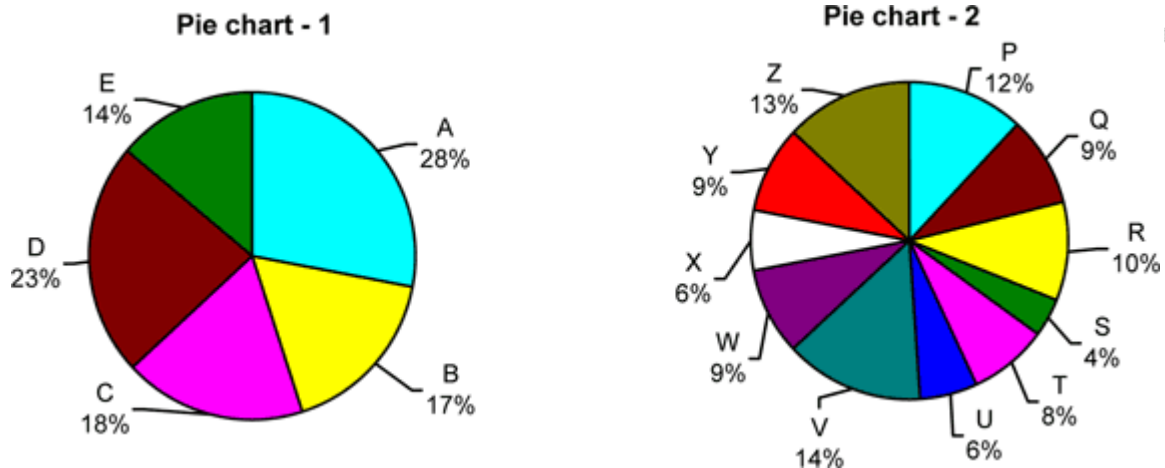
- I. Ankit : I am a liar, only if Bhanu is a truth teller.**
- II. Bhanu : I am a truth teller, only if Ankit is a liar.**

- (1) The question can be answered by using one of the statements alone but not by the other.
- (2) The question can be answered by using either statement alone.
- (3) The question can be answered by using both the statements together, but cannot be answered by using either statement alone.

(4) The question cannot be answered even by using both the statements together.

DIRECTIONS for questions 38 to 40: Answer the questions on the basis of the information given below.

Pie chart - 1 gives the percentage shares of all the five cement companies - A, B, C, D and E - in the total quantity of cement sold in country XYZ. Pie chart - 2 gives the percentage shares of all the eleven states - P through Z - in the total quantity of cement sold in the country.



The *market share* of any company in a state is the total quantity of cement sold by the company in that state as a percentage of the total quantity of cement sold in that state.

38. In any state, if no company had more than 50% *market share*, then in at least how many states did company A sell cement?

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

39. If in all the states in which company E was present, it had a *market share* of at least 25%, in at most how many states did company E sell cement?

- (1) 9
- (2) 8
- (3) 7
- (4) 6

40. The number of companies which had sales in more than two states, is at least

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

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Verbal Ability

DIRECTIONS for question 41: The following question has a set of five sequentially ordered statements. Each statement can be classified as one of the following.

- **Facts**, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- **Inferences**, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- **Judgements**, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J').

Select the answer option that best describes the set of statements.

41. (A) The renewed corporate interest in power is welcome, given the huge investment backlog in the vexed sector and the routine revenue leakages.
- (B) Reportedly, industrial houses like Reliance Industries and the Aditya Birla Group are keen to foray into power equipment manufacture.
- (C) In tandem, we need proactive policy to wipe out continuing losses of state power utilities, and regular disclosure of SEB finances.
- (D) Of late, the tendency has been to clamp up on the huge annual losses of power utilities - the latest Economic Survey like the previous one is mum on losses, subsidies and plain theft of power; instead we have some pious intentions to gather 'baseline data' and use information technology application for accounting and auditing power distribution.
- (E) We do need to step up IT for meter reading, billing and collections, of course, but in parallel, what is essential indeed vital, is improved governance in power delivery and follow through.

- (1) JFIFJ
- (2) IJFJJ
- (3) FJJIF
- (4) JFJIJ

DIRECTIONS for questions 42 and 43: In each question, four different ways of presenting an idea are given. Choose the one that conforms most closely to standard English usage.

- 42. (A) The inflexibility of the laws, which prevent them from being adapted for emergencies, may in certain cases render them pernicious and thereby cause the ruin of the state in a time of crisis.**
(B) The inflexibility of the laws, which prevents them from being adapted for emergencies may in certain cases render them pernicious, thereby causes the ruin of the state in a time of crisis.
(C) The inflexibility of the laws, which prevents them from being adapted to emergencies, may in certain cases render them pernicious, and thereby cause the ruin of the state in a time of crisis.
(D) The inflexibility of the laws, which prevents them from being adapted for emergencies may in certain cases render them pernicious, and thereby causing the ruin of the state in a time of crisis.

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

- 43. (A) Human talents vary considerably, within a fixed framework that is characteristic of the species, and that permits ample scope for creative work, including the creative work of appreciating the achievements of others.**
(B) Human talents vary considerably within a fixed framework that is characteristic to the species, and which permits ample scope for creative work, including the creative work of appreciating the achievements of others.
(C) Human talents vary considerably, within a fixed framework that is characteristic for the species, and that permits ample scope for creative work, including the creative work of appreciating achievements of others.
(D) Human talents vary considerably, within a fixed framework that is characteristic of the species, and which permits ample scope for creative work, including the creative work of appreciating achievements of others.

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

DIRECTIONS for question 44: In the following question, there are five sentences/paragraphs. The sentence/ paragraph labelled A is in its correct place. The four that follow are labelled B, C, D and E, and

need to be arranged in the logical order to form a coherent paragraph/ passage. From the given options, choose the most appropriate option.

44. (A) The driving force of the 'nuclear renaissance' is a claim that nuclear power, once up and running, is a carbon-free energy source. The assertion is that a functioning nuclear reactor creates no greenhouse gases and thus contributes nothing to global warming or chaotic weather.
- (B) The frequently repeated notion that nuclear power is a carbon-free energy source is simply untrue.
- (C) At every stage of the cycle greenhouse gases are released into the atmosphere from burning diesel, manufacturing steel and cement and, in the circumpolar regions of the planet, by disturbance of the tundra which releases large amounts of methane, a particularly potent greenhouse gas.
- (D) That part is almost true, but the claim ignores the total environmental impact of nuclear energy, which includes a long and complicated chain of events known in the industry as the 'nuclear cycle' which begins with finding, mining, milling and enriching uranium, then spans through plant construction and power generation to the reprocessing and eventual storage of nuclear waste, all of which creates tons of CO₂.
- (E) Even the claim that a functioning nuclear power facility is co₂-free is challenged by the fact that operating plant requires an external power source to run, and that electricity is almost certain to come from a fossil-fuelled plant.

