

INSTRUCTIONS

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
2. This test has three sections with 60 questions – 20, 20, and 20 respectively in the first, second and third sections. The TOTAL TIME available for the paper is 135 minutes. The student may apportion this time among various sections as he/she wishes. However, the student is expected to show his/her competence in all the three sections.
3. All questions carry three marks each. Each wrong answer will attract a penalty of one mark.

SECTION – I
Number of Questions = 20

DIRECTIONS for questions 1 to 20: Answer the questions independently of each other.

1. Arrange the following in the ascending order of their magnitude.
 $A = 4^{444}$, $B = 444^4$, $C = 44^{44}$, $D = 4^{4^4}$
 (1) BCAD (2) BACD (3) ABCD (4) ACBD
2. A bus rental agency has the following terms. If a bus is rented for twelve hours or less, the charge is Rs.200 per hour or Rs.7 per kilometre whichever is more. On the other hand, if the bus is rented for more than twelve hours, the charge is Rs.160 per hour or Rs.5 per kilometre whichever is more. Manoj rented a bus from this agency, drove it for 400 kilometre and ended up paying Rs.2400. For how many hours did he rent the bus?
 (1) 12 (2) 15 (3) 18 (4) 16
3. The probability of a bomb hitting a bridge when it is dropped from a plane is $1/2$. At least two hits are required to destroy the bridge completely. Find the least number of bombs that must be dropped so that the probability of destruction of the bridge is greater than 0.99.
 (1) 10 (2) 11 (3) 9 (4) 8
4. The area (in sq.units) enclosed by the graph of $|x - 1| + |y - 1| = 2$, is
 (1) 16 (2) 4 (3) $4\sqrt{2}$ (4) 8
5. If $a + b + c = 25$ and $(1 + b)(a + c) = 144$, then which of the following could be the value of b ?
 (1) 8 (2) 10 (3) 17 (4) More than one of the above
6. A square of the greatest possible area is cut out from a rectangle, leaving behind a smaller rectangle. If the ratio of the length and the breadth of the smaller rectangle is equal to that of the original rectangle, then how many times the area of the smaller rectangle is area of the square cut out?
 (1) 0.809 (2) 1.618 (3) 2.236 (4) 3.236
7. Ravi forgot a telephone number which he wanted to dial. However, he remembered the following details about it:
 (a) The number was a seven-digit number.
 (b) The digit 1 appeared exactly once in the number.
 (c) The other six digits were three non-zero digits, each appearing exactly twice.
 What is the minimum number of different numbers that Ravi would have to dial, to be certain of dialling the right number?
 (1) 35280 (2) 25872 (3) 17640 (4) 28224
8. Two boys start simultaneously at the same point on a circular track and run along the track in the same direction. The point on the track at which they meet for the 5th time is same as that at which they meet for the 17th time. If the ratio of the speed of the faster boy to that of the slower one is $n : 1$ where n is a natural number. Which of the following is not a possible value of n ?
 (1) 2 (2) 4 (3) 5 (4) 6
9. If $N = 2^{1500}$, what is the remainder when N is divided by 13?
 (1) 1 (2) 2 (3) 4 (4) 12
10. 2 pens or 3 erasers or 4 sharpeners all cost the same. If the cost of an eraser increases by 20% and that of a sharpener increases by 30%, find the approximate percentage increase in the total cost of 6 pens, 4 erasers and 3 sharpeners.
 (1) 7.67% (2) 8.33% (3) 9.67% (4) 11.33%
11. There are n mugs with capacities $C_1, C_2, C_3, \dots, C_n$ litres such that $2 < C_1 < C_2 < \dots < C_n < 4$ litres. Each mug is filled to its capacity. The water in each mug is transferred to a minimum number of empty buckets each of volume 4 litres, such that unless a bucket has enough empty space to hold all the water from the mug, the water is not transferred into that bucket. According to the above condition, x buckets were needed to empty all the mugs. Which of the following represents the highest lower bound of the total empty volume in all the x buckets after the water from all the mugs is emptied into them?
 (1) nC_n (2) nC_1
 (3) $n(4 - C_n)$ (4) $n(4 - C_1)$

12. For real numbers x and y , let

$$f(x, y) = (x + y)^2, \text{ if } x + y \geq 0 \\ = -(x + y), \text{ if } x + y < 0$$

$$g(x, y) = \sqrt{x+y}, \text{ if } x + y \geq 0 \\ = (x + y)^2, \text{ if } x + y < 0$$

Which of the following expressions is positive for non-zero real numbers x and y ?

- (1) $(f(x, y))^2 - (g(x, y))^2$ (2) $(f(x, y))^2 - g(x, y)$
 (3) $f(x, y) + g(x, y)$ (4) $f(x, y) - g(x, y)$

13. A natural number N has four factors. The sum of the factors of N , excluding one and itself, is 56. Find the sum of all the values that N can assume.

- (1) 1724 (2) 1764 (3) 1754 (4) 1784

14. Zoysa and Yuva can travel from P to Q in 3 hours and 6 hours respectively. They both start from P, go towards Q, reach Q and return to P. If they both start at 9:00 a.m. from P, when will they cross each other?

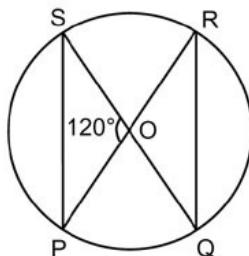
- (1) 1:00 p.m. (2) 11:00 a.m.
 (3) 2:00 p.m. (4) 3:00 p.m.

15. One day, an enterprising bumble-bee starts its own colony by giving birth to two enterprising bumble-bees. Every bumble-bee of this colony, as soon as it is one day old, starts to give birth to exactly two offspring each day, which in turn continue the process. As a natural phenomenon, every such colony splits up into five equal groups after exactly eight weeks of its inception. The remaining bees if any, commit mass suicide for having been left out. How many bees commit suicide after one such split?

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

16. Given below is a circle with centre O and four points – P, Q, R and S – on the circle. If the chords SQ and

PR intersect each other at O and the radius of the circle is $8\sqrt{3}$ cm, find area (in sq.cm) of $\triangle PSQ$ (in cm^2).



- (1) $108\sqrt{3}$ (2) $54\sqrt{3}$ (3) $81\sqrt{3}$ (4) $96\sqrt{3}$

17. A set of several consecutive natural numbers beginning with 1 was written on the board. A number out of those numbers written was erased and the average of the remaining numbers was found to be

$$\frac{28}{9}. \text{ Find the number that was erased.}$$

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

18. Find the area (in sq.cm) of a right-angled triangle whose inradius is 4 cm and circumradius is 10 cm.

- (1) 96 (2) 100 (3) 108 (4) 120

19. An expression E is defined as $E = 2x^2 + 3y^2 - 6x + 9y + 15$. What is the least integral value of E?

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

20. If a natural number N has 12 factors, then which of the following is not a possible value for the number of factors of N^2 ?

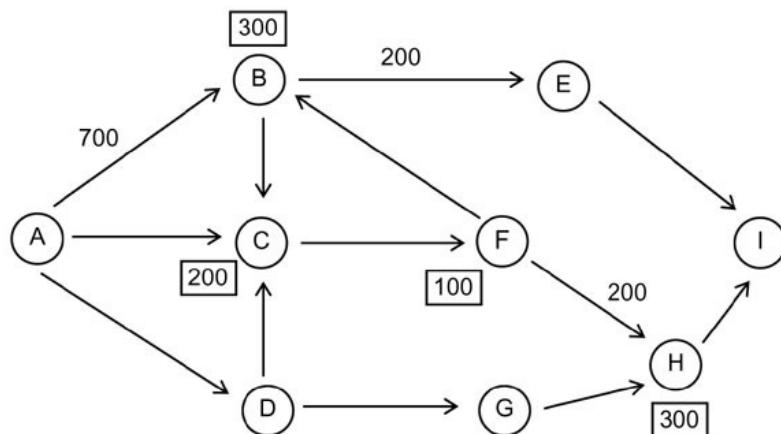
- (1) 23 (2) 45 (3) 35 (4) 55

SECTION – II

Number of Questions = 20

DIRECTIONS for questions 21 to 24: Answer the questions on the basis of the information given below.

Given below is a network of water pipelines and nine hubs – A through I. The requirement of water at the hubs is exactly met by the flow in the pipelines. The flow in some of the pipelines and the requirement at some of the hubs is also mentioned. A is the only hub which is a source hub, i.e. the hub A does not have any requirement of its own but it supplies the requirements of all the other hubs.



