

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. 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
2. 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
3. The base radius and height of a right circular cone C_1 are equal to the height and radius of a cylinder L_1 respectively. The height and radius of C_1 are interchanged to get another cone C_2 and similarly the height and radius of L_1 are interchanged to get another cylinder L_2 . If the volume of L_1 is 9 times the volume of C_1 , what is the ratio of the volumes of L_2 and C_2 ?
(1) 1 : 9 (2) 1 : 3 (3) 1 : 1 (4) 3 : 1
4. All reputed B-schools fleece their students and one-sixth of all B-schools that fleece their students are reputed. Also, one-fourth of all B-schools that are recognised, fleece their students. There are exactly six reputed B-schools which are also recognised, and 39 B-schools which are recognised but do not fleece their students. If there are a total of 78 B-schools which fleece their students, then how many of these are neither recognised nor reputed?
(1) 55 (2) 56 (3) 57 (4) 58
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. 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
7. Mr. Shyam manufactures and sells pens in a market. The cost, in rupees, of producing x units is $\frac{x^2}{75} + 0.1x$, whereas the selling price, in rupees, of x units is $10 + 0.5x$. How many units should Mr. Shyam manufacture and sell to maximize the profit?
(1) 14 (2) 18 (3) 15 (4) 17
8. 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
9. Of 64 boxes of apricots, each box contains at least 60 and at most 81 apricots and not more than three boxes have the same number of apricots. What is the least number of apricots that can be there in all the boxes together?
(1) 4,532 (2) 4,391 (3) 4,491 (4) 4,492
10. 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) $n(4 - C_1)$
11. 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) $f(x, y) - g(x, y)$

12. Consider the following sum of 2^{32} terms:

$$S = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \dots + \frac{1}{2^{32}},$$

Which of the following statements is true?

- (1) $5 < S < 8\frac{1}{2}$ (2) $9 < S < 16\frac{1}{2}$
 (3) $17 < S < 32\frac{1}{2}$ (4) $33 < S < 64\frac{1}{2}$

13. Five friends A_1, A_2, A_3, A_4 and A_5 take up an assignment. It is known that, for $i = 1$ to 4 , A_i , when working alone, takes $(i+1)$ times as much time as the other four would take, when working together. If all the five friends work together on the assignment and they earn a total of Rs.600, what is the share of A_5 ?

- (1) Rs.40 (2) Rs.20 (3) Rs.25 (4) Rs.30

14. A triangle is drawn on the x - y plane with its vertices at $(3, 3), (3, 53)$ and $(53, 3)$. The number of points with integer co-ordinates lying inside the triangle, including all the points on the boundary, is

- (1) 1540 (2) 1326 (3) 1236 (4) 1425

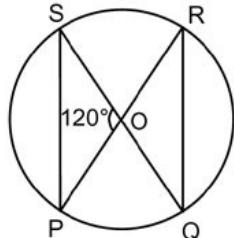
15. A bus rental agency has the following terms. If a bus is rented for twelve hours or less, the charge is Rs.200 per hour or Rs.7 per kilometre whichever is more. On the other hand, if the bus is rented for more than twelve hours, the charge is Rs.160 per hour or Rs.5 per kilometre whichever is more. 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

16. If n is a natural number less than 100 and k is any whole number, for how many values of n is $n^2 = 24k + 1$?

- (1) 32 (2) 33
 (3) 34 (4) None of these

17. 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) $96\sqrt{3}$

18. 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

19. Vessel 1 contains 5 litres of alcohol; vessel 2 contains 5 litres of water. From vessel 1, one mug of alcohol is taken and added to vessel 2. One mug of the mixture is poured back into vessel 1. What can be said about the percentage of alcohol in vessel 2 and the percentage of water in vessel 1?

- (1) The former is greater than the latter.
 (2) The two are equal.
 (3) The latter is greater than the former.
 (4) Nothing can be said as volume of the mug is not known.

20. $|2x - 5| \leq 9$ and $|4y - 7| \leq 21$. What is the maximum value of $|x| - |y|$?

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

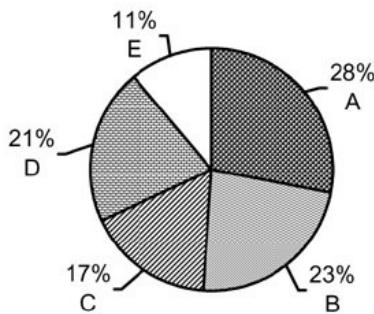
SECTION – II

Number of Questions = 20

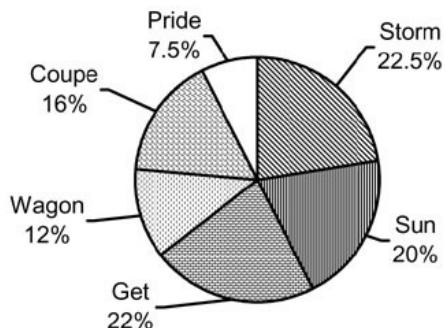
DIRECTIONS for questions 21 to 24: Answer the questions on the basis of the information given below.