- (1) DCEB
(2) EBCD
(3) DEBC
(4) EDCB

DIRECTIONS for questions 45 and 46: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

45. Jawaharlal Nehru seemed an unlikely candidate to lead India towards its vision. Under the cotton Khadi he wore in deference to the dictates of Congress, he remained the quintessential English gentleman. In a land of mysteries, he was a cool rationalist. The mind that had exulted in the discovery of science at Cambridge never ceased to be appalled by his fellow Indians who refused to stir from their homes on days proclaimed inauspicious by their favourite

astrologers. He was a publicly declared agnostic in the most intensely spiritual area in the world, and he never ceased to proclaim the horror the word 'religion' inspired in him. Nehru despised India's priests, her sadhus, her chanting monks and pious 'skerkhs'.

- (1) And yet, the India of those sadhus and the superstition-haunted masses had accepted Nehru.
- (2) They had only served, he felt, to impede her progress.
- (3) The Mahatma had made it clear that it was on his shoulders that he wished his mantle to fall.
- (4) Nehru's heart told him to follow the Mahatma and his heart, he would later admit, had been right.

46. Birth rates have fallen dramatically - and voluntarily. Coercive birth control, including paying people not to have babies, was discredited and abandoned decades ago. Nearly two-thirds of the couples in poor countries now use birth control, and not because some patriarchal westerner told them to. In the 1970s, the government of Bangladesh offered people in the Matlals region low-cost contraceptive supplies and advice. Birth rates promptly fell well below those of neighbouring regions. So Bangladesh extended the service nationally and its birth rate plummeted from six children per woman to three.

- (1) The 'population bomb' has already gone off.
- (2) Given the choice, people want fewer children.
- (3) Governments want fewer children since their own life expectancy falls with rising numbers.
- (4) Even when birth rates fall, there is a lag which means population keeps growing far decades until birth and death rates even out.

DIRECTIONS for questions 47 and 48: In each question, there are five sentences. Each sentence has pairs of words/phrases that are italicised and highlighted. From the italicised and highlighted word(s)/phrase(s), select the most appropriate word(s)/phrase(s) to form correct sentences. Then, from the options given, choose the best one.

- 47. (i) The municipal *councillor* (A) / *counsellor* (B) promised to improve civic amenities in the suburbs.**
(ii) Jean's *adopted* (A) / *adoptive* (B) parents dote on her and cater to her every whim.
(iii) The *venal* (A) / *venial* (B) official was caught red - handed accepting bribe.

- (iv) We have now shifted our residence *farther* (A) / *further* (B) away from the main city.
(v) She claims to be of aristocratic *dissent* (A) / *descent* (B).

- (1) AAABB
(2) BBABB
(3) ABBAB
(4) ABAAB

48. (i) While evacuating people from the flood ravaged areas *precedence* (A) / *precedent* (B) was given to women and children.
(ii) The best way to reach the summit is by trekking up the hill, *alternately* (A) / *alternatively* (B) you can go on horse back
(iii) His impeccable manners perfectly *complimented* (A) / *complemented* (B) his polished looks and fashionable attire.
(iv) There has been a *noticeable* (A) / *notable* (B) improvement in Tarun's academic performance lately.
(v) You must be *discreet* (A) / *discrete* (B) about your plans

- (1) AABAB
(2) ABBBB
(3) BABAA
(4) ABBA

DIRECTIONS for questions 49 and 50: In each of the following questions, the word at the top is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

49. PULL

- (1) Pull aside the curtains and let in some fresh air.
(2) I decided to pull away from the venture due to differences of opinion with my partners.
(3) Being a charismatic leader that he is, he can certainly pull the crowds.
(4) The municipal corporation has decided to pull down all illegal constructions in the city.

50. SHADE

- (1) Nina's bedroom was painted in a soft shade of pink.
(2) Abdul is a dubious character who is suspected of being involved in

several shady deals.

(3) The weary traveller rested for a while in the shade of a tree.

(4) The people in the strife torn region have been living in the shade of fear for several years.

DIRECTIONS for questions 51 to 54: Read the following passage and answer the questions that follow it.

Organic food is a two-billion pound industry grown fat on the back of celebrity endorsement and a well-heeled middle class seduced by claims that it is good for health. Prince Charles is one of its most enthusiastic and pro-active promoters. Not content with simply consuming it, he has his own lucrative line in overpriced organic products including biscuits which taste more like chalk.

But now questions are being raised about some of the basic assumptions that have contributed to the popularity of organic food and the phenomenal growth of this sector in the past decade. People are asking: is organic food really worth the price which is often three times more than that of normal food?

This follows new research by a group of British scientists who found that organic food offered no extra benefit over the ordinary cheaper foodstuff. In a controversial report, experts from the London School of Hygiene and Tropical Medicine say there is no evidence that organic food is more nutritional or healthier than food produced using fertilizers. For example, the expensive free-range chicken (sold as a "premium" product) has the same nutritional value as the factory-farmed chicken; and similarly, there is no difference between organic and non-organic vegetables or dairy produce.

The research, based on data published over the past 50 years and said to be the most comprehensive review ever of the relative benefits of organic food, strikes at the very heart of what has been portrayed by campaigners as its USP - that it is healthier than conventional food and therefore worth paying a "bit "extra.

Dr. Alan Dangour, who led the study, was unambiguous in rejecting claims made for organic food. "Looking at all of the studies published in the last 50 years, we have concluded that there's no good evidence that consumption of organic food is beneficial to health based on the nutrient content," he said.

The report, commissioned by the government's Food Standards Agency and published in the *American Journal of Clinical Nutrition*, concluded that "organically and conventionally produced crops and

livestock products are broadly comparable in their nutrient content." A "small number of differences" were noted but these were "unlikely to be of any public health relevance."

In a pointed reference to the hype over the supposed benefits of organic food, the FSA said the research was aimed at helping people make "informed choices" about what they ate. In other words, it was concerned that the high-profile campaign for organic food, dressed up as an ethical issue, was preventing people from making "informed choices" and they were being sold things on false premises.

"Ensuring people have accurate information is absolutely essential in allowing us all to more informed choices about the food we eat. This study does not mean that people should not eat organic food. What it shows is that there is little, if any, nutritional difference between organic and conventionally produced food and that there is no evidence of additional health benefits from eating organic food," said Gill Fine, FSA's Director of Consumer Choice and Dietary Health.

In the organic food circles, the report has caused fury with campaigners alleging that it is all part of a "cancerous conspiracy" to defame the organic food movement. Newspapers have been full of angry letters denouncing the report as "selective," "misleading" and "limited."

The Soil Association, which campaigns for "planet-friendly organic food and farming," is furious that the research crucially ignored the presence of higher pesticide residues in conventional food. Some have defended organic food arguing that it is not about health alone but also involves wider environmental and social issues.

However, even those who agree that the report may be "flawed" in some respects believe that it is an important contribution to the debate on organic food.

"Yet the report - for all its alleged flaws - is an important one. For a start, it is certainly not the work of dogmatic and intractably hostile opponents of the cause... In fact, it raises key global issues... After all, if organic food is no more beneficial in terms of nutrition than other, standard foodstuffs, why should we pay excessive price to eat the stuff? Why devote more land to its production," asked Robin McKie, Science Editor of *The Observer*.

There is also a view that the fad for organic food is a bit of a class thing - something to do with the idea that if something is expensive it is also good. So, a Marks & Spencer cheese sandwich is supposed to taste better than a similar sandwich at Subway next

door; *everything* at Harrods is out of this world; and similarly you don't know what you are missing if organic food is not your preferred choice. There is said to be a whiff of snobbery about buying into an expensive lifestyle choice. Will science bring them down to earth?