It is also known that

- i. The maximum capacity of any pipeline is 1000.
- ii. The requirement at any hub except A and I is equal to the flow in exactly one of the pipelines directly connected to it.
- iii. No two pipelines directly connected to the same hub carry the same amount of water.
- iv. The flow in none of the pipelines shown above is zero.

- 21.** What is the requirement at the hub I?
 (1) 100 (2) 200 (3) 300 (4) 400
- 22.** What is the amount of water carried by the pipeline D-G?
 (1) 500 (2) 600 (3) 700 (4) 800
- 23.** What is the total requirement that should be supplied by A?
 (1) 1800 (2) 1900 (3) 2100 (4) 2500
- 24.** What is the amount of water carried by the pipeline C-F?
 (1) 100 (2) 300 (3) 400 (4) 600

DIRECTIONS for questions 25 and 26: Answer the questions on the basis of the information given below.

Six houses – White House, Light House, Bright House, Delight House, Knight House and Might House – are there in a street from left to right respectively.

In each of the houses, exactly one of the six persons – Ranjit, Mohit, Sohit, Farhat, Barath and Lohith, not necessarily in that order stays along with his wife. The names of the wives are – Ramya, Manya, Sanya, Falgun, Basanthi, and Laila, not necessarily in that order. Further, the following information is also known:

- (i) No woman's name starts with the same letter as her husband's name.
- (ii) No two persons staying in any two adjacent houses had the same first letter in their names.
- (iii) Mohit stays in the Light house and Basanthi stays in the Delight house.
- (iv) Ranjit's wife is Laila.
- (v) Lohith's house is to the immediate right of Farhat's house.
- (vi) The first letters of the names of the persons staying in the White house are different from those of the persons staying in the Bright house. Same is the case with the persons staying in the Delight house and the Might house and also with the persons staying in the Light house and the Knight house.

- 25.** If Falgun lives in the Light House, then which couple lives in the Might House?
 (1) Sohit and Manya (2) Ranjit and Laila
 (3) Barath and Manya (4) None of these
- 26.** Who among the following has to live in the house adjacent to that of Laila?
 (1) Basanti (2) Falgun
 (3) Manya (4) Cannot be determined

DIRECTIONS for questions 27 and 28: 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 using statement A alone but not by using statement B alone.
- Mark (2) if the question can be answered using statement B alone but not by using statement A alone.
- Mark (3) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (4) if the question cannot be answered even on the basis of both the statements and additional information is required.

- 27.** On which day of the week did Venus play?
 A. 26th January of year X is a Sunday.
 B. She played on 25th February of year X, 15 days before Serena, who played on Tuesday.
- 28.** A team of three members is to be selected from five members – A, B, C, D and E. If A is not selected, then B must be selected. Is B selected in the team?
 A. At most one of C and D can be selected.
 B. If E is selected, then A must be selected but neither of C and D can be selected.

DIRECTIONS for questions 29 to 32: Answer the questions on the basis of the information given below.

A boy purchased exactly four items. The cost of each item was a two-digit prime number, such that these four numbers together consist of eight different digits.

- 29.** If the boy purchased items worth Rs.47 and Rs.29, what is the amount spent for purchasing all the four items?
 (1) Rs.190 (2) Rs.220
 (3) Rs.271 (4) Cannot be determined
- 30.** Which of the following statements is false?
 (1) The boy did not purchase an item costing Rs.43.
 (2) The total amount spent is divisible by ten.
 (3) The boy must have purchased an item costing Rs.61 or Rs.67.
 (4) If the boy purchased an item costing Rs.23, he could not have purchased an item costing Rs.89.

- 31.** What is the difference (in Rs.) between the least possible amount spent and the highest possible amount spent by the boy on purchasing all the four items put together?
 (1) 30 (2) 40 (3) 50 (4) 60

- 32.** The difference (in Rs.) between the cost of the costliest item and that of the cheapest item, is at least
 (1) 32 (2) 44 (3) 36 (4) 66

DIRECTIONS for questions 33 and 34: Answer the questions on the basis of the information given below.

Consider the 3×3 grid of numbers given below. In this grid, an *operation* is defined as the interchanging of the positions of any two of the numbers. A *configuration* is defined as any unique arrangement of the numbers in the grid.

1	2	3
4	5	6
7	8	9

- 33.** What is the least number of *operations* required to rearrange the above given *configuration* into another *configuration* such that, the sum of the numbers in the leftmost column is nine more than that of the

middle column and 18 more than that of the rightmost column, while the sum of the numbers in the top row is three more than that of the middle row and six more than that of the last row?

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

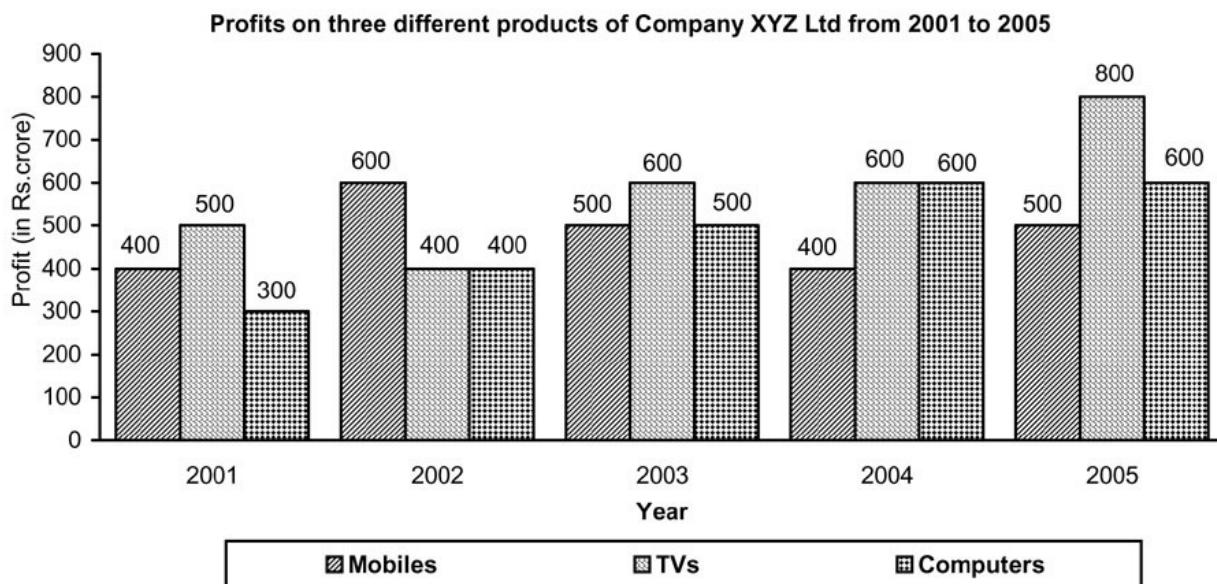
34. If the grid of numbers were to be a 4×4 grid (containing the numbers from 1 to 16), then what is the least possible number of operations that will always be sufficient to rearrange the grid of numbers into any given configuration?

- (1) 17 (2) 13 (3) 15 (4) 16

DIRECTIONS for question 35: 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 both the statements together but not by either of the statements alone.
 Mark (4) if the question cannot be answered on the basis of the two statements.

DIRECTIONS for questions 37 to 40: These questions are based on the bar graph and tables given below.



Profit of each product as a percentage of the total sales of that product

Product→ Year↓	Mobiles	TVs	Computers
2001	25%	20%	30%
2002	30%	25%	25%
2003	25%	25%	40%
2004	40%	15%	15%
2005	40%	10%	20%

35. Eight friends – A through H, sit around a circular table. Who is the only person who sits between B and D?

- A. It is known that A sits in between F and H, and that C sits neither adjacent nor opposite to B.
 B. It is known that D sits neither adjacent to B nor opposite to H and that E sits opposite to F and to the left of C.

DIRECTIONS for question 36: Each problem contains a question and two statements, A and B, giving certain data. You have to mark the correct answer from (1) to (4), depending on the sufficiency of the data given in the statements to answer the question.

Mark (1) if the question can be answered by using one of the statements alone but cannot be answered by using the other statement alone.

Mark (2) if the question can be answered by using either statement alone.

Mark (3) if the question can be answered by using both the statements together but cannot be answered by using either statement alone.

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

36. If x , y and z are natural numbers, is $xy + yz + zx$ even?

- A. $xy + yz$ is even.
 B. $yz + zx$ is even.