Pie chart -1 gives the dealerwise break-up of the number of cars sold by XYZ motors in Chennai by its five dealers – A, B, C, D and E – and Pie-chart -2 gives the modelwise break-up of the number of cars sold in Chennai by all the five dealers of XYZ motors.

Pie chart -1



Pie chart -2



Note: All questions pertain only to the sales (by volume) of XYZ motors in Chennai.

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21. At least how many models of cars did dealer A sell, if it was known that for any model sold by dealer A, the sales of that model by dealer A accounted for at least one-third of the total sales of that model in Chennai?
 (1) 2 (2) 3 (3) 4 (4) 5
22. If for any dealer, sales of the model Coupe accounted for at most 30% of the total sales, then at least how many dealers sold this model?
 (1) 2 (2) 3 (3) 4 (4) 5
23. If dealer D sold an equal number of all the six models of cars, the share of sales of any model by dealer D in the total sales of that model in Chennai is at most
 (1) 20% (2) 25%
 (3) 33.33% (4) None of these

24. If the dealers A and B sold only the lower and mid-size models, i.e., Sun, Storm and Get, at least what percentage of the total sales of Storm in Chennai are sold by these two dealers?
 (1) 50% (2) 40% (3) 30% (4) 25%

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 question 27: 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.

27. If $x + 2y + z = 8$ and $2x + y + z = 7$, what are the values of x , y and z ?
 A. x , y and z are positive integers.
 B. x , y and z are distinct numbers.

DIRECTIONS for question 28: Each question is followed by two statements, A and B. Answer each question using the following instructions:

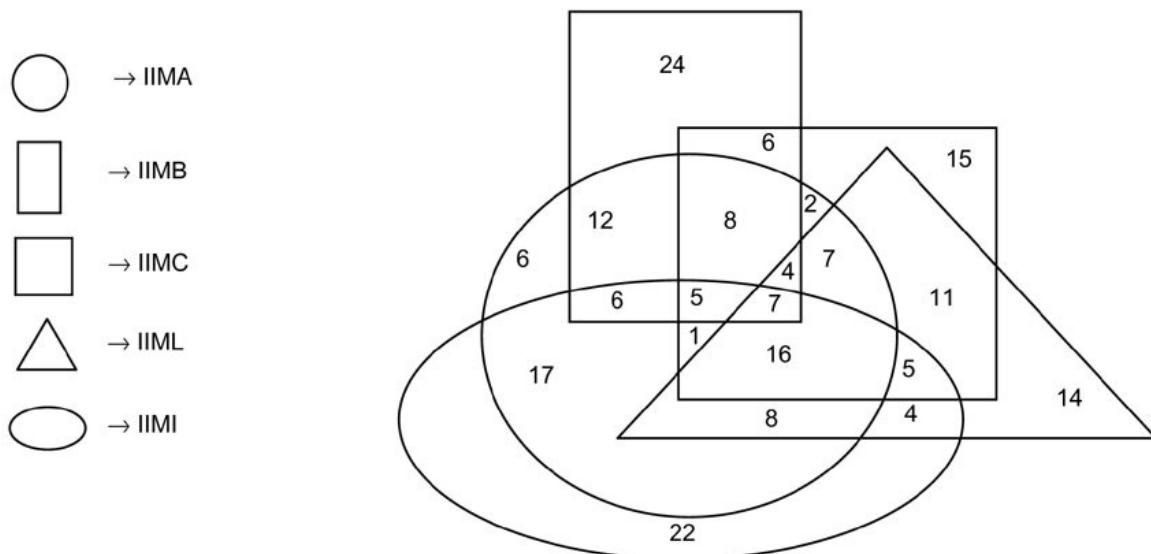
- Mark (1) if the question can be answered using statement A alone but not by using statement B alone.
 Mark (2) if the question can be answered using statement B alone but not by using statement A alone.
 Mark (3) if the question can be answered by using both the statements together but not by either 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.

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 on the next page.

29. Of the students who did not get admission into IIMA, how many did not get admission into IIMB or did not get admission into IIML but did manage to get admission into IIMC?
 (1) 34 (2) 35
 (3) 37 (4) None of these
30. How many students got admission into exactly two or into exactly three of the given institutes?
 (1) 87 (2) 90
 (3) 91 (4) None of these

The diagram given below represents the distribution of the number of students from a well known institute of CAT coaching in India getting admissions at five prestigious Institutes of Management in India.



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 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 using either of the statements alone.

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

35. In an island, there live three types of tribes – Truth-Tellers, who always tell the truth, Liars, who always lie and Alternators, who always tell a truth and a lie, alternately, in any order. A, B and C are three persons who belong to that island. If A says "B and C belong to different tribes. I am an Alternator", to which tribe does C belong?

A. B says "Both A and C are Truth-Tellers. I am not a Truth-Teller".

B. C says "A is not a Truth-Teller. I am not a Liar".

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.