51. All of the following are the author's views on organic food EXCEPT

- (1) It is insipid
- (2) It is very costly
- (3) It is not more nutritious than conventional food
- (4) It is patronized by the rich.

52. Which of the following factors/aspects, related to organic food, has the result of the FSA study primarily called into question?

- (1) The nutritional value
- (2) The health benefits
- (3) The celebrity endorsement
- (4) The presence of pesticides

53. According to the passage, defenders of organic food are of the opinion that the FSA study

- (1) is not representative and scientific.
- (2) has been promoted by those who have vested interest in conventional food.
- (3) is flawed and has been projected as an ethical issue.
- (4) is not balanced and has not taken a comprehensive view of the issue.

54. In this passage, the author essentially

- (1) analyses the pros and cons of promoting organic food.
- (2) debunks the findings of a study on organic food.
- (3) reports the findings of a research on organic food and checks the veracity of its claim.
- (4) discusses the debate which has followed the findings of a study on organic food.

DIRECTIONS for questions 55 to 57: Read the following passage and answer the questions that follow it.

Some artists go out in a blaze of glory. Pierre-Auguste Renoir went out in a blaze of kitsch. At least, that's the received opinion about the work of his final decades: all those pillowy nudes, sunning their abundant selves in dappled glades; all those peachy girls, strumming guitars and idling in bourgeois parlors; all that pink. In the long twilight of his career, the old man found his way to a kissable classicism that modern eyes can find awfully hard to take.

All the same, the Renoir of this period - the three very productive decades before his death in 1919 at the age of 78 - fascinated some of the chief figures of modernism. Picasso was on board; his thick-limbed 'neoclassical' women from the 1920 are indebted to Renoir. So was Matisse, who had one eye on Renoir's Orientalist dress-up fantasies like the Concert, with its flattened space and overall patterning, when he produced his odalisques. Given that so much of late Renoir seems saccharine and semi comical to us, is it still possible to see what made it modern to them?

Yes and no. To understand the Renoir in the 20th Century you have to remember that before he became a semiclassicalist, he was a consummate Impressionist. You need to picture him in 1874, 33 years old, painting side by side with Monet in Argenteuil, teasing out the new possibilities of sketchy brushwork to capture fleeting light as it fell across people and things in an indisputably modern world.

But in the decade that followed, Renoir became one of the movement's first apostates. Impressionism affected many people in the 19th century in much the way the internet does now. It both charmed and unnerved them. It brought to painting a novel immediacy, but it also gave back a world that felt weightless and unstable. What we now call post - Impressionism was the inevitable by-product of that anxiety. Artists like Seurat and Gauguin searched for an art that owed nothing to the stale models of academicism but possessed the substance and authority that Impressionism had let fall away.

For Renoir, a turning point came during his honeymoon to Rome and Naples in 1881. Face to face with the firm outlines of Raphael and the musculature of Michelangelo, he lost faith in his flickering sunbeams. He returned to France determined to find his way to lucid, distinct forms in an art that reached for the eternal, not the momentary. By the later years of that decade, Renoir had lost his taste for the modern world anyway. As for modern women, in 1888 he could write, "I consider that women who are authors, lawyers and politicians are monsters". ("The woman who is an artist," he added graciously, "is merely ridiculous.")

Ah, but the woman who is a goddess - or at least harks back to one - that's different matter. It would be Renoir's aim to reconfigure the female nude in a way that would convey the spirit of the classical world without classical trappings. Set in "timeless" outdoor settings, these women by their weight and scale and serenity alone - along with their often recognizably classical poses - would point back to antiquity.

For a time, Renior worked with figures so strongly outlined that they could have been put down by Ingres with a jackhammer. By 1892, he had drifted back toward a fluctuating impressionist brushstroke. Firmly contoured or flickering, his softly scalped women are as full-bodied as Doric columns. This was one of the qualities that caught Picasso's eye, especially after his first trip to Italy, in 1917. He would assimilate Renoir along-side his own sources in Iberian sculpture and elsewhere to come up with a frankly more powerful, even haunting, amalgam of the antique and the modern in paintings like Woman in a White Hat.

Renior was most valuable as a stepping - stone for artists making more potent use of the ideas he was developing. The heart of the problem is the challenge. Renoir set for himself: to reconcile classical and Renaissance models with the 18th century French painters he loved. To synthesize the force and clarity of classicism with the intimacy and charm of the Rococo is a nearly impossible trick. How do you cross the power of Phidias with the delicacy of Fragonard? The answer: at your own risk - especially the risk of admitting into your work the weaknesses of the Rococo. It's fine line between charming and insipid, and 18th century French painters crossed it all the time. So did Renoir.

55. All of the following are true in light of the passage EXCEPT.

- (1) Fragonard is an 18th century artist.
- (2) Picasso combined classicism and modernism in "Woman in a white Hat".
- (3) Renoir was a semi - Classicist, who became an Impressionist.
- (4) Gauguin suffered from post - Impressionism anxiety.

56. We can infer from the passage that the word 'odalisques' means

- (1) pillars
- (2) landscapes
- (3) figures
- (4) women

57. The passage suggests that

- (1) Renoir was greatly misunderstood in his lifetime.
- (2) Classicism and modernism don't go together.
- (3) Renoir's later work appealed to modern tastes.
- (4) Renoir's artistic appeal waned in the twilight of his career.

DIRECTIONS for questions 58 to 60: Read the following passage and answer the questions that follow it.

Humans have a basic need to perceive themselves as part of a grand scheme, of a natural order that has a deeper significance and greater endurance than the petty affairs of daily life. The incongruous mismatch between the futility of the human condition and the brooding majesty of the cosmos compels people to seek a transcendent meaning to underpin their fragile existence.

For thousands of years this broader context was provided by tribal mythology and storytelling. The transporting qualities of those narratives gave human beings a crucial spiritual anchor. All cultures lay claim to haunting myths of other-worldliness: from the dreaming of the Australian Aborigines or the Chronicles of Narnia, from the Nirvana of Buddhism to the Christian Kingdom of Heaven. Over time, the humble campfire stories morphed into the splendour and ritual of organized religion and the great works of drama and literature.

Even in our secular age, where many societies have evolved to a post-religious phase, people still have unfulfilled spiritual yearnings. A project with the scope and profundity of SETI (search for extra-terrestrial intelligence) cannot be divorced from this wider cultural context, for it too offers us the compelling promise that this could happen any day soon. As writer David Brin has pointed out, 'contact with advanced alien civilizations may carry much the same transcendental or hopeful significance as any more traditional notion of "salvation from above". I have argued that if we did make contact with an advanced extraterrestrial community, the entities with which we would be dealing would approach godlike status in our eyes. Certainly they would be more godlike than humanlike; indeed, their powers would be greater than those attributed to most gods in human history.'

So is SETI itself in danger of becoming a latter day religion? Science fiction writer Michael Crichton thought so. He said: "Faith is defined as the firm belief in something for which there is no proof," he explained. "The belief that there are other life forms in the universe

is a matter of faith. There is not a single shred of evidence for any other life forms, and in forty years of searching, none has been discovered." Writer Margaret Wertheim has studied how the concept of space and its inhabitants has evolved over several centuries. She traces the modern notion of aliens to Renaissance writers such as the Roman Catholic Cardinal Nichols of Cusa, who considered the status of man in the universe in relation to celestial beings such as angels.