(Total sales = domestic sales + exports)

Exports (by value) of each product as a percentage of the total sales of that product

Product→ Year↓	Mobiles	TVs	Computers
2001	30%	50%	35%
2002	25%	25%	40%
2003	20%	30%	25%
2004	35%	40%	20%
2005	25%	60%	30%

37. In the year 2003 if the total sales (by value) of Mobiles, TVs and Computers are P, Q and R respectively, then which of the following is true?
 (1) $P > Q > R$ (2) $P > R > Q$
 (3) $Q > P > R$ (4) $R > P > Q$
38. In which of the following years was the profit as a percentage of exports the highest for Mobiles?
 (1) 2001 (2) 2003 (3) 2004 (4) 2005
39. In the year 2005, the ratio of the volume of exports to the volume of total sales is 1 : 5 for TVs. What is

the ratio of the average price per TV in the domestic market to the average export price per TV in that year?
 (1) 1 : 2 (2) 2 : 3 (3) 3 : 5 (4) 1 : 6

40. If the company XYZ sells only these three products, then in which of the following years did the total profit of the company grow by the highest percentage?
 (1) 2002 (2) 2003 (3) 2004 (4) 2005

SECTION – III

Number of Questions = 20

DIRECTIONS for question 41: The following question consists of four sentences on a topic. Some sentences are grammatically incorrect or inappropriate. Select the option that indicates the grammatically correct and appropriate sentence(s).

41. (A) I was standing in front of the most imposing edifice of Shimla.
 (B) Once a power to reckon, it is today a scholar's retreat.
 (C) It is a magnificent sprawling grey stone structure occupying an entire hill.
 (D) It is considered a fine example of British colonial architecture inspired by Renaissance in England.
 (1) A, B and C (2) A and D
 (3) A and C (4) B and C

DIRECTIONS for question 42: There are two blanks in the following sentence. From the pairs of words given below, choose the pair that fills the blanks most appropriately.

42. It is an undeniable fact that even to this day, several women in India live in a _____ society, displaying very little _____ to break the chauvinistic conduct of a largely male dominated world.
 (1) downtrodden . . . steadfastness
 (2) impoverished . . . resilience
 (3) progressive . . . audacity
 (4) conformist . . . courage

DIRECTIONS for questions 43 to 46: Read the following passage and answer the questions that follow it.

Empathy is second nature to us, so much so that anyone devoid of it strikes us as dangerous or mentally ill. At the movies, we can't help but get inside the skin of the characters on the screen. We despair when their gigantic ship sinks; we exult when they finally stare into the eyes of a long-lost lover. We are so used to empathy that we take it for granted. Even Adam Smith, the father of economics, best known for emphasizing self-interest as the lifeblood of human economy, understood that the concepts of self-interest and empathy don't conflict. Empathy makes us reach out to others, first just emotionally, but later in life also by understanding their situation.

This capacity likely evolved because it served our ancestors' survival in two ways. First, like every mammal, we need to be sensitive to the needs of our offspring. Second, our species depends on cooperation, which means that we do better if we are surrounded by healthy, capable group mates. Taking care of them is just a matter of enlightened self-interest. It is hard to imagine that empathy—a characteristic so basic to the human species that it emerges early in life, and is accompanied by strong physiological reactions—came into existence only when our lineage split off from that of the apes. It must be far older than that. Examples of empathy in other animals would suggest a long evolutionary history to this capacity in humans.

Evolution has not merely replaced simpler forms of empathy with more advanced ones, the latter are merely elaborations on the former and remain dependent on them. This also means that empathy comes naturally to us. It is not something we only learn later in life, or that is culturally constructed. At heart, it is a hard-wired response that we fine-tune and elaborate upon in the course of our lives, until it reaches a level at which it becomes such a complex response that it is hard to recognize its origin in simpler responses, such as body mimicry and emotional contagion.

Biology holds us "on a leash," in the felicitous words of biologist Edward Wilson, and will let us stray only so far from who we are. We can design our life any way we want, but whether we will thrive depends on how well that life fits human predispositions.

I hesitate to predict what we humans can and can't do, but we must consider our biological leash when deciding what kind of society we want to build, especially when it comes to goals like achieving universal human rights.

If we could manage to see people on other continents as part of us, drawing them into our circle of reciprocity and empathy, we would be building upon, rather than going against, our nature.

For instance, in 2004, the Israeli Minister of Justice Joseph Lapid caused political uproar for sympathizing with the enemy. He had been touched by images on the evening news. "When I saw a picture on the TV of an old woman on all fours in the ruins of her home looking under some floor tiles for her medicines, I did think, 'What would I say if it were my grandmother?'" he said. Lapid's grandmother was a Holocaust victim.

This incident shows how a simple emotion can widen the definition of one's group. Lapid had suddenly realized that Palestinians were part of his circle of concern, too. Empathy is the one weapon in the human repertoire that can rid us of the curse of xenophobia.

Empathy is fragile, though. Among our close animal relatives, it is switched on by events within their community, such as a youngster in distress, but it is just as easily switched off with regards to outsiders or members of other species, such as prey. The way a chimpanzee bashes in the skull of a live monkey by hitting it against a tree trunk is no advertisement for ape empathy. Bonobos are less brutal, but in their case, too, empathy needs to pass through several filters before it will be expressed. Often, the filters prevent expressions of empathy because no ape can afford feeling pity for all living things all the time. This applies equally to humans. Our evolutionary background makes it hard to identify with outsiders. We've evolved to hate our enemies, to ignore people we barely know, and to distrust anybody who doesn't look like us. Even if we are largely cooperative within our communities, we become almost a different animal in our treatment of strangers.

This is the challenge of our time: globalisation by a tribal species. In trying to structure the world such that it suits human nature, the point to keep in mind is that political ideologues by definition hold narrow views. They are blind to what they don't wish to see. The possibility that empathy is part of our primate heritage ought to make us happy, but we are not in the habit of embracing our nature. When people kill each other, we call them "animals." But when they give to the poor, we praise them for being "humane." We like to claim the latter tendency for ourselves. Yet, it will be hard to come up with anything we like about ourselves that is not part of our evolutionary background. What we need, therefore, is a vision of human nature that encompasses all of our tendencies: the good, the bad, and the ugly.

Our best hope for transcending tribal differences is based on the moral emotions, because emotions defy ideology. In principle, empathy can override every rule about how to treat others. When Oskar Schindler kept Jews out of concentration camps during World War II, for example, he was under clear orders by his society on how to treat people, yet his feelings interfered.

Caring emotions may lead to subversive acts, such as the case of a prison guard who during wartime was directed to feed his charges only water and bread, but who occasionally sneaked in a hard-boiled egg. However small his gesture, it etched itself into the prisoners' memories as a sign that not all of their enemies were monsters. And then there are the many acts of omission, such as when soldiers could have killed captives without negative repercussions but decided not to. In war, restraint can be a form of compassion.

Emotions trump rules. This is why, when speaking of moral role models, we talk of their hearts, not their brains (even if, as any neuroscientist will point out, the heart as the seat of emotions is an outdated notion). We rely more on what we feel than what we think when solving moral dilemmas.

It's not that religion and culture don't have a role to play, but the building blocks of morality clearly predate humanity. We recognize them in our primate relatives, with empathy being most conspicuous in the bonobo ape and reciprocity in the chimpanzee. Moral rules tell us when and how to apply our empathetic tendencies, but the tendencies themselves have been in existence since time immemorial.

43. The author uses the example of the Israeli Minister of Justice to show that
- visual images have the power to change people's attitude to others, even enemies.
 - universal human rights is not an unachievable goal.
 - even tough hardliners are not totally bereft of gentler emotions.
 - empathy can help us overcome our fear and hatred of strangers.
44. From the author's use of the phrase 'biological leash' we understand that
- our biological past limits our ability to empathise with strangers.
 - we should take our predispositions into consideration when we seek to structure the world.
 - universal human right is not an achievable goal since we are naturally xenophobic.
 - biology sets a limit to what is achievable and we must respect that in order to survive.
45. When the author says that 'This is the challenge of our times', he is referring to
- our natural suspicion of strangers and people different from us.
46. The origin of empathy, according to the author,
- can be traced back to the point where our lineage split off from that of the apes.
 - begins a few hundred years ago when man developed intellectually to understand himself and others.
 - is deep rooted in our evolutionary past as it is also found in other animals.
 - is lost in a maze of claims and counter claims by sociologists and scientists.

DIRECTIONS for question 47: In the following 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) When the notorious criminal was shot dead in a police encounter, people said that he got his just **deserts** (A) / **desserts** (B).
(ii) The new taxation policy introduced by the government drew a lot of **flak** (A) / **flack** (B) from all quarters.
(iii) All the students in the class seemed **anxious** (A) / **eager** (B) to impress the new teacher.
(iv) Threshing is done with the help of machines to separate the grain from the **chaff** (A) / **chafe** (B).
(v) The opposition dismissed the government's move to reduce prices as a pre-election **gambit** (A) / **gamut** (B).
(1) BAABA (2) AABAA (3) BABAA (4) AABAB

DIRECTIONS for question 48: The following question has a paragraph with one italicised word that does not make sense. Choose the most appropriate replacement for that word, from the options given below the paragraph.