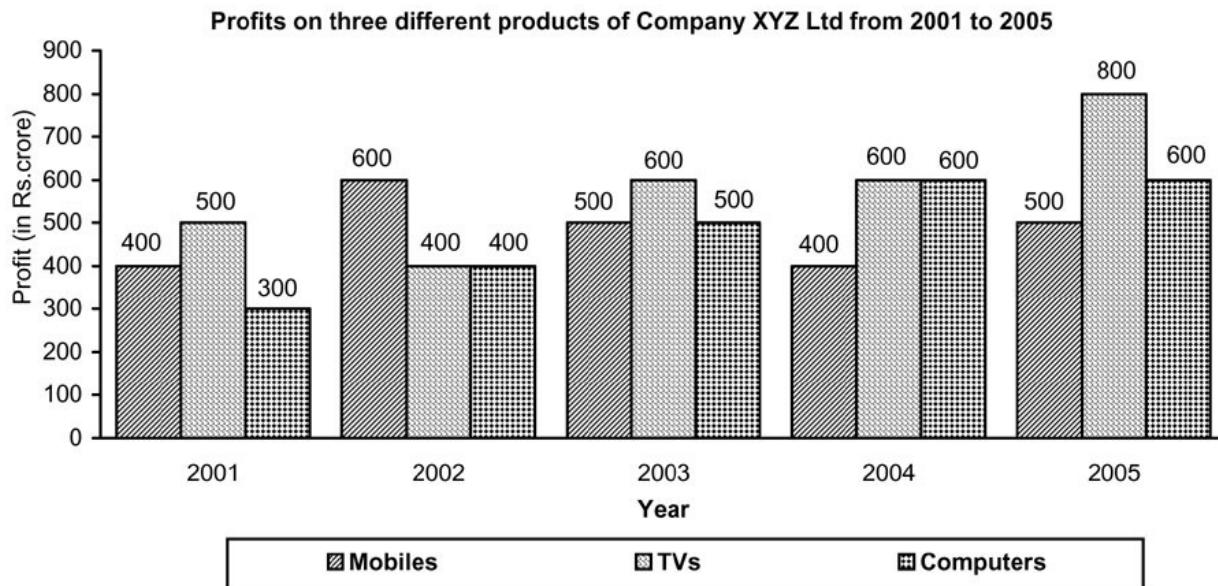
Mark (2) if the question can be answered by using either statement alone.

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.

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%

(Total sales = domestic sales + exports)

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

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%

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 empathic 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

 - (1) visual images have the power to change people's attitude to others, even enemies.
 - (2) universal human rights is not an unachievable goal.
 - (3) even tough hardliners are not totally bereft of gentler emotions.
 - (4) 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

 - (1) our biological past limits our ability to empathise with strangers.
 - (2) we should take our predispositions into consideration when we seek to structure the world.
 - (3) universal human right is not an achievable goal since we are naturally xenophobic.
 - (4) 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

 - (1) our natural suspicion of strangers and people different from us.
 - (2) the fact that it is possible for man to overcome his natural proclivities.
 - (3) our tendency to appropriate positive qualities to ourselves while attributing negative qualities to animals.
 - (4) the fact that though we seek to build a global village, our instincts still lie in our tribal past.

46. The origin of empathy, according to the author,

 - (1) can be traced back to the point where our lineage split off from that of the apes.
 - (2) begins a few hundred years ago when man developed intellectually to understand himself and others.
 - (3) is deep rooted in our evolutionary past as it is also found in other animals.
 - (4) is lost in a maze of claims and counter claims by sociologists and scientists.

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

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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.

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 carbon dioxide, 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. Adrenalinor-adrenaline, dopamine histamine, acetylcysteine 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 acetylcysteine 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. Endorphins 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 and decarbonisation.
- (3) explain the chemical reactions that constitute life.
- (4) link the terrestrial to the extraterrestrial.

50. Which of the following statements are not true?

- (1) Chocolates make up for lack of phenyl ethylene.
- (2) A low level of dopamine causes schizophrenia.
- (3) Morphine is a pain-reliever.
- (4) Exercise and meditation are good antidotes to depression.

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

Banning the burqa is a hot-button issue in Europe, and several countries in the continent have already pressed it. However, across the Channel, mainline British parties won't touch it for fear of burning their fingers. Is it then worth the risk? Why not look the other way and get along with democracy as usual? Are there lessons in here for India?

For Europeans, in general, the burqa symbolises an anti-democratic way of life. This is why they find it so repugnant. Many have argued that European burqa-baiters are Christian fanatics, but that is an exaggeration. Whether conservative or radical, when it comes to the burqa there is near unanimity in the main streets of Europe, including the crossroads to the right and the left. According to most Europeans, the only way democracy can condone the burqa is either to don one itself or stick its head in the sand. There is no third option!

Unsurprisingly, banning the burqa has been relatively easy in Europe. Belgium's Lower House unanimously passed it; in France, Nicolas Sarkozy is putting all his weight behind it; Italy has already tabled a Bill on it; and in socialist-ruled Spain burqa wearers might soon face criminal charges. Municipalities like those in Barcelona, Tarragon and Lleida had banned the burqa earlier. That the burqa does not have religious sanction in the most sacred texts of Islam has come in useful. Nevertheless, there is little doubt ordinary Europeans find the veiling of half the world inherently contrary to the basic principles of democracy. This perception has led the governments of France, Italy, Belgium and Spain to brave the ire of radical Islamicists and their diaspora mullahs.