With the arrival of the scientific age, speculations about alien beings passed from theologians to science fiction writers, but the spiritual dimension remained just below the surface. Occasionally it is made explicit, as in Olaf Stapledon's *Star Maker*, David Lindsay's *A Voyage to Arcturus*, or Steven Spielberg's *Close Encounters of the Third Kind*, which is strongly reminiscent of John Bunyan's *A Pilgrim's Progress*. These are iconic images that resonate deeply with the human psyche, and shadow the scientific quest to discover intelligent life beyond Earth...

58. It can be inferred from the passage that, 'Close Encounters of the Third Kind'

- (1) is a modern, scientific version of John Bunyan's *Pilgrim's Progress*.
- (2) explores the spiritual unknown in the scientific quest to discover the extraterrestrial.
- (3) is the work of a theologian-turned science fictionist.
- (4) speculates on intelligent life in outer space and reflects vivid spiritual overtones.

59. Which of the following statements reflects or captures the author's view on the search for extraterrestrial intelligence?

- (1) It is a vain attempt by man to underpin his fragile existence.
- (2) It is in danger of becoming a latter day religion.
- (3) Were the search to yield positive results, man would accord those creatures super god status.
- (4) The belief that there are aliens in the universe springs from enormous faith and the pursuit reflects man's spiritual urge.

60. Great literary works, according to the passage

- (1) had their origins in the spiritual age.
- (2) evolved from tribal tales.
- (3) were a product of the Renaissance.
- (4) dwelt on the spiritual.

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SOLUTIONS

Quantitative Ability

1. Let the cost of pencil, eraser and sharpener (in rupees) be p , e , s respectively.

$$2p + 5e + 7s = 30 \text{ ---(1)}$$

$$3p - 6e + 5s = 15 \text{ ---(2)}$$

We need the value of the following expression

$$E = -6p + 39e + s$$

We assume that by multiplying equation (1) by x and equation (2) by y and adding we get the equation E. By considering the coefficients of only p and e , we get

$$2x + 3y = -6$$

$$\text{and } 5x - 6y = 39$$

$$\text{This gives } x = \frac{(6)(-6) - 3(39)}{(2)(-6) - (5)(3)} = \frac{36 - 117}{-12 - 15} = \frac{-81}{-27} = 3 \text{ and } \therefore y = -4$$

[Note: Observe that the coefficients of s also combine in the same way to match the coefficient of s in E i.e., $3(7) - 4(5) = 1$].

$$\therefore E = 3(30) - 4(15) = 30$$

Choice (2)

2. $(x + 1)(x + 9) + 8 = 0$
 $x^2 + 10x + 17 = 0$

The roots of the equation are a and b

$$\therefore a + b = -10$$

$$ab = 17$$

$$(x + a)(x + b) - 8 = 0$$

$$x^2 + (a + b)x + ab - 8 = 0$$

$$x^2 - 10x + 9 = 0$$

Therefore, roots of $(x + a)(x + b) - 8 = 0$ are 1 and 9. Choice (1)

3. Consider 7^4 , whose value is 2401

$$\therefore 7^{700} = (7^4)^{175} = (2401)^{175}$$

Any power of 2401 will end with 1 as the units digit and 0 as the tens digit.

\therefore When it is divided by 100, the remainder is 1. Choice (1)

4. Tabulating the given information

Cost price	item	selling price
y	S	$x - 300$
$y + 100$	C	$x - 200$
$y - 200$	L	$x - 500$
$y + 300$	J	X

To compare the profit percentages, we can compare $\frac{SP}{CP}$.

$$\frac{x - 300}{y}, \frac{x - 200}{y + 100}, \frac{x - 500}{y - 200}, \frac{x}{y + 300}$$

It can be observed that the above fractions can be written as

$$\frac{a}{b}, \frac{a + 100}{b + 100}, \frac{a - 200}{b - 200}, \frac{a + 300}{b + 300}$$

where $a = x - 300$, $b = y$

Now since no item sells at a loss, and given the identity that $\frac{m}{n} > \frac{m + k}{n + k}$ whenever

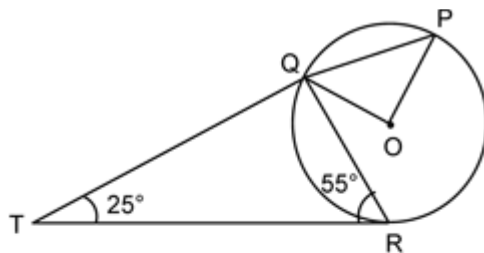
$\frac{m}{n} \geq 1$, and k is a +ve quantity, the above ratios can be rearranged as

$$\frac{a - 200}{b - 200} \geq \frac{a}{b} \geq \frac{a + 100}{b + 100} \geq \frac{a + 300}{b + 300}$$

$$\Rightarrow l \geq s \geq c \geq j.$$

Choice (3)

5.



In ΔQTR ,

$$\angle QTR + \angle QRT + \angle RQT = 180^\circ.$$

$$\angle RQT = 180^\circ - (55^\circ + 25^\circ) = 100^\circ$$

$\angle ORT = 90^\circ$. (TR is a tangent to the circle at R)

$$\angle QRT + \angle ORQ = 90^\circ$$

$$\angle ORQ = 90^\circ - 55^\circ = 35^\circ.$$

$OQ = OR$

$$\therefore \angle OQR = \angle ORQ = 35^\circ.$$

$\angle RQT + \angle PQR = 180^\circ$ (PQT is a straight line)

$$100^\circ + 35^\circ + \angle PQR = 180^\circ$$

$$\angle PQR = 45^\circ$$

In ΔOQP , $OQ = OP$

$$\therefore \angle OPQ = \angle PQR = 45^\circ$$

$$\therefore \angle POQ = 90^\circ$$

Choice (3)

6. Let the 4-digit sequence be $abcd$.
 In base 6, this represents $216a + 36b + 6c + d$ and each of a, b, c, d is less than 6.
 In base 10, it represents $1000a + 100b + 10c + d$.
 Given $4(216a + 36b + 6c + d) = 1000a + 100b + 10c + d$
 $\Rightarrow 136a = 44b + 14c + 3d$ ----- (A)
 By trial $a = 1, b = 2, c = 3, d = 2$
 If $a = 2$, the LHS = 272
 [If we consider $b = 5$, we need $272 - 220$ or 52 from $14c + 3d$ (c, d) = (2, 8) but 8 is not a proper digit in base 6.
 If $a = 3$, the LHS = 408, while $44b + 14c + 3d$ can at the most be $(44 + 14 + 3)5$ or 305.
 \therefore There are no other possible values that satisfy (A)]
 $\therefore abcd = 1232$ and $a + b + c + d = 8$ Choice (4)

7. Let the number of friends initially be n and let the contribution of each be x .
 Given $nx = (n - 2)(x + 1) = nx - 2x + n - 2$
 $\Rightarrow n = 2(x + 1)$
 We tabulate the possible values of x, n and nx below.

x	n	nx
21	44	920
22	46	1012
23	48	1104
24	50	1200

As $1000 < nx < 1100$, $(x, n) = (22, 46)$ i.e. $n = 46$.
 Hence, number of friends who actually contributed = $n - 2 = 44$ Choice (3)

8. If n is a factor of 360, then according to the pattern of movement followed by the robot, it will cover a regular polygon of an external angle of n° and number of sides = $\frac{360}{n}$.
 The length of each side will be $2n$ metres. Hence the robot will come back to O in this case. However, if n is not a factor of 360° , then the robot will not come back to O, but will continue moving till it covers 1000 metres and then stop.
 Note: The robot may come back to O for other values of n , which are not factors of 360° but are factors of $720^\circ, 1080^\circ$...etc. However, in such cases the distance required to be covered before reaching O will be greater than 1000 m.