48. No goal is more crucial to healing the global environment than stabilizing human population. The rapid **sekshun** in the number of people since the beginning of the scientific revolution-and especially during the latter half of this century is the clearest single example of the dramatic change in the overall relationship between the human species and the earth's ecological system.
(1) explosion (2) proliferation
(3) burgeoning (4) eruption

DIRECTIONS for questions 49 and 50: Read the following passage and answer the questions that follow it.

The entire process of living consists of various physical, chemical, biological, physiological and psychological activities that are being carried out simultaneously, in sequence and in stages - the total culmination of which constitutes active human existence.

Chemistry is concerned with the interaction of elements and compounds which react with one another in what are known as inorganic and organic chemical reactions. Such reactions take place in the plant and animal kingdom, resulting in the production of more complex organic chemicals with newer properties. Thus we come to possess additional capabilities - which are due to the building up of more complex organic compounds.

Assuming that the Big Bang theory is the accepted one, we can theorise that the earth consisted of only a few inorganic elements to start with. These elements began to combine resulting in the build up of inorganic chemicals. Later carbon was added to these, resulting in organic compounds. These organic compounds reacted with one another, building up more complex molecules with each having some additional properties. Thus what we call living matter is nothing but a pack of multiple organic chemicals reacting with one another simultaneously and in sequence and as complementary to one another.

Recent research has given ample evidence to show that most of the human body can be seen as a combination of millions of chemicals reacting with one another. It is said that God made man out of clay in his own image and breathed life into him. Meaning that by breathing life into man, God actually pumped oxygen inside and took out carbondioxide, thus bringing into existence life as it is. This is the process of oxygenation and decarbonisation which constituted life. One can presume that life came into existence by these chemical reactions.

When it comes to the human body, human beings possess various highly complex chemical compounds not found in lower animals or plants. Evidently these compounds came into existence as a result of synthesis from other smaller molecules only.

In the human body, a large number of known chemicals have been found to be involved in the transmission of impulses from one tissue or cell to another. Adrenalinenor-adrenaline, dopamine histamine, acetylecholine and the recently discovered endorphins and encephalins are some in this category. Elevation or depletion of any one of these chemicals, interferes with the normal functioning of cells and tissues, resulting in a diseased state of the body. Restoration of their supply cures the disease. The deficiency of acetylecholine leads to Alzheimer's disease, while a decrease in dopamine leads to Parkinson's disease and its elevation causes schizophrenia, a well-known mental disorder. Endorphines and encephalines are morphine-like and produce sensations like pleasure and reduction of pain sensitivity. In a depressed person, there are lower levels of serotonin, adrenaline and 5-Hydroxy-tryptamine in the body. Exercise and meditation lead to the release of endorphins which produce a sense of calmness and pleasure. As for love, the brain releases a chemical substance called phenyl ethylene which acts like amphetamine and increases mental alertness and physical energy. People with low levels of these chemicals develop a craving for foods like chocolate, which are rich in such compounds.

It is evident that all chemical activities taking place on the planet's surface are really meant to transfer or transmit the energy of the sun, resulting in the building up of more complex molecules which can exhibit higher qualities as years pass by. This has happened over the past 4,000 million years. Thus capturing Sun's energy to build up higher organic compounds with newer capabilities constitutes in essence the chemistry of living.

49. The writer has introduced God into the argument to
(1) seek a divine explanation of life.
(2) illustrate the process of oxygenation ad decarbonisation.
(3) explain the chemical reactions that constitute life.
(4) link the terrestrial to the extraterrestrial.
50. The passage supports all of the following statements EXCEPT:
(1) Living matter is a pack of multiple organic chemicals reacting with one another.

- (2) Humans have highly complex chemical compounds not found in animals.
 (3) The reaction of organic compounds resulted in more complex molecules.
 (4) Organic elements gave rise to inorganic elements.

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

It is hard to think of anyone better placed to write the first comprehensive history of American women's literature than Elaine Showalter. One of the founders of feminist literary criticism in America and Princeton University's former professor of English literature, she mixes academic respect with the common touch; she has been a television critic for 'People' magazine and has a passion for campus novels, both serious and satirical.

Ms. Showalter's 18 previous academic works include "A Literature of Their Own: British Women Novelists from Bronte to Lessing", which came out in 1977 and has since become a classic. Now, turning her attention to her own native tradition, she has produced a magisterially wide-ranging survey, which stretches from the time of the Pilgrim Fathers to the present.

Her new book is named after a short story by Susan Gaskell, published in 1917, about a sensational murder trial. A downtrodden farmer's wife from Iowa is accused of murdering her husband. While the sheriff's men miss the proof of her guilt, their more perceptive wives immediately spot what has actually been going on in the bleak farmhouse. Concluding that the wife was driven mad by domestic abuse, they plot to make absolutely sure of her acquittal by secretly destroying the evidence: the patriarchal legal system, they believe, is not fit to judge a woman.

Ms. Showalter does not attempt to unravel the intractable moral and legal conundrums raised by this unsettling parable, but she uses it as a metaphor to ask questions about literary judgment. Certainly, in the early 20th century, when literature was being defined as an academic subject, establishment male critics who wanted to make American literature "more energetic and masculine" actively attempted to exclude female writers from the canon. In the 1970s, when Ms. Showalter herself started writing about women's literature, many critics thought they had to counter this trend with feminist polemic. In this book, however, Ms. Showalter's admirable aim is less pugnacious: to rescue forgotten works for a general audience, but not to shirk from making judgments (robustly dispensed, for example, towards the "unreadable, self-indulgent and excruciatingly boring" Gertrude Stein). All the writers discussed here are interesting from a historical viewpoint, but only some reach the peaks of genius. One perennial factor for women writers, according to Ms. Showalter, is "how they reconciled their public selves with their private lives". Unlike more abstract forms of criticism, which seem to place the work of art in a vacuum, Ms. Showalter's is grounded in the lived lives of her subjects, for whom she provides vibrant biographical sketches. This serves to counter Romantic (and, some would say, ultimately male) myths about the self-sufficiency of art, thus offering a subtle statement of her own feminist aesthetic.

From the earliest period, there seem to have been exceptional women who really were capable of having it all, such as Anne Bradstreet, a prolific 17th-century poet, who had eight children and a happy marriage, as well as critical renown. Others were pushed into writing by circumstance: Mary Rowlandson, who was captured and held hostage by native Americans in 1675, later described her experiences in a vivid account that was part anthropology (her captors' alarming diet included tortoises and horses' ears) and part adventure story.

Race is as dominant a theme as gender for Ms. Showalter's project. So she charts the tradition not only of African-American women writers, from Phillis Wheatley, an 18th-century poet, to the Nobel-prize-winning Toni Morrison, but also of white women who wrote on slavery. Pre-eminent among these was Harriet Beecher Stowe. Both Wheatley (who thanked God in heroic couplets for bringing her as a slave to America and Christianity) and the anti-slavery activist Stowe, whose "Uncle Tom's Cabin" depicts the lives of African-American slaves, have been accused of racism. Ms. Showalter instead treads a careful line, seeking primarily to appreciate their literary achievements in the cultural context of their times.

The most striking aspect of Ms. Showalter's survey is that it is not a history of inevitable progress. Indeed, the mid-19th-century literary marketplace was more dominated by women writers than any period before or since. Marriage and motherhood did not prevent Stowe—for whose exceptional literary craft Ms. Showalter makes a powerful case—from achieving unparalleled commercial success and political influence. It is later that female writers begin to feel routinely, sometimes suicidally, trapped by their womanhood. Modernism, with its macho ideal of the artist, seems to have provided a particularly hostile environment.

Ms. Showalter ends on an upbeat note, suggesting that women writing today are free from sexual prejudice. One warning, though: given that her overall narrative suggests that female literary status has been subject to historical ups and downs, one cannot assume women's writing will always be seen in the same light.

51. In the phrase "she uses it as a metaphor", the pronoun 'it' refers to
 (1) the incompetence of the patriarchal legal system.
 (2) the intractable moral and legal conundrums.
 (3) the short story by Susan Gaskell.
 (4) the judgement of the accused by the women.
52. When the reviewer talks of Ms. Showalter turning her attention to her own native tradition, he means that she is
 (1) studying feminist literature.

- (2) undertaking a critical review of feminist polemic.
(3) critically examining the work of American women novelists.
(4) passing literary judgement on American traditions.