If Turkey's admission to the European Union has met with popular reluctance in Europe, the reason is simply this. At the street level, most Europeans feel that while they are moving away from religion, Turkey is not. It is not as if the EU is full up to the rafters, but it is the veil that blocks the North from seeing eye to eye with Turkey. Jose Manuel Barroso, European Commission President, is unhappy about this, but his is a minority voice. Of course, it would be good if Turkey were to have organic links with Europe; this might even give its politics a westward shift. But most people don't think that far.

Many religious bigots in Europe might rejoice over this popular secular mood. Some may even draw symbolic energy from the 16th century paintings in the Venetian Academy that depict veiled Turkish women watching St Mark's martyrdom. Such artistic licence notwithstanding, Christian conservatives in Europe today are facing tough times, especially in their native lands.

To contextualise the widespread opposition to the burqa in Europe, it is necessary to see how Christianity has fared on the continent. Citizens of Madrid recently won a decision in court opposing a church-sponsored building project that would have taken over 20,000 square km of public gardens. The European Council of Human Rights will examine a case in Italy where a family has objected to the presence of the crucifix in public schools.

Spain, once rock-solid Catholic, is today steadily curbing the presence of religious symbols, most notably of the Church, in schools and other public places. Just over three decades ago, Franco's dictatorship in Spain artfully used the Falangists and Christianity to prop itself up. At that time it seemed as if the Spanish state would always remain irrevocably religious. Yet, the day that dictatorship died and Antonio Hernandez Gil took over as chief of the Cortes, his first act was to remove the crucifix from his office. It is not unlikely that estates owned by the Catholic Church in Spain might soon have to pay income tax.

Predictably, these secular moves in Spain have met with opposition from the Catholic hierarchy. Reminiscent of the way Pope Pius X reacted to the 1906 French Bill shackling the clergy, this time too the Church is crying foul. It has likened the Spanish move to "persecution" and "cultural suicide", but with little impact. If these words are echoing anywhere at all it is only in the empty halls of the church. This should make it evident that the modern European sentiment opposing religion in public life began its career by attacking the Church, before it turned against the burqa.

What Europe teaches us is that democracy cannot make exceptions, least of all for religion. In India, on the other hand, many politicians ridicule the burqa but speak with a forked tongue. They are ready to condemn practices popularly associated with Islam, but stop right there. They will not oppose ethnic killings, misdeeds of sants or the public display of Hindu symbols. If their opposition to the burqa is to be convincing they must look inwards first, even if that hurts. As this is what Christians are doing in Europe, Turkey will have to wait.

51. Which of the following ideas can be surmised from the passage?
- Most Europeans can't stand the burqa.
 - In Europe political parties of all shades feel that the burqa is undemocratic.
 - Some European countries have done away with the burqa.
 - All of the above.
52. The writer uses the term forked tongue to mean that
- Indian politicians condemn Islamist practices while condoning their own extremities.
 - Indians would never dare to condemn the burqa.
 - Indians condemn some Islamist practices but condone the burqa.
 - India must look inwards before it looks at the burqa.
53. Europe has reacted to the church's protests against secular moves with
- acquiescence. (2) hostility.
 - indifference. (4) concern.
54. All of the following statements are true EXCEPT:
- Christian conservatives can no longer draw comfort from the 16th century paintings in the Venetian Academy.
 - Turkey does not fit harmoniously into Europe.
 - There is little room for religion in public affairs in Europe today.
 - France has banned the burqa.

DIRECTIONS for question 55: In the following question, 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
- She had a brush with death when she drove in haste.
 - You cannot afford to brush aside her suggestions.
 - You will have to brush up your German before going abroad.
 - You can brush away the dirt from the dress.

DIRECTIONS for question 56: There are two blanks in the following sentence. From the pairs of words given below, choose the pair that fills the blanks most appropriately.

56. In the post-modern world where 'borrowings' are acceptable and the concept of 'global-local' is commonplace, the suggestion that contemporary Indian sculptors should consider western influence a/an _____ and look solely to indigenous tradition may seem _____.
(1) boon . . . heartening
(2) encumbrance . . . ironical
(3) anathema . . . risible
(4) bugbear . . . paradoxical

DIRECTIONS for question 57: In the following question, 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.

57. SCENE
- One of Leonardo Da Vinci's paintings depicts a scene in Milan.
 - There was a scene at home when Venu announced his decision to marry against his parents' wishes.
 - The second scene of the fifth act reveals the twist in the tale.
 - There were scores of people who worked untiringly behind the scene to make FIFA 2010 a grand success.

DIRECTIONS for question 58: Select the correct alternative.

58. Olive Ridley turtles nest only at their own birthplace on the Orissa coast. After a young one is hatched on the beach, it enters the water, migrates to other tropical coasts, and returns to this coast to nest only after 15 years or so. Some zoologists have theorised that the turtle recalls the smell of its birth environment, and returns to this smell to nest.

Which one of the following, if true, would undermine the theory of these zoologists?

- (1) Olive Ridleys, unlike other turtles, have a well-developed sense of smell.
 - (2) Captive Olive Ridleys, when studied in experimental conditions, were found to display no particular preference for pens that contained sand from the Orissa coast.
 - (3) Electronic tags attached to Olive Ridleys did not indicate alteration in their nesting patterns.
 - (4) Widespread pollution of the world's oceans is known to have rendered ineffective the olfactory systems of all marine animals.