Since the robot came back to O, n must be a factor of 360° and also the total distance covered = (number of sides of the regular polygon) \times (length of each side) = $\frac{360}{n} \times 2n = 720$ m Choice (3)

Note that the distance is independent of N.

9. If n is a factor of 360, then according to the pattern of movement followed by the robot, it will cover a regular polygon of an external angle of n° and number of sides = $\frac{360}{n}$.

The length of each side will be $2n$ metres. Hence the robot will come back to O in this case. However, if n is not a factor of 360° , then the robot will not come back to O, but will continue moving till it covers 1000 metres and then stop.

Note: The robot may come back to O for other values of n , which are not factors of 360° but are factors of 720° , 1080° ...etc. However, in such cases the distance required to be covered before reaching O will be greater than 1000 m.

If the robot covered less than 1000 m, then it must have come back to O. The factors of 360 in the range $[1, 60]$ are $\frac{360}{1} \Rightarrow 360$ sides to $\frac{360}{60} = 6$ sides. All other rational values of n , for 359 sides, 358 sides and so on till 6 sides are possible. Hence a total of $(360 - 6) + 1 = 355$ values are possible. Choice (3)

10. Rem $[N/625]$

$$= \text{Rem} \left[\frac{\text{the number formed by the last four digits}}{625} \right]$$

$$= \text{Rem} \left[\frac{8888}{625} \right] = \text{Rem} \left[\frac{14 \times 625 + 138}{625} \right] = 138 \quad \text{Choice (2)}$$

11. $[\log_{10}x] = 0$, for any value of $x \in \{1, 2, \dots, 9\}$, — (1)

Similarly $[\log_{10}x] = 1$, for $x \in \{10, 11, 12, \dots, 99\}$ — (2) and $[\log_{10}x] = 2$, for $x \in \{100, 101, 102, \dots, 999\}$ — (3)

Now consider, $1 \leq n \leq 9$, then

$$[\log_{10}1] + [\log_{10}2] + [\log_{10}3] \dots [\log_{10}n] = 0 \text{ (i.e., } \neq n)$$

Hence the expression given in the question cannot be satisfied.

Now consider, $10 \leq n \leq 99$, then $[\log_{10}1] + [\log_{10}2] \dots [\log_{10}n]$

From (1) and (2), the above expression becomes $(0 + 0 \dots 9 \text{ times}) + (1 + 1 + \dots (n - 9) \text{ times}) = n - 9$

Using the same approach, for

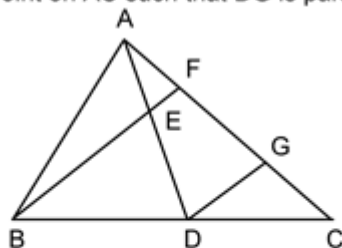
$$100 \leq n \leq 999, [\log_{10}1] + [\log_{10}2] \dots [\log_{10}n] \\ = 90 + 2(n - 99)$$

It can be seen that, only for the third case i.e., $100 \leq n \leq 999$, can the expression given in the question be satisfied.

$$\text{Hence } 90 + 2(n - 99) = n$$

$$\Rightarrow n = 198 - 90 = 108 \quad \text{Choice (3)}$$

12. Let G be a point on AC such that DG is parallel to BF.



$$\frac{AF}{FG} = \frac{AE}{ED} = \frac{3}{4}, \quad \frac{FG}{GC} = \frac{BD}{DC} = \frac{4}{3}$$

$$\therefore AF : FG : GC = 3 : 4 : 3.$$

$$\therefore AC = \frac{10}{3}(AF) = \frac{10}{3}(12) \text{ cm} = 40 \text{ cm} \quad \text{Choice (4)}$$

13. Let the number of sides be $2n$. Let the length of the side be S and the length of the perpendicular from the centre to each side be P . Since the number of sides is even, the opposite sides will be parallel and the distance between any two opposite sides is equal to $2P$.

$$\text{Also, area of the polygon (A)} = 2n \left(\frac{SP}{2} \right) \text{---- (1)}$$

$$\text{Given that } S(2P) = A/4 \text{ or } SP = A/8$$

$$\therefore (1) \Rightarrow A = n(A/8)$$

$$\Rightarrow n = 8 \text{ or } 2n = 16$$

Choice (4)

14. Let $BC = 5k$

Given, by the time Q reaches C , P was halfway to C , i.e., $AC/2 = 3k$ and $AC = 6k$.

As Q met P , 165 km away from A , the distance to the meeting point from A is $3k$

$$+ (3k) \left(\frac{3}{5+3} \right) \text{ i.e., } \frac{33k}{8}$$

$$\text{Given, } \frac{33k}{8} = 165 \Rightarrow k = 40$$

\therefore Distance between A and C is 240 km and that between B and C is 200 km.

From the data, as distance between A and B is twice that between B and C , it is 400 km.

$$\therefore \text{Speed of } P = \frac{400}{\left(6\frac{2}{3}\right)} = 60 \text{ kmph}$$

$$\Rightarrow \text{Speed of } Q = \frac{5}{3}(60) = 100 \text{ kmph}$$

$$\therefore \text{Time taken by } Q \text{ to reach } C \text{ from } A = \frac{240}{100} = 2.4 \text{ hr.}$$

Choice (1)

15. If a positive number a is expressed as the sum of two positive numbers s_1 and s_2 then $[a]$ could be at the most 1 more than $[s_1] + [s_2]$, i.e., the fractional parts of s_1 and s_2 together, can provide at most 1.

Similarly, the fractional parts of s_1, s_2, s_3, s_4, s_5 can together, provide at most 4.

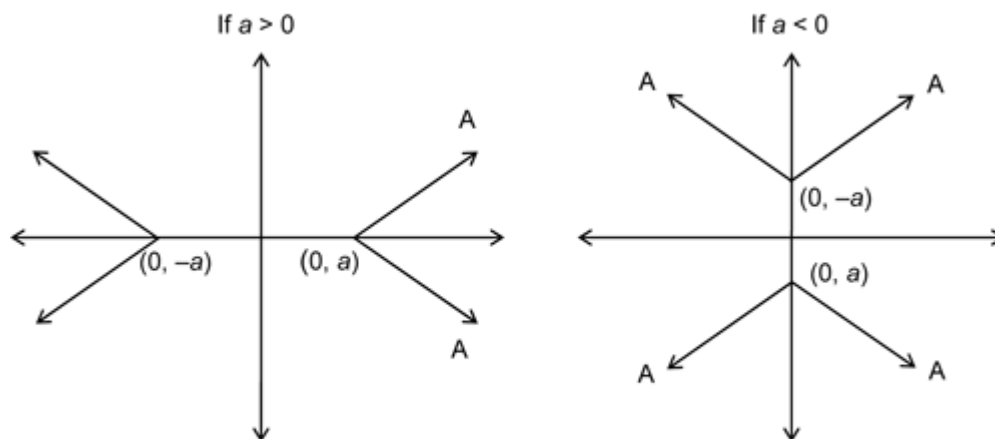
Conversely, if $[a]$ is 4 more than $[s_1] + [s_2] + [s_3] + [s_4] + [s_m]$, then m has to be at least 5.