53. The 'feminist aesthetic' in Ms. Showalter's writings is apparent in the

 - biographical sketches she draws of her subjects.
 - subtle statements she makes.
 - myths about the self-sufficiency of art.
 - all of the above.

54. Which of the following statements cannot be inferred from the passage?

 - Gertrude Stein comes under the critical gaze of Elaine Showalter
 - Ms. Showalter highlighted the racist aspects of Wheatley's work
 - Ms. Showalter recognized the literary merit of Stowe's work
 - Womanhood became a liability for female writers of the modern era

DIRECTIONS for question 55 and 56: 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.

55. BRUSH

- (1) She had a brush with death when she drove in haste.
 - (2) You cannot afford to brush aside her suggestions.
 - (3) You will have to brush up your German before going abroad.
 - (4) You can brush away the dirt from the dress.

56. ROBUST

- (1) A robust economy fuelled by employment opportunities is the aim of all developing countries.
 - (2) Even at the age of eighty, grandpa was a robust old man.
 - (3) Our banking system proved robust enough to withstand the backlash of the global banking crisis.
 - (4) The robust whimper of the puppy arrested my attention.

DIRECTIONS for question 57: There are two blanks in the following sentence. From the pairs of words given below, choose the pair that fills the blanks most appropriately.

57. Much of our justice system is based on _____ justice – to _____ the perpetrator by way of fine or imprisonment.

- or imprisonment.

 - (1) retributive . . . penalize
 - (2) egalitarian . . . accuse
 - (3) equitable . . . torment
 - (4) unprejudiced . . . punish

DIRECTIONS for questions 58 and 59: Select the correct alternative.

(Key and Solutions for AIMCAT1104-Form-3)

Key

1. 1	7. 1	13. 2	19. 4	25. 1	31. 4	37. 3	43. 4	49. 3	55. 3
2. 2	8. 4	14. 1	20. 4	26. 1	32. 1	38. 4	44. 2	50. 4	56. 4
3. 2	9. 1	15. 4	21. 4	27. 2	33. 4	39. 4	45. 4	51. 2	57. 1
4. 4	10. 3	16. 4	22. 4	28. 3	34. 3	40. 4	46. 3	52. 3	58. 4
5. 3	11. 3	17. 2	23. 2	29. 4	35. 3	41. 3	47. 2	53. 1	59. 1
6. 2	12. 3	18. 1	24. 3	30. 4	36. 4	42. 4	48. 1	54. 2	60. 2

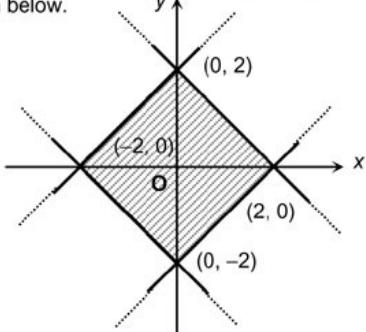
Solutions

SECTION – I

Solutions for questions 1 to 20:

1. $A = 4^{444}$; $B = 444^4$
 444 lies between 4^4 and 4^5
 $\therefore B$ lies between 4^{16} and 4^{20}
 $C = 44^{44}$
 44 lies between 4^2 and 4^3
 44^{44} lies between 4^{88} and 4^{132}
 $D = 4^{4^4}$ and is greater than 4^{4^4} [$\because 4^{4^4} > 444$]
The ascending order is BCAD. Choice (1)
2. If Manoj rented the bus for 12 hours or less, then the rent would have been greater than Rs.2400 because at Rs.7 per kilometre, for 400 kilometres the rent would be Rs.2800.
 \therefore The bus is rented for more than twelve hours.
 \therefore The rent at Rs.5 per kilometre = Rs.2000
As it is less than Rs.2400, the rent is calculated on hours basis.
 \therefore Number of hours = $\frac{2400}{160} = 15$ Choice (2)

3. Let $P_n(x)$ be the probability of x bombs hitting the bridge when a total of n bombs are dropped.
 $P_n(x \geq 2) > 99/100$ (required)
 $\Rightarrow 1 - [P(x=0) + P(x=1)] > 99/100$
 $\Rightarrow P(x=0) + P(x=1) < 1/100$
 ${}^nC_0 \cdot (1/2)^0 (1/2)^n + {}^nC_1 (1/2)^1 (1/2)^{n-1} < 1/100$
 $1/2^n + n/2^n < 1/100$
 $\frac{n+1}{2^n} < \frac{1}{100}$
Now if $n = 10$, $\frac{10+1}{2^{10}} = \frac{11}{1024}$ is not less than $\frac{1}{100}$.
Hence, clearly choices (3) and (4) are also eliminated.
(Observe that the number of bombs dropped (i.e., n) must be increased to increase the probability that the task is accomplished.) Choice (2)
4. Consider the area enclosed by the graph of $|x| + |y| = 2$, given below.



The area of the shaded region will be

$$\left(\frac{\text{The product of the diagonals}}{2} \right) = \frac{4 \times 4}{2} = 8 \text{ sq.units}$$

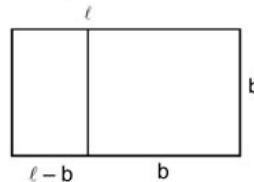
This graph can be shifted in the plane (without changing its size and shape), from the origin as its centre, to any point (a, b) as its centre.

Then the new (shifted) graph will be $|x - a| + |y - b| = 2$
[Note: The area enclosed by such a graph is independent of the values of a and b].

Hence the area enclosed by the graph $|x - 1| + |y - 1| = 2$ is also 8 sq.units. Choice (4)

5. Let $a + c = x$
 $\Rightarrow b + x = 25$ ————— (1)
and $(1+b)x = 144$ ————— (2)
 $\Rightarrow (1+b)(25-b) = 144$
 $b^2 - 24b + 119 = 0$
 $\Rightarrow b = 7$ or 17 Choice (3)

6. Let the length and the breadth of the original rectangle be ℓ and b respectively. The length and breadth of the smaller rectangle after a square of side b cut is $b \times (\ell - b)$.



Given that $\frac{\ell}{b} = \frac{b}{\ell-b}$
 $\Rightarrow \ell^2 - \ell b - b^2 = 0 \quad \Rightarrow \left(\frac{\ell}{b}\right)^2 - \left(\frac{\ell}{b}\right) - 1 = 0$
 $\Rightarrow \frac{\ell}{b} = \frac{1 \pm \sqrt{5}}{2}$ since $\frac{\ell}{b} > 0$, $\frac{\ell}{b} = \frac{\sqrt{5}+1}{2}$
The required ratio = $\frac{b^2}{b(\ell-b)} = \frac{b}{\ell-b} = \frac{1}{\frac{\ell}{b}-1}$
 $= \frac{1}{\frac{\sqrt{5}+1}{2}-1} = \frac{2}{\sqrt{5}-1} = \frac{\sqrt{5}+1}{2} = 1.618$ Choice (2)

7. The number of ways of choosing the three non-zero and non-unity digits out of 8 digits = ${}^8C_3 = 56$. These can be arranged in $\frac{6!}{2! \times 2! \times 2!} = 90$ ways and the digit 1 can be placed in any of the seven possible locations with respect to the six digits (7 \times 56 \times 90 as 35280)
 \therefore There are 35280 trials that are needed. Choice (1)

8. Since they are running in the same direction with their speeds in the ratio $n : 1$, (and n is a natural number) they meet at $(n - 1)$ distinct points. (At $\frac{L}{n-1}$, $\frac{2L}{n-1}$, $\frac{3L}{n-1}$ L , where L is the length of the track.) They meet at each of these points once every $(n - 1)$ times that they meet.
So, $(n - 1)$ has to be a factor of the difference $(17 - 5)$ or 12 . Except for $n = 6$, for all other values of n , this is true.
Choice (4)

9. Consider $13 \times 5 = 65 = 2^6 + 1$
First, find the remainder of $\frac{2^{1500}}{65} = \frac{(2^6)^{250}}{2^6 + 1}$, the remainder

of which is $(-1)^{250} = 1$
Since the remainder of 2^{1500} , when divided by 65 (which is a multiple of 13 , is 1), the remainder when 2^{1500} is divided by 13 will also be 1 .
Choice (1)

10. Let the cost of 2 pens = cost of 3 erasers = cost of 4 sharpeners = Rs.12
 \Rightarrow Cost of 1 pen = Rs.6, 1 eraser = Rs.4 and 1 sharpener = Rs.3. Therefore cost of 6 pens, 4 erasers and 3 sharpeners = $6 \times 6 + 4 \times 4 + 3 \times 3 =$ Rs.61.
Now, new prices after the increase are 1 pen = Rs.6, 1 eraser = Rs.4.8, 1 sharpener = Rs.3.9.
Therefore new cost of 6 pens, 4 erasers and 3 sharpeners = $6 \times 6 + 4 \times 4.8 + 3 \times 3.9 =$ Rs.66.9
 \Rightarrow Percentage increase required = $\frac{66.9 - 61}{61} = \frac{5.9}{61}$ which is slightly less than 10%
Choice (3)