DIRECTIONS for question 59: The following question 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.

59. India will need to carve its own unique path. Aping the US, or China won't help. India's emergence as a services-driven economy—bypassing the industrial development stage—demonstrates this. IT services off-shoring has made the prosperous world change the lens it views the nation with. Today, India is recognised for its talent pool, not just the Taj Mahal.

- (1) A small car, Nano, revolution could be one.

- (2) But, leapfrogging a few levels won't come from doing what the country's economic constituents have been doing.
 - (3) Her growth will be fuelled by superior demographics, rising levels of domestic investment whose power is accentuated through continued economic liberalisation.
 - (4) The country will need similar innovative, path-breaking moves to expand into global markets.

DIRECTIONS for question 60: 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).

(Key and Solutions for AIMCAT1104-Form-2)

Key

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

Solutions

SECTION – I

Solutions for questions 1 to 20:

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

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

$[\because 12 = (12 \times 1) \text{ OR } (2 \times 6) \text{ OR } (3 \times 4) \text{ OR } (2 \times 2 \times 3)]$

N^2 can correspondingly be of the forms

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

$\Rightarrow N^2$ 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)

2. $A = 4^{444}$; $B = 444^4$

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}

$$D = 4^{4^{44}}$$
 and is greater than $4^{4^{44}}$ $[\because 4^{44} > 444]$

The ascending order is BCAD. Choice (1)

3. The data is tabulated below.

	Cone (C ₁)	Cylinder (L ₁)
Height	h	r
Base Radius	r	h
Height	(C ₂) r	(L ₂) h
Base Radius	h	r

$$\text{Volume of } L_1 = \pi h^2 r; \text{ Volume of } C_1 = \frac{1}{3} \pi r^2 h$$

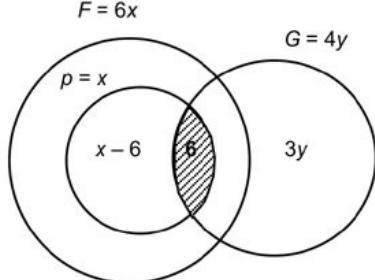
$$\text{Given } \pi r^2 h = 9 \left(\frac{1}{3} \right) \pi r^2 h \Rightarrow h = 3r$$

$$\text{Volume of } L_2 = \pi r^2 h; \text{ Volume of } C_2 = \left(\frac{1}{3} \right) \pi r^2 h$$

$$\Rightarrow \frac{\text{Volume of } L_2}{\text{Volume of } C_2} = \frac{\pi r^2 h}{\left(\frac{1}{3} \right) \pi r^2 h} = \frac{3r^2 h}{h^2 r} = 3 \left(\frac{r}{h} \right) = 1 : 1$$

Choice (3)

- 4.



From the given information, the above diagram can be drawn, where F is set of all B-schools which fleece their students = $6x$ B-schools.

P is the set of all B-schools which are reputed = x B-schools.

G = set of all B-schools which are recognised = $4y$ B-schools.

Now the shaded region is given as 6 B-schools.

and $3y = 39 \Rightarrow y = 13$

also $6x = 78 \Rightarrow x = 13$

$\Rightarrow x - 6 = 7$ and $y - 6 = 7$

$\Rightarrow F - (P \cup G) = 78 - (7 + 6 + 7) = 58$. Choice (4)

5. Let $a + c = x$

$$\Rightarrow b + x = 25 \quad (1)$$

$$\text{and } (1 + b)x = 144 \quad (2)$$

$$\Rightarrow (1 + b)(25 - b) = 144$$

$$b^2 - 24b + 119 = 0$$

$$\Rightarrow b = 7 \text{ or } 17$$

Choice (3)

6. Let $P_n(x)$ be the probability of x bombs hitting the bridge when a total of n bombs are dropped.

$$P_n(x \geq 2) > 99/100 \text{ (required)}$$

$$\Rightarrow 1 - [P(x = 0) + P(x = 1)] > 99/100$$

$$\Rightarrow P(x = 0) + P(x = 1) < 1/100$$

$${}^n C_0 \cdot (1/2)^0 (1/2)^n + {}^n C_1 (1/2)^1 (1/2)^{n-1} < 1/100$$

$$1/2^n + n/2^n < 1/100$$

$$\frac{n+1}{2^n} < \frac{1}{100}$$

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)

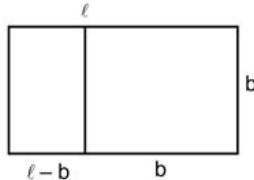
7. The profit (P) of Mr. Shyam for ' x ' units is given by

$$P = S.P. - C.P. = (10 + 0.5x) - \left(\frac{x^2}{75} + 0.1x \right)$$

$$\Rightarrow P = \frac{-x^2}{75} + 0.4x + 10$$

Clearly, P is a quadratic in x and hence P will be maximum at $x = \frac{-(0.4)}{2\left(-\frac{1}{75}\right)} = 15$ units
Choice (3)

8. 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 $b \times (\ell - b)$.