Similarly, the least value of n is 4.

$$\therefore (m+n)_{\min} = 5 + 4 = 9$$

Choice (4)

16. The lines represented by A where $a > 0$ and when $a < 0$ are given in the following figures.



The area enclosed by A and D would be zero if $d < |a|$. In choice (2), $d = 1$ and $a = -2$ i.e., $d < |a|$.

If $a > 0$, then the only case when the area enclosed by A and D will be zero, is when $d = 0$.

Choice (2)

17. Given that $120 \leq n \leq 240$.
 $120 = 2^3 (3) (5)$ and $240 = 2^4 (3) (5)$
 So, the prime factors involved in 120 and 240 are the same. We want the number of co-primes of 240 lying between 120 and 240 = $\phi(240) - \phi(120)$.
 $= 240 \left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{5}\right) - 120 \left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{5}\right)$
 $= (240 - 120) \left(\frac{1}{2}\right) \left(\frac{2}{3}\right) \left(\frac{4}{5}\right) = 32$ Choice (2)

18. Let $\frac{1}{10} = x$, then
 $S = 2x + 6x^2 + 12x^3 + 20x^4 + 30x^5 + \dots$
 $\Rightarrow Sx = 2x^2 + 6x^3 + 12x^4 + 20x^5 + \dots$
 $\Rightarrow S(1-x) = 2x + 4x^2 + 6x^3 + 8x^4 + \dots$
 $\Rightarrow S(1-x)x = 2x^2 + 4x^3 + 6x^4 + 8x^5 + \dots$
 $\Rightarrow S(1-x)(1-x) = 2x + 2x^2 + 2x^3 + 2x^4 + 2x^5 + \dots$
 $\Rightarrow S(1-x)^2 = 2 \left(\frac{x}{(1-x)}\right) \Rightarrow S = \frac{2x}{(1-x)^3} = \frac{2 \left(\frac{1}{10}\right)}{\left(1 - \frac{1}{10}\right)^3}$
 $\Rightarrow S = \frac{2}{10} \times \frac{1000}{729} = \frac{200}{729}$

Alternative solution:

$S = 0.2 + 0.06 + 0.012 + 0.0020 + 0.00030 + 0.000042 + \dots$
 $\Rightarrow S = 0.274342 + \dots$
 Going from answer choices, choice (1) = 0.2666.....;
 Choice (2) = 0.268888.....; choice (3) = 0.27222.....;
 Choice (4) = 0.27434.....; choice (5) = 0.28943
 Hence choice (4). Choice (4)

19. Let $S = (2-d) \left(\frac{2}{3}\right) + (2+d) \left(\frac{4}{9}\right) + (2+3d) \left(\frac{8}{27}\right)$
 $\therefore S \left(\frac{2}{3}\right) = (2-d) \left(\frac{4}{9}\right) + (2+d) \left(\frac{8}{27}\right) + \dots$
 Subtracting,
 $\frac{S}{3} = (2-d) \left(\frac{2}{3}\right) + 2d \left(\frac{4}{9}\right) + 2d \left(\frac{8}{27}\right) + \dots$
 $= (2-d) \left(\frac{2}{3}\right) + 2d \left[\frac{4}{9} + \frac{8}{27} + \dots\right]$
 $= (2-d) \left(\frac{2}{3}\right) + (2d) \left[\frac{4}{9} \left(\frac{3}{1}\right)\right] = \frac{4}{3} + 2d$
 $\Rightarrow S = 4 + 6d$. Given $S = \frac{5}{2} - 2 = \frac{1}{2} \therefore d = \frac{-7}{12}$ Choice (2)

20. If there are an odd number of numbers between any two numbers, the two numbers occupy positions of the same parity (i.e. both are in even places or both are in odd places)
There are an odd number of numbers between any two even numbers as well as between any two odd numbers, i.e., the even numbers occupy the even positions and the odd numbers occupy the odd position or vice versa. If $n = 6$, this can be done in $3! \cdot 3!$ or 72 ways. For other values of n , this is not 72.

Alternative solution:

If n is even, i.e., say $n = 2m$ then the number of ways is $2 \times m! \times m!$, i.e., m odd numbers in alternate places and m even numbers in alternate places.

If n is odd, i.e., say $n = 2m + 1$, then the number of ways = $m!(m + 1)!$

Hence, either $2(m!)^2 = 72$ or $m!(m + 1)! = 72$

If $2(m!)^2 = 72$, $\Rightarrow m! = 6 \Rightarrow m = 3$

for $m!(m + 1)! = 72$, there is no solution.

Hence $m = 3$, and $n = 2m = 6$.

Choice (1)

Logical & Data Interpretation

21. Let the countries to which the persons belong i.e. Australia, Canada, Pakistan, India and Japan be represented by A, C, P, I and J respectively. Let the countries that they are coaching i.e. Australia, Wales, Bangladesh, Bermuda and China be represented by Au, Wa, Ba, Be and Ch respectively.

Name	Anshuman		Buchanan		John		Whatmore		Chappel	
	x	✓	x	✓	x	✓	x	✓	x	✓
Country of origin	A C P	I or J	-	A	J A P	C	A	J or I	C	P
Country he is coaching	Au Wa Ba Be	Ch	Ba Be Au Ch	Wa	Au Wa Ba Ch	Be	Wa	Au	Ch Au Wa Be	Ba

Whatmore can be from India or Japan.

Choice (4)

22. Let the countries to which the persons belong i.e. Australia, Canada, Pakistan, India and Japan be represented by A, C, P, I and J respectively. Let the countries that they are coaching i.e. Australia, Wales, Bangladesh, Bermuda and China be represented by Au, Wa, Ba, Be and Ch respectively.

Name	Anshuman		Buchanan		John		Whatmore		Chappel	
	x	✓	x	✓	x	✓	x	✓	x	✓
Country of origin	A C P	I or J	-	A	J A P	C	A	J or I	C	P
Country he is coaching	Au Wa Ba Be	Ch	Ba Be Au Ch	Wa	Au Wa Ba Ch	Be	Wa	Au	Ch Au Wa Be	Ba

Buchanan is from Australia.

Choice (1)

23. Let the countries to which the persons belong i.e. Australia, Canada, Pakistan, India and Japan be represented by A, C, P, I and J respectively. Let the countries that they are coaching i.e. Australia, Wales, Bangladesh, Bermuda and China be represented by Au, Wa, Ba, Be and Ch respectively.