11. The capacity of each mug is between 2 and 4 litres, where as the capacity of each bucket is 4 litres. Hence to empty n mugs, as per the condition, n buckets are needed $\Rightarrow x = n$. Since C_n is the greatest among all capacities, the bucket with C_n litres of water has the least empty space, i.e. $(4 - C_n)$. The empty space of other buckets is greater than this. Therefore, the total empty space must be greater than $n(4 - C_n)$.
Choice (3)

12. For $x = -2$ and $y = 1$, $f(x, y) = 1$ and $g(x, y) = 1$
 \therefore the choices (1), (2) and (4) all yield the value 0 .
Hence, choice (3) is the right option.
Choice (3)
13. Let the number be $N = a^p \cdot b^q \cdot c^r$ with $p > q > r$ Where a, b, c, \dots are prime numbers and p, q and r are natural numbers.
Number of factors $N = (p+1)(q+1)(r+1)$ = 4
 $4 = (1)(4) = (2)(2)$
 \therefore the possibilities are
 $p+1 = 4$ OR
 $p+1 = q+1 = 2$
 $\therefore p = 3$ or $p = q = 1$
 \therefore Either $N = a^3$ or $N = ab$. In either case, sum of the factors of N excluding 1 and N is 56 .
If $N = a^3$, $a + a^2 = 56 \Rightarrow a = 7$. $N = 343$
if $N = ab$, $a + b = 56$
Assuming $a < b$, $(a, b) = (3, 53), (13, 43)$ or $(19, 37)$.
 \therefore required sum = $343 + (3)(53) + (13)(43) + (19)(37)$
 $= 343 + 159 + 559 + 703 = 1764$
Choice (2)

14. Let the distance $PQ = 1$. When Zoysa and Yuva to meet they together cover a distance of $2PQ$ i.e. 2 .
Speed of Zoysa = $\frac{1}{3}$ and the speed of Yuva = $\frac{1}{6}$
 \therefore The time taken by them to together cover $2PQ = \frac{2}{\frac{1}{3} + \frac{1}{6}} = 4$ hours
So, they will meet at 1:00 p.m.
Choice (1)

15. There are 3 bumble bees on the 1^{st} day, 9 on the second, 27 on the 3^{rd} etc. After 8 weeks i.e. 56 days there will be 3^{56} bees.
Now we need the remainder when 3^{56} is divided by 5 which is 1 .
Choice (4)

- 16.
-

$\triangle SPQ$ is right-angled (angle in a semicircle)
 $\angle POQ = 180^\circ - 120^\circ = 60^\circ$ and $OP = OQ =$ radius (i.e. $8\sqrt{3}$ cm). Hence $\triangle POQ$ is equilateral and $PQ = 8\sqrt{3}$ cm

$$\text{Now in } \triangle SPQ, SP = \sqrt{SQ^2 - PQ^2} = 24 \text{ cm}$$

$$= \sqrt{(2 \times 8\sqrt{3})^2 - (8\sqrt{3})^2}$$

$$\Rightarrow \text{Area of } \triangle SPQ, \text{ right-angled at } P, \text{ will be } \frac{1}{2} SP \times PQ$$

$$= \frac{1}{2} \times 24 \times 8\sqrt{3} = 96\sqrt{3} \text{ sq.cm.}$$

Choice (4)

17. Let the largest natural number written be n and let the erased number be x .

$$\frac{n(n+1)}{2} - x = 28 \frac{4}{9} = \frac{256}{9}$$

$\Rightarrow (n-1)$ is a multiple of 9 .

The average of n natural numbers is $\left(\frac{n+1}{2}\right)$

$\therefore 28 \frac{4}{9}$ should be close to $\left(\frac{n+1}{2}\right)$ as $(n-1)$ is divisible by 9 .

$\therefore n$ is of the form $9k + 1$ close to $(2 \times 28) = 56$
Only value of ' n ' satisfying this is $n = 55$

$\therefore n = 55$
when $n - 1 = 54 \Rightarrow n = 55$

$$\therefore \frac{\frac{55 \times 56}{2} - x}{54} = \frac{256}{9}$$

$$\Rightarrow 55 \times 28 - x = 256 \times 6$$

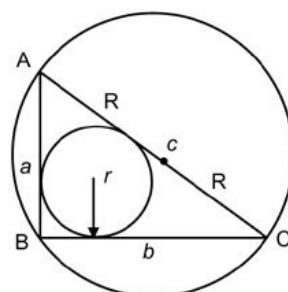
$$\Rightarrow x = 1540 - 1536 = 4$$

Choice (2)

18. The area of a right-angled triangle whose inradius is r and circumradius is R is given by $(r^2 + 2Rr)$. In the given problem, $r = 4$ cm and $R = 10$ cm.

\therefore The area is 96 sq.cm.

Proof:
Consider the right-angled triangle ABC shown below, wherein radius = r and circumradius = R



Let $AB = a$, $BC = b$ and $AC = c$

$$\text{Then area } A = \frac{1}{2} ab = \frac{1}{2} r(r^2 + 2Rr)$$

$$\begin{aligned} \Rightarrow 2A &= r(a+b) + rc \\ \text{But } c &= 2R \text{ and } a+b \\ &= \sqrt{(a+b)^2} = \sqrt{a^2+b^2+2ab} = \sqrt{(2R)^2+4A} \\ \Rightarrow 2A &= r\sqrt{4R^2+4A} + 2Rr \Rightarrow A - Rr = r\sqrt{R^2+A} \\ \Rightarrow A^2 - 2ARr + R^2r^2 &= R^2r^2 = r^2R^2 + r^2 \Rightarrow A = R^2 + 2Rr \\ \text{Now, given } r &= 4 \text{ and } R = 10 \Rightarrow r^2 + 2Rr = 96 \end{aligned}$$

Alternative solution:

It can be noted that for a 3/4/5 right-angled triangle, inradius = 1 cm (i.e., because $rs = 1/2 ab$ OR $\frac{r(3+4+5)}{2} = \frac{1}{2} \times 3 \times 4$) and circumradius = 10 cm.

Hence for the given right-angled triangle, each parameter has become exactly four times that for a 3/4/5 right-angled triangle. Hence, the ratio of the dimension is 1 : 4 (i.e., $\frac{10}{25} = \frac{4}{1} = 4$) and the ratio of areas will be 1 : 16.

Hence, the area of the given triangle = $16 \times \left(\frac{1}{2} \times 3 \times 4\right)$ = 96 sq.cm
Choice (1)

$$\begin{aligned} 19. \text{ Given } E &= 2x^2 + 3y^2 - 6x + 9y + 15 \\ &= 2x^2 - 6x + 3y^2 + 9y + 15 = 2(x^2 - 3x) + 3(y^2 + 3y) + 15 \\ &= 2\left(x - \frac{3}{2}\right)^2 + 3\left(y + \frac{3}{2}\right)^2 + 15 - 2\left(\frac{9}{4}\right) - 3\left(\frac{9}{4}\right) \end{aligned}$$

$$= 2\left(x - \frac{3}{2}\right)^2 + 3\left(y + \frac{3}{2}\right)^2 + \frac{15}{4}$$

So, if $x = \frac{3}{2}$ and $y = -\frac{3}{2}$, E has its minimum value, i.e.,

$\frac{15}{4}$. The smallest integer greater than $\frac{15}{4}$ is 4.

∴ The minimum integral value of E is 4. Choice (4)

20. If N has 12 factors, the complete list of the possible forms of N are

$$N = a^{11} \text{ OR } N = a \times b^5 \text{ OR } N = a^2 \times b^3 \text{ OR } N = a \times b \times c^2$$

[∴ 12 = (12 × 1) OR (2 × 6) OR (3 × 4) OR (2 × 2 × 3)]

N^2 can correspondingly be of the forms

$$N^2 = a^{22} \text{ OR } N^2 = a^2 \times b^{10} \text{ OR } N^2 = a^4 \times b^6 \text{ OR } N^2$$

$$= a^2 \times b^2 \times c^4$$

∴ N^2 can have (22 + 1) OR (2 + 1)(10 + 1) OR (4 + 1)(6 + 1) OR (2 + 1)(2 + 1)(4 + 1) factors i.e., 23, 33, 35 or 45 factors but N^2 cannot have 55 factors. Choice (4)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	-
Easy	2, 12
Medium	1, 4, 5, 7, 10, 14, 16, 18, 20
Difficult	3, 6, 8, 9, 11, 13, 15, 17, 19
Very Difficult	-

SECTION - II

Solutions for questions 21 to 24:

As no two pipelines connecting same place are carrying same amount, and at least one of the pipelines should carry same as that of the place, either H-I or G-H must carry 300. If G-H carries 300, then H-I must carry 200, which is not possible.