$$\text{Given that } \frac{\ell}{b} = \frac{b}{\ell-b}$$

$$\Rightarrow \ell^2 - \ell b - b^2 = 0 \Rightarrow \left(\frac{\ell}{b}\right)^2 - \left(\frac{\ell}{b}\right) - 1 = 0$$

$$\Rightarrow \frac{\ell}{b} = \frac{1 \pm \sqrt{5}}{2} \text{ since } \frac{\ell}{b} > 0, \frac{\ell}{b} = \frac{\sqrt{5}+1}{2}$$

$$\text{The required ratio} = \frac{b^2}{b(\ell-b)} = \frac{b}{\ell-b} = \frac{\frac{\ell}{b}}{\frac{\ell}{b}-1}$$

$$= \frac{1}{\frac{\sqrt{5}+1}{2}-1} = \frac{2}{\sqrt{5}-1} = \frac{\sqrt{5}+1}{2} = 1.618 \quad \text{Choice (2)}$$

9. We have 22 different numbers (60 to 81) available to us to fill in the boxes. Since each number can go into a maximum of 3 boxes, out of 64 boxes we have to use 21 numbers (each occurring in 3 boxes) to fill in 3 boxes. Since we want the least number of apricots, we will use the 21 numbers from 60 to 80. The 64th box will be filled with 81 apricots.

$$\begin{aligned} \text{Total number of apricots} &= 3 \times (60 + 61 + \dots + 80) + 81 \\ &= \frac{3(60+80)}{2} (21) + 81 = 4,410 + 81 = 4,491 \end{aligned}$$

Choice (3)

10. 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)

11. For $x = -2$ and $y = 1$,

$$f(x, y) = 1 \text{ and } g(x, y) = 1$$

\therefore the choices (1), (2) and (4) all yield the value 0.

Hence, choice (3) is the right option.
Choice (3)

$$12. S = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{2^{32}}$$

$$\therefore S = (1) + \left(\frac{1}{2}\right) + \left(\frac{1}{3} + \frac{1}{4}\right) + \left(\frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8}\right) + \dots$$

$$+ \left(\frac{1}{2^{31}+1} + \frac{1}{2^{31}+2} + \dots + \frac{1}{2^{32}}\right)$$

Each term from T_2 onwards in the above series will be greater than the preceding term and also lie between $\frac{1}{2}$ and 1.

$$\Rightarrow \left[1 + \frac{1}{2} + (32-1)\frac{1}{2}\right] < S < \left[1 + \frac{1}{2} + (32-1)1\right] \text{ i.e., } S \text{ is greater than } 17 \text{ and less than } 32\frac{1}{2}. \quad \text{Choice (3)}$$

13. For a given work, A_1 takes 2 times the time taken by the other four together.

$$\therefore \text{We have} \quad \begin{array}{c} A_1 \\ \text{Ratio of time} \\ \text{and ratio of work done} \end{array} \quad \begin{array}{c} \frac{A_1}{2} : 1 \\ 1 : 2 \end{array}$$

$\therefore A_1$ does $1/3^{\text{rd}}$ total work done.

$$\text{Similarly,} \quad \begin{array}{c} A_2 \\ \text{Ratio of time} \\ \text{Ratio of work done} \end{array} \quad \begin{array}{c} \frac{A_2}{3} : 1 \\ 1 : 3 \end{array}$$

$\therefore A_2$ does $1/4^{\text{th}}$ total work done.

Similarly, A_3, A_4 do $1/5^{\text{th}}$ and $1/6^{\text{th}}$ of total work respectively.

$$A_1 \text{ receives } \frac{1}{3} \times 600 = 200$$

$$A_2 \text{ receives } \frac{1}{4} \times 600 = 150$$

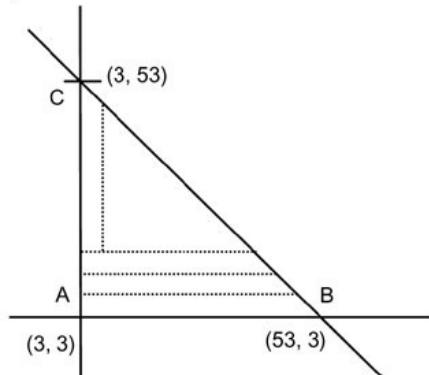
$$A_3 \text{ receives } \frac{1}{5} \times 600 = 120$$

$$A_4 \text{ receives } \frac{1}{6} \times 600 = 100$$

570

$\therefore A_5$ receives Rs.600 - 570 = Rs.30
Choice (4)

14. The triangle formed by the vertices as (3, 3) (3, 53) and (53, 3) is as follows:



This is equivalent to the case when the vertices are (0, 0) (0, 50) and (50, 0)

Hence, the points on \overline{AB} with integer coordinates are (0, 0) (1, 0) (50, 0), i.e., 51 points. Consider the line parallel to \overline{AB} and one unit above it, this will have exactly 50 points, and then the line above it will have 49 points and so on till 1 point (that will be C). Hence, the total number of points with integral coordinates is $51 + 50 + \dots + 2 + 1$

$$= \frac{51 \times (52)}{2} = 1326. \quad \text{Choice (2)}$$

15. 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

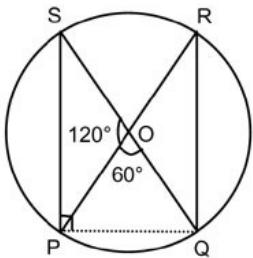
As it is less than Rs.2400, the rent is calculated on hours basis.