Name	Anshuman		Buchanan		John		Whatmore		Chappel	
	x	✓	x	✓	x	✓	x	✓	x	✓
Country of origin	A C P	I or J	-	A	J A P	C	A	J or I	C	P
Country he is coaching	Au Wa Ba Be	Ch	Ba Be Au Ch	Wa	Au Wa Ba Ch	Be	Wa	Au	Ch Au Wa Be	Ba

Wales had Buchanan, who is from Australia, as their coach.

Choice (2)

24. Given that the ratio of the number of cars of brand A and B sold in the last year is 3 : 2

Last year	A	:	B
	3		②
	Last year	:	Present year
A	2		3
B	②		5

In the above numbers, the underlined numbers represent the same value. Similarly the encircled numbers also represent the same value. So make them same.

Last year	A	:	B
	6		4
	Last year	:	Present year
A	6		9
B	4		10
C	–		81

From the above ratio it is clear that for every 6 cars of A sold last year, 19 cars of A and B are sold this year and 81 cars of C are sold this year.

∴ Number of cars of 'C' sold this year is $\frac{24}{6} \times 81 = 324$ Choice (1)

25. Given that the ratio of the number of cars of brand A and B sold in the last year is 3 : 2

Last year	A	:	B
	3		②
	Last year	:	Present year
A	2		3
B	②		5

In the above numbers, the underlined numbers represent the same value. Similarly the encircled numbers also represent the same value. So make them same.

Last year	A	:	B
	6		4
	Last year	:	Present year
A	6		9
B	4		10
C	–		81

From the previous question and the given ratios, it is clear that for every 10 cars sold last year, 100 cars are sold this year.

∴ The percentage increase is 900%. Choice (3)

26. Given that the ratio of the number of cars of brand A and B sold in the last year is 3 : 2

Last year	A	:	B
	<u>3</u>		②
	Last year	:	Present year
A	<u>2</u>		3
B	②		5

In the above numbers, the underlined numbers represent the same value. Similarly the encircled numbers also represent the same value. So make them same.

Last year	A	:	B
	6		4
	Last year	:	Present year
A	6		9
B	4		10
C	-		81

For every 10 cars sold last year, 100 cars are sold this year and he wants to sell 180 cars in the next year. It is clear that out of this 180, 80 cars will be of brand D.

∴ Number of cars to be sold in the next year will be 700% more than the total sales of last year. Choice (4)

27. Given that the ratio of the number of cars of brand A and B sold in the last year is 3 : 2

Last year	A	:	B
	<u>3</u>		②
	Last year	:	Present year
A	<u>2</u>		3
B	②		5

In the above numbers, the underlined numbers represent the same value. Similarly the encircled numbers also represent the same value. So make them same.

Last year	A	:	B
	6		4
	Last year	:	Present year
A	6		9
B	4		10
C	-		81

Given that a total of 380 cars are sold this year. From the above ratios it is clear that for every 19 cars sold this year 6 cars of brand A were sold in the last year.

∴ Number of cars of brand A sold last year is $\frac{380}{19} \times 6 = 120$ Choice (2)

28. Given Tarun scored the highest number of centuries among Tarun, Rajan and Pavan.
∴ From I, we can say that Pavan scored more runs than Tarun and is one of the persons selected

But we cannot say who is the other person selected.

∴ I alone is not sufficient.

From II, we can only say that, Pavan is not the person who scored the highest number of centuries between the persons selected.

∴ II is not sufficient.

Using both the statements Tarun or Rajan is one of the other persons selected.

∴ Either Tarun or Rajan is not selected. Choice (4)

29. Either statement alone will not give the answer. Combining both the statements we can find $AB + BC$.
 Let c and a be AB and BC , then $\left(\frac{a + b + c}{2}\right)$ in radius = $\frac{1}{2}ac$
 And $a^2 + c^2 = b^2$
 Given inradius = $\frac{10}{2}$, and $a = 2x$ circumradius, $(b + c)$ can be solved for. Choice (3)
30. Companies for which the expenses are less than 60% of the sales, will have a profit more than 40% of the sales. There are six such companies. Choice (3)
31. Only for three software companies the sales, are over Rs.2500 crore and expenses are less than Rs.2100 crore. Choice (2)
32. The conditions related to G are, if G is included, F also must be included and C and I cannot be included. There are no other conditions related to G . Hence, a team that includes G can be
 (1) AEJGDF (2) ADGFE (3) EGFH
 More arrangements are also possible. Hence, the number of members in the team is not unique. Choice (4)
33. The largest possible team can have six members. As one of, (E, B) and (D, H) and two of (C, G, I) must definitely be excluded. Hence, a minimum of four members must be excluded. Choice (3)
34. If a team includes H , neither A nor D can be included in that team and further one of (E, B) and two of (C, G, I) must be excluded making the size of the team as 5. Choice (2)
35. If C is included, G, I and F must be excluded.
 As F is excluded, J also must be excluded.
 As F and I are excluded, the only remaining defender D must be included.
 As D is included, A must be included and thus H must be excluded.
 As G and H are excluded, the only remaining point guard B must be selected.
 As B is included, E must be excluded.
 \therefore The team is (A, B, C, D) Choice (2)
36. From statement I, we cannot determine the total percentage of questions attempted by Ramya as we do not know the % of questions attempted by Ramya but not by Swathi. From statement II, the number of questions attempted by both Ramya and Swathi together is not known. But by combining both the statements, If x is the percentage of questions attempted by Ramya
 $\frac{3}{8} \times x = 30 \Rightarrow x = 80$
 \therefore 80% of the questions are attempted by Ramya. Choice (3)
37. Neither of the statements alone is sufficient, as each statement gives only partial information.
 Combining both the statements, if Ankit is a truth teller, Bhanu cannot be a truth teller.
 \therefore Bhanu is a liar.
 If Ankit is a liar, then Bhanu can be a truth teller or a liar.
 \therefore We cannot answer the question. Choice (4)

38. To find the least number of states in which company A sold cement, we have to assume that company A had its sales in states in which the total sales were the maximum. Even if we assume company A had 50% market share in the states with maximum sales, there must be at least 5 states where company A sold cement.
Choice (2)
39. To find the maximum number of states where company E was present, we have to assume it had sales in the states where the total sales are minimum and it had a share of only 25% in the states.
∴ Company E had its sales in at most 7 states (S, U, X, T, Q, W and Y). It cannot include R also as 25% of sales in R is 2.5% of total and already at least 25% of 51% = 12.75% is accounted by the seven states.
Choice (3)
40. For the minimum number of companies with sales in more than two states, the sales of the companies can be as follows:
B(17%) – W(9%) + T(8%)
C(18%) – Y(9%) + Q(9%)
D(23%) – Z(13%) + R(10%)
E(14%) – V(14%)
Only company A has sales in more than two states.
Choice (1)