∴ H-I must carry 300 and G-H must carry 400.

D-G should carry 400 more than the requirement at 6.

∴ G's requirement must equal that of G-H.

∴ Requirement at G = 400

D-G = 800

The maximum capacity of A-D is 1000.

∴ D cannot be more than 100, as then A-D will be more than 1000.

∴ D must be 100 and D-C must be 100.

A-D is 1000.

Similarly, E is 100 and E-I is 100.

∴ I is 100 + 300 = 400

Total requirements of all the places given is

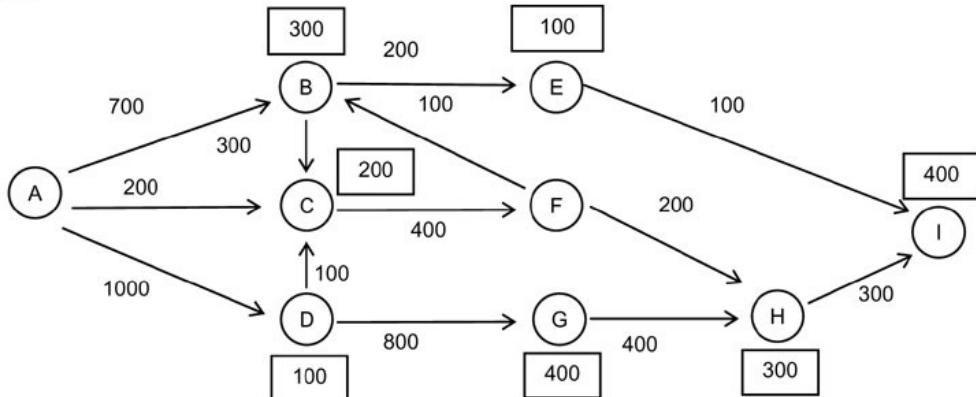
300 + 200 + 100 + 100 + 100 + 400 + 300 + 400 i.e., 1900.

∴ A-C = 1900 - (1000 + 700) = 200

Now C-F cannot be 100.

∴ F-B must be 100 and B-C must be 300 and C-F is 400.

The final diagram is



21. Choice (4)
 22. Choice (4)
 23. Choice (2)
 24. Choice (3)

Solutions for questions 25 and 26:

It is given that, the houses, are arranged as below.

White	Light	Bright	Delight	Knight	Might
	Mohit				
				Basant	

Ranjit \longleftrightarrow Laila

Further,

$$\begin{array}{l} \text{White} \times \text{ Bright} \\ \text{Delight} \times \text{ Might} \\ \text{Light} \times \text{ Knight} \end{array}$$

Now

\Rightarrow Manya cannot stay in the White or the Light or the Bright or the Delight or the Knight houses.
 \Rightarrow She must stay in the Might house.

Similarly, Barath must stay in the White house.

\Rightarrow Ranjit and Laila must stay in the Bright house [because, if they are in the Knight House (i.e., the only other possibility), then Farhat and Lohit must be in Bright House and Delight House respectively (from item v in question). Then Laila and Lohit are in adjacent houses, which is a contradiction] and Ramya must stay in the Knight house.

White	Light	Bright	Delight	Knight	Might
Barath	Mohit	Ranjit			
		Laila	Basant	Ramya	Manya

25. If Falgun stays in the Light house, Farhat has to stay in the Delight house and Lohith will be staying in the Knight house and then the members of the Might house are Sohit and Manya. Choice (1)

26. Basanti has to be in the house next to Laila. Choice (1)

Solutions for questions 27 and 28:

27. From A alone, unless the date on which Venus played is known, the question cannot be answered.
 Hence A alone is not sufficient.
 From B alone, the 15th day is Tuesday and number of odd days in one. Hence 25th February is a Tuesday.
 Hence B alone is sufficient. Choice (2)

28. From statement A, at least one of C and D must be rejected.
 At least two of A, B and E must be selected.
 At least one of A and B must be selected in the team, but that can be A or B.
 \therefore Statement A alone is not sufficient
 From statement B, if E is selected, then A must be selected but none of C and D is selected.
 The teams can be ABE, or ACD or BCD.....
 \therefore B alone is not sufficient. From A and B, as at most one of C, D and E can be selected, B must always be selected.
 \therefore Statements A and B together are sufficient. Choice (3)

Solutions for questions 29 to 32:

Since, the cost price of each item is a two digit prime number, each of the unit's digit in the cost price has to be 1, 3, 7 or 9. Since all the digits are to be different, the tens digit of each cost price has to be one of 2, 4, 5, 6 or 8.

\therefore The available prime numbers are 23, 29, 41, 47, 53, 59, 61, 67, 83 and 89.

29. If Rs.47 and Rs.29 are the cost prices of two items, then the cost price of the third item would be Rs.61 and the cost price of the fourth item can be either Rs.53 or Rs.83. Accordingly the total amount spent will be Rs.190 or Rs.220. Choice (4)

30. Choice (1) – The boy has to purchase one item costing Rs.41 or Rs.47. \therefore He cannot purchase the item costing Rs.43.

Choice (2) – The units digits of all the four cost prices are 1, 3, 7 and 9, whose sum is 20. Hence, the total cost is divisible by ten.

Choice (3) – Since, the cost prices with units digit 1 or 7 are 41, 47, 61 and 67, one item costing Rs.61 or Rs.67 has to be purchased.

Choice (4) – The boy can purchase items costing Rs.23, Rs.89, Rs.61 and Rs.47. Hence choice (4) is false. Choice (4)

31. The cost of two items must be (41, 67) or (61, 47)

\therefore Total cost of these two items will be the same. The costs of one of the remaining items is 23, 53, 83 and the other is 29, 59, 89.

\therefore Difference is at the most 60. Choice (4)

32. The difference will be the least if the costs of the items are 29, 47, 53, 61. In this case the difference is 32.

Choice (1)

Solutions for questions 33 and 34:

33. The required configuration is as given below

9	6	3
8	5	2
7	4	1

This can be obtained from the given configuration by interchanging.

①	②	3
④	5	⑥
7	⑧	⑨

(i) 1 and 9

(ii) 2 and 6

(iii) 4 and 8

i.e. a total of 3 operations.

Choice (4)

34. First consider a 2×2 grid. From any initial configuration, any other configuration can be obtained in a maximum of 3 steps.

Now, consider the 3×3 grid itself. To obtain any configuration we have to arrange 8 of the given numbers in correct position, which will automatically make the 9th number to move into correct position. To get each of these numbers into their correct positions, we need at most one interchange. Hence, 8 operations will be sufficient to obtain any configuration. In general, for $n \times n$ grid, at most $n^2 - 1$ steps (i.e., 1 less than the number of numbers in the grid) are required. If there are a total of 16 numbers, the required answer as per the above explanation, will be 15.

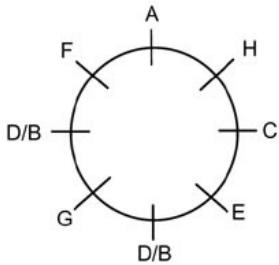
Choice (3)

Solution for question 35:

35. From A alone, we cannot determine who sits in between B and D. A alone is not sufficient.

From B alone, we cannot determine who sits in between B and D. So, B alone is not sufficient.

Combining A and B we get



G sits in between B and D.

Choice (3)

36. From statement A, $yz + xy = \text{even}$
 $\Rightarrow \text{even} + \text{even} = \text{even}$
 $\text{odd} + \text{odd} = \text{even}$
 but as zx may be odd or even we cannot answer the question.
 From statement B, $yz + zx = \text{even}$
 $\Rightarrow \text{even} + \text{even} = \text{even}$
 $\text{odd} + \text{odd} = \text{even}$
 Since xy can be odd or even we cannot answer the question.
 \therefore Using both the statements, $xy + yz + zx = \text{odd}$
 $\text{odd} + \text{odd} + \text{odd} = \text{odd}$
 $\text{even} + \text{even} + \text{even} = \text{even}$
 Both the statements are also not sufficient. Choice (4)

Solutions for questions 37 to 40:

37. Sales = $\frac{\text{Profit}}{\text{Profit as a percentage of sales}}$

In 2003,

$$P = \frac{500}{25\%}$$

$$Q = \frac{600}{25\%}$$

$$R = \frac{500}{40\%}$$

Clearly, $Q > P > R$.