$$\therefore \text{Number of hours} = \frac{2400}{160} = 15 \quad \text{Choice (2)}$$

16. If $n^2 = 24k + 1$, then n^2 when divided by 24 leaves a remainder of 1. Any perfect square (i.e., n^2) which leaves a remainder of 1 when divided by 24 must be the square of a natural number (i.e., n) which is of the form $n = 6p \pm 1$ where p is a whole number. In the problem given, least number in the form $6p \pm 1$ is $1 = 6(0) + 1$ and the greatest number in this form is $97 = 6(16) + 1$.
 \therefore A total of 16 values of p are possible.
 \therefore A total of $1 + 2(16) = 33$ natural numbers satisfy the given conditions.

Note : It can be shown that $(6p \pm 1)^2 = 36p^2 \pm 12p + 1 = 12p(3p \pm 1) + 1$, where $12p(3p \pm 1)$ is always a multiple of 24 (since $p(3p \pm 1)$ is always even).
Hence $(6p \pm 1)^2 = 24k + 1$ Choice (2)

17.



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

$$\begin{aligned} \text{Now in } \triangle SPQ, SP &= \sqrt{SQ^2 - PQ^2} = 24 \text{ cm} \\ &= \sqrt{(2 \times 8\sqrt{3})^2 - (8\sqrt{3})^2} \\ \Rightarrow \text{Area of } \triangle SPQ, \text{right-angled at } P, \text{ will be } &\frac{1}{2} SP \times PQ \\ &= \frac{1}{2} \times 24 \times 8\sqrt{3} = 96\sqrt{3} \text{ sq.cm.} \quad \text{Choice (4)} \end{aligned}$$

18. 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 $\frac{L}{n-1}, \frac{2L}{n-1}, \dots, \frac{3L}{n-1} \dots, L$, 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)

19. In the two vessels, at any stage, there is a total of 5 litres of alcohol and 5 litre of water.
At the end of the two transfers, let the quantities of alcohol and water be as tabulated below.

	Vessel 1	Vessel 2
Alcohol	x	$5 - x$
Water	$5 - x$	x

$$\text{Percentage of alcohol in vessel 2} = \left(\frac{5-x}{5} \right) 100\%$$

$$\text{Percentage of water in vessel 1} = \left(\frac{5-x}{5} \right) 100\%$$

These two percentages are equal. Choice (2)

20. For $|x| - |y|$ to be maximum, $|x|$ must be maximum and $|y|$ minimum.
For $|x|$ to be maximum given $|2x - 5| \leq 9, -9 \leq (2x - 5) \leq 9$

i.e., $-2 \leq x \leq 7 \Rightarrow |x| \leq 7$ and $|y|$ can be zero, which still satisfies $|4y - 7| \leq 21$.
(i.e., $| -7 | \leq 21$)
 \therefore maximum value of $|x| - |y| = 7 - 0 = 7$ Choice (1)

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

SECTION – II

Solutions for questions 21 to 24:

21. Here, we are looking for the least value of number of models. Hence, the given condition did not play any role. So, the required sales by A can be accounted for by two models (ex: - Sun and Get).
 \therefore He would have sold at least two models of cars.
Choice (1)

22. To find the least number of dealers by whom the model Coupe was sold, we need to consider that it was sold by the dealers with the maximum sales.
As sales of Coupe is 16% of the total sales, even if we take the two dealers with highest sales, they will account for only 30% of 51% i.e., 15.3% is not sufficient to account for all the sales of Coupe. Hence, we need one more dealer.
 \therefore The model Coupe was sold by at least three dealers.
Choice (2)

23. If dealer D sold an equal number of all the six models, he would have sold 3.5% each of the different models and it would have accounted for $\frac{3.5\%}{7.5\%} = 46\frac{2}{3}\%$ of the sales of the model Pride in the city.
Choice (4)

24. Sales of Sun, Get and Strom are 20%, 22% and 22.5% respectively. Even if we assume that the entire sales of Sun and Get are by the dealers A and B, then at least 9% of the total sales i.e., $\frac{9}{22.5} \times 100 = 40\%$ of the sales of Strom are by the dealers A and B.
Choice (2)

Solutions for questions 25 and 26:

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

White	Light	Bright	Delight	Knight	Might
Mohit					
				Basanti	

Ranjit \longleftrightarrow Laila

Further,

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

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	Basanti	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)

Solution for question 27:

27. Subtracting the second equation from the first, we get $y - x = 1$
From A, we get the following solution

$$\begin{array}{ccc} x & y & z \\ 1 & 2 & 3 \end{array}$$

From B, we get the following solutions, among others.

$$\begin{array}{ccc} x & y & z \\ 1 & 2 & 3 \\ 2 & 3 & 0 \\ 3 & 4 & -3 \end{array}$$

∴ A is sufficient, but B is not.
Choice (1)

Solution for question 28:

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.

∴ 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.....

∴ 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.