Verbal Ability

41. A. Though second half of the sentence is a fact (given it is so), the author is clearly approving of corporate interest in the power sector. Therefore a judgement – J.
B. This is a fact since the author says this is what is reported – F.
C. This is the author's opinion, hence judgement – J.
D. The author infers what the current tendency is, based on what the latest economic survey and the earlier one said or remainder silent on – I.
E. This is the author's opinion, his view on what we should do – J. Hence JFJIJ
Choice (4)
42. Statement A can be ruled out firstly due to a discord between the subject and the verb. The subject of the sentence is 'inflexibility', hence 'prevents' is the right form of the verb. (When the subject is singular the verb takes 's').
Further, A, B and D have a prepositional error i.e., 'adapted for'. The correction is 'adapted to' 'something is adapted for something' but the given sentence does not express this idea. Hence 'adapted to something' is the correction. Besides the above mentioned errors, the use of 'thereby causes the ruin' is incorrect as it disrupts the parallelism. The correction is 'the inflexibility of the laws ... may in certain cases render ... and thereby 'cause' not 'causes'. (According to the rule of parallelism when two or more sentences, phrases, clauses or words are joined using connectives all of them must belong to the same grammatical form.) Thus, only statement C is free of errors.
Choice (3)
43. Statements B and C are incorrect due to the incorrect preposition used after the word 'characteristic'. 'Characteristic' takes the preposition 'of'. 'Characteristic of the species' is the correction. Further, in B the use of 'which' is incorrect. It should be replaced with a demonstrative adjective 'that', which refers to the considerable variation of human talents. This renders B and D incorrect. Besides the above mentioned errors the absence of the definite article 'the' before 'achievements' makes C and D incorrect. Hence, only A is free of errors.
Choice (1)
44. The opening sentences tell us about 'nuclear renaissance' and the claim that nuclear energy would encourage a green and carbon-free environment. This claim is only partly true, as stated in D. Hence D follows A. The word 'claim' in D refers to the 'assertion' in A. D explains how the 'nuclear cycle' can be hazardous to the environment. 'At every stage of the cycle' is a continuation of this idea, the 'cycle' referring to the 'nuclear cycle' mentioned in D. Hence C follows D. C tells us about the 'stages' and E tells us about what happens once the power plant starts functioning and B concludes stating that the assertion made in A is 'untrue'. Thus the proper sequence of the sentences would be DCEB.
Choice (1)
45. The given para is about Jawaharlal Nehru – what he was and now he was different from his country men – a rationalist in the midst of spiritualists. choices 3 and 4 can be ruled out since they talk of Gandhi not mentioned in the para. Choices 1 and 2 appear close of the two. Choice 2 is better since it continues telling us about Nehru and how he felt. Choice 1 changes stand to what the people thought of Nehru.
Choice (2)
46. The para talks of falling birth rate – not due to coercion but through choice. It gives the example of Bangladesh to show that if people have the knowledge and access to birth control measures, births will fall dramatically. Choice 4 cannot conclude the para because its tone is not in keeping with the positive tone of the para. Choice 3 talks of what governments want and why and so is not relevant. Choice 1 and 2 are possible choices. Choice 1 is not very clear where as 2 concludes the idea in the para.
Choice (2)

47. A councillor is a member of a municipal council etc whereas a counsellor is an advisor. Only the former is apt here. Hence A. Someone's adoptive parents are those who have adopted them. To adopt a child is to adopt someone else's child and take it into your own family Therefore B.
Venal means corrupt. Venial is minor offence. Only A makes sense here.
The word farther which means a greater distance than something else, is apt here. Hence A.

The word descent which refers to family origin is apt in the context. Dissent meaning disagreement does not make sense here. Hence B. Therefore the correct sequence is ABAAB. Choice (4)

48. The word precedence which means the condition of being dealt with before other things or of being considered more important than other things is apt in the given context. Hence A.
Alternately means alternating between two things. Alternatively which is used to suggest another possibility is apt in the context. Hence B. Compliment is a remark that expresses approval admiration or respect. Complement which means to make something else seem better or more attractive when combining with it. Only B is apt here

Notable means important and demanding attention. Noticeable means easy to see or recognize. Only A is apt
The word discreet means to keep something several Discrete means having a clear, independent shape or form. Only the former makes sense here. Hence the correct sequence is ABBA. Choice (4)

49. Choice 2 is erroneous. 'Pull away from...' is an incorrect expression in this context. The correction is '...pull out of' or 'from'. To pull out of something is to move away from something or stop being involved in it. Choice (2)

50. The usage of shade is incorrect in choice 4. Here the usage of shade is incorrect. You live in the shadow of something and not in the shade of something. Choice (4)

51. **Number of words and Explanatory notes for RC:**

Number of words : 808

Choice (3) is the finding of a study, not the author's view. The first and the last paras support other options. Choice (3)

52. **Number of words and Explanatory notes for RC:**

Number of words : 808

Paras (5) and (6) point to choice (2) as the answer. Although other aspects have been called into question, the health benefits that organic food supposedly provides has been questioned by the study. Choice (2)

53. **Number of words and Explanatory notes for RC:**

Number of words : 808

Refer to paras 9, 10 and 11. Choice (1) can't be supported. There is no mention of the study not being scientific. Choice (2) has not been suggested. Choice (3) the second half is inapt. Choice (4) is correct. Choice (4)

54. **Number of words and Explanatory notes for RC:**

Number of words : 808

In this passage, the author reports the findings of a study and discusses the debate that it (the study report) has raised. So, choice (4) is the best answer. The reason for and against promoting organic food has not been discussed. Choice (1) is incorrect. Choices (2) and (3) are easy eliminations. Choice (4)

55. **Number of words and Explanatory notes for RC:**

Number of words : 754

Choice (1) can be inferred from the last paragraph – '18th century French painter ---- Fragonard' (2) can be inferred from 'amalgam of the antique and the modern' in paragraph 7. (4) can be inferred from 'call post - Impressionism ---- anxiety ---- Gauguin searched for an art' in paragraph 4. Choice (3) is negated by sentence (2) of para (3). Choice (3)

56. **Number of words and Explanatory notes for RC:**

Number of words : 754

Refer to paragraph 2, 'Picasso ---- women ---- indebted to Renior ----- So was Matisse ---- produced his odalisques', which means that the women in the works of Picasso and Matisse resembled Renior women' Hence, other choices are rendered incorrect. Choice (4)

57. **Number of words and Explanatory notes for RC:**

Number of words : 754

Refer to para (1). Work of Renoir's final decades were considered 'kitsch', and is the subject of this passage. Not all his work was misunderstood. Besides, the option fails to include the crucial word 'art' and incorrectly suggests Renior, the person. Choice (4) is not completely correct, as Picasso was influenced by Renoir's works. (3) is also incorrect, as the last sentence in paragraph (1) suggests that modern eyes 'found' it difficult to digest late Renoir works. (2) is the answer, as can be inferred 'a ---- classicism, modern eyes ---- awfully hard to take'. Choice (2)

58. **Number of words and Explanatory notes for RC:**

Number of words : 498

Choice (4) is the best pick. Refer to the last para. The phrase 'modern scientific' renders choice (1) incorrect. The book does not explore the 'spiritual unknown in the scientific quest'. It is science fiction with explicit spiritual dimensions'. Choice (3) can be easily ruled out. Choice (4)

59. **Number of words and Explanatory notes for RC:**

Number of words : 498

The author does not say that the search is a vain attempt. So, choice (1) is ruled out. Choices (2) and (4) are not the author's view. Refer to para (4). They are science fiction writer Michael Crichton's view. Para (3) points to option (3) as the answer. Choice (3)

60. **Number of words and Explanatory notes for RC:**

Number of words : 498

Para (2) clearly points to option (2). Ideas suggested in other options are distorted and can't be supported. Choice (2)

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