Choice (3)

38. Ratio of profits to Exports of mobiles in the different years are

$$2002 = \frac{30\% \text{ of sales}}{25\% \text{ of sales}}$$

$$2003 = \frac{25\% \text{ of sales}}{20\% \text{ of sales}}$$

$$2004 = \frac{40\% \text{ of sales}}{35\% \text{ of sales}}$$

$$2005 = \frac{40\% \text{ of sales}}{25\% \text{ of sales}}$$

Clearly, it is the highest in 2005.

Choice (4)

39. We know that 60% of sales are exports.

\therefore Ratio of domestic sales to exports (by value) = 2 : 3.
 Ratio of domestic sales to exports (by volume) = 4 : 1

$$\text{Ratio of average prices} = \frac{2}{4} : \frac{3}{1} = 1 : 6 \quad \text{Choice (4)}$$

40. The total profits in the different years are

2001 – 1200

2002 – 1400

2003 – 1600

2004 – 1600

2005 – 1900

The percentage growth in profits are $\frac{200}{1200}, \frac{200}{1400}, \frac{0}{1600}$

$$\text{and } \frac{300}{1600}$$

The highest is $\frac{300}{1600}$, i.e. for the year 2005

Choice (4)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	33, 36
Medium	25, 26, 27, 28, 34, 35, 37, 38, 39, 40
Difficult	21, 22, 23, 24, 29, 30, 31, 32
Very Difficult	–

SECTION – III

Solution for question 41:

41. Statement B is incorrect because the word 'reckon' is always followed by with. Hence the correction is 'once a power to reckon with.....'. Statement D is erroneous because the word 'Renaissance' should be preceded by the definite article 'the' because here, the reference is to a famous movement in history. Only A and C are free of errors.

Choice (3)

Solution for question 42:

42. The sentence speaks about women being unable to break the chauvinistic conduct of a male dominated society. Hence it is obvious that women live in a 'conformist' (i.e. conforming or complying with accepted behaviour or established practices) society and therefore they display very little 'courage' to break the conduct of a male dominated world. Hence option 4 is the most appropriate answer. The words downtrodden (treated badly by people in power) and impoverished (poor) do not suit the context. The word progressive (advanced) is a misfit in the given context. Hence option 3 can be eliminated. Choice (4)

Solutions for questions 43 to 46:

Number of words and Explanatory notes for RC:

Number of words : 1,178

43. Refer to para 7 and para 8; para 8 says.....' simple emotions can widen the definition of one's group and then '..... rid us of the curse of xenophobia' (fear of foreigners).

Choice (4)

44. The phrase occurs in para 5 and this together with para 4 shows that choice 2 right (..... we must consider our biological leash when deciding what kind of society we want to build.....). The other options are partly or fully true, but (2) is what the author is driving at through the use of the phrase.

Choice (2)

45. Refer to para 10 beginning with the words in quote. The colon indicates that what follows – 'globalisation by a tribal species - explains the statement.

Choice (4)

46. Refer to para 2, the last 4 lines.

Choice (3)

Solution for question 47:

47. The word dessert refers to sweet food eaten at the end of a meal. Hence, it does not suit the context. 'Somebody's just deserts' is an idiom. What somebody deserves, especially when it is something bad is referred to as 'just deserts'. Hence A is apt. The word flak which means criticism is more apt in the given context. Flack which means a publicity agent, does not suit the context. Anxious means feeling worried or nervous. The word eager which means very interested or excited about something that one wants to do, suits the context perfectly. Hence B.

Chaff refers to the outer covering of the seeds of grains such as wheat. Chafe refers to the soreness caused when something rubs against something. Only the former is apt in the given context. Hence A.

The word gambit, which refers to a thing that somebody does or something that somebody says at the beginning of

a situation or conversation, that is intended to give them some advantage, suits the context appropriately when compared to the word gamut (the complete range of a particular kind of thing). Hence the correct sequence is AABAA.
Choice (2)

Solution for question 48:

48. Only the word explosion suits the context perfectly, because here we are talking in terms of the steep increase in the number of people. The words proliferation, burgeoning and eruption are not suitable in this context because we cannot say the rapid proliferation, burgeoning or eruption in the number of people. Hence only 1 is apt.
Choice (1)

Solutions for questions 49 and 50:

Number of words and Explanatory notes for RC:

Number of words : 597

49. Choice (3) is best supported by the 4th para of the passage ... "by breathing life into man ... oxygenation and decarbonisation ... constituted life ... these chemical reactions".
Choice (3)
50. The first three paragraphs support options (1), (2) and (3). Paras (2) and (3) state that organic and inorganic reactions take place to form more complex compounds. But nowhere is choice (4) stated.
Choice (4)

Solutions for questions 51 to 54:

Number of words and Explanatory notes for RC:

Number of words : 791

51. The sentence appears in para (3) and the pronoun stands for the immediate precedent (parable). So, the reference is to the short-story by Susan Gaskell as stated in the previous para. All the other options are distractors. Choice (2) seems right, but is logically flawed. Note that noun conundrums is plural and can't be followed by pronoun 'it'.
Choice (3)
52. Choice (3) is the answer. Refer to paras (1) and (2). It is clear that her own native tradition is criticism of American literature produced by women. From British women literature, she has turned to American literature. Choice (1) is not specific. Choice (2) is not suggested. "American traditions" renders choice (4) incorrect.
Choice (3)
53. Refer to para (6), where the idea is discussed. Read in context, we can easily arrive at choice (1) as the answer. Choice (2) is vague and incomplete. Choice (3) is an absurd suggestion.
Choice (1)
54. Choice (1) can be inferred in the lines 'boring Gertrude Stein'. Choice (2) is not true. Ms. Showalter does not level the charges of racism on Wheatley.. She 'instead ... appreciates their literary achievements'. Choice (3) can be inferred from 'Ms. Showalter makes a powerful case' for Stowe's 'exceptional literary craft. Choice (4) can be inferred from as 'modernism' drew a 'macho' image of the artist'.
Choice (2)

Solutions for questions 55 and 56:

55. The third option is incorrect. The word brush is followed by 'up'. The phrasal verb 'brush up' is used in the sense of 'polish up' or 'work on' something.
Choice (3)
56. In choice (4) robust is used incorrectly 'Robust' implies power or a strength. 'Whimper' is a cry of pain or distress. Hence the two words do not go with each other.
Choice (4)

Solution for question 57:

57. Levying fine on someone or inflicting punishment on someone means penalizing them or punishing them. Hence the words punish and penalize suit the context. The word accuse and torment do not suit the context. Hence 2 and 3 are inapt. The word retributive (requital usually for evil done) is most appropriate in the given context. Penalizing the perpetrator of evil is based on retributive justice. Hence choice 1 fits in most perfectly in the given context.
Choice (1)

Solutions for questions 58 and 59:

58. The possibilities of undermining (weakening) the theory would be (i) if there is some other reason that could logically explain why the turtles return, or (ii) if there is a reason given that indicates it is not possible for the turtles to be guided by smell. None of the choices provide the first possibility. (Choice 2 would offer the possibility only if a connection were to be drawn between sand and smell). Choice 4 points to the second possibility. 4 makes it clear that the turtles no longer have a sense of smell. In such case, the smell would not be what causes their return.
Choice (4)

59. The lyric indicates that the box no longer contains any wishes or dreams since these have been answered by the loved one. It must be kept in mind that, since the person is not talking about 'a box for my wishes....', but about 'a box for wishes....', this would, logically, indicate anybody's (and everybody's) unfulfilled wishes and dreams.

With these expressions:

- (a) can be understood.
- That the loved one could 'answer' does not indicate that no one else could. Thus, (b) cannot be inferred.
- The last 2 lines indicate that (c) can be understood.
- For the same reasons as for (b), (d) cannot be inferred.
- Since the box can, conceivably, contain all unfulfilled wishes and dreams, (e) can be inferred.
Choice (1)

Solution for question 60:

60. Statement B is erroneous because the word order is incorrect here. The correction is 'so high is the court from where justice is delivered' Statement C is incorrect because the pronoun 'itself' does not agree with the plural word 'bretheren'. Therefore, the correction is '..... the robed bretheren as a class are a wonder in themselves. A and D are free of errors.
Choice (2)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
Very Easy	-
Easy	49, 50
Medium	41, 42, 45, 46, 48, 51, 52, 53, 55, 56, 60
Difficult	43, 44, 47, 54, 57, 58, 59
Very Difficult	-