∴ Statements A and B together are sufficient.

Choice (3)

Solutions for questions 29 to 32:

29. From observation, the number of students getting IIMC but not IIMA is $(6 + 15 + 11 + 5) = 37$.

Out of which 6 got IIMB 2 not L and $(5 + 11)$ got L not B.
Since we need B or L, both these figures are taken.

Choice (3)

30. Exactly two or exactly three

= at least two – exactly five – exactly four

⇒ at least two = 119

⇒ exactly five = 7 (from figure)

⇒ exactly four = 25

∴ $119 - 7 - 25 = 119 - 32 = 87$

Choice (1)

31. Exactly four

⇒ all except IIMA = none

⇒ all except IIMB = 16

⇒ all except IIMC = none

⇒ all except IIML = 5

⇒ all except IIMI = 4

∴ $16 + 5 + 4 = 25$

Choice (1)

32. Students getting admission in at least two colleges

= Total number of students (who got at least one admission) – Total number of students getting exactly one admission = $200 - (22 + 14 + 15 + 6 + 24) = 200 - 81 = 119$

Choice (3)

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 the given statement, A cannot be a truthteller, he must be a liar or an alternator. But in any case B and C must belong to the same tribe. Using statement A alone, B cannot be a truthteller or liar.

∴ He must be an alternator and even C must be an alternator.

Using statement B alone, C's first statement must be true. Now C must be a truth teller or alternator. But if C is an alternator, his second statement will be also true, which is a contradiction.

∴ C must be a truthteller.

Either of the statements alone is sufficient. Choice (3)

Solution for question 36:

36. From statement A, $yz + xy = \text{even}$

⇒ even + even = even

odd + odd = even

but as zx may be odd or even we cannot answer the question.

From statement B, $yz + zx = \text{even}$

⇒ even + even = even

odd + odd = even

Since xy can be odd or even we cannot answer the question.

∴ Using both the statements, $xy + yz + zx$

odd + odd + odd = odd

even + even + even = 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 $\frac{200}{1200}, \frac{200}{1400}, \frac{0}{1600}$

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	21, 22, 23, 24, 25, 26, 27, 28, 34, 35, 37, 38, 39, 40
Difficult	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. The latter half of the paragraph states that the battle went on well enough but not well enough as to bring the possibility of total victory into view i.e. the battle gave him only an illusion (false belief) of unlimited powers.

Choice (4)

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. Choices (1) (3), and (4) find support in the penultimate paragraph but not choice (2) ...Dopamine elevation, in fact, causes schizophrenia....

Choice (2)

Solutions for questions 51 to 54:**Number of words and Explanatory notes for RC:**

Number of words : 817

51. Refer to paras (2) and (3). Choice (1) is stated "...ordinary Europeans find the veiling... contrary to ... democracy.; Choice (2) is stated "...when it comes to the burqa ...near unanimity .. to the right and left", Choice (3) is also true. 'Belgium's lower House unanimously passed it...'
Choice (4)
52. Choice (1) is the answer and explains the idea conveyed through this phrase... 'ready to condemn practices ... Islam ... will not oppose ...misdeeds...' All other choices are more or less true, but, do not address the 'forked' aspect.
Choice (1)
53. The last but one para clearly states Europe's opposition to the Church's hegemony. The ...'opposition from the catholic hierarchy' has had 'little impact'. Hence 'indifference' is the best answer. The paragraphs preceding this also suggest that the political establishment, and the people strongly support a secular life.
Choice (3)
54. Choice (1) is stated in the sentence 'such artistic license notwithstanding ...' Choice (2) is stated, in the sentence' If Turkey were to have organic links with Europe ...' Choice (3) is stated in the sentence, '...democracy cannot make exceptions ... least of all for religion...' Choice (4) is not true yet, as the bill is being tabled in parliament. The burqa has not yet been banned in France.
Choice (4)

Solution for question 55:

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)

Solution for question 56:

56. It is evident from the sentence that Indian sculptors are not favourably disposed towards 'borrowings'. Hence we cannot say that the Indian sculptors consider it a boon, therefore option 1 is ruled out. The word encumbrance is a misfit here because 'borrowings' cannot be called an encumbrance. Hence option 2 can be eliminated. Although the word anathema may fit into the first blank, the word risible (laughable) does not make sense in the second blank. When 'borrowings' are acceptable and the concept

of 'global-local' is common place in the post-modern world, it is paradoxical that the Indian scholars consider it a bug bear. Hence option 4 is most logical.
Choice (4)

Solution for question 57:

57. In choice (4) the phrase 'behind the scene' is incorrect. 'Scene' in this context cannot be used in the singular. Work behind the scenes is the correct expression'. To 'work behind the scenes' means to work privately or without expectation for public recognition.
Choice (4)

Solution for question 58:

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)

Solution for question 59:

59. IT services off-shoring is a good illustration to show that India has taken up the path of innovation. Option 1 is another illustration but cannot give a good conclusion. Options 2 and 3 are deviant. Option 4 takes the thought to a progressive conclusion.
Choice (4)

Solution for question 60:

60. Statement B is incorrect because 'so' should be followed by that. The correction is 'it is a place so still that birds.....' In statement C the use of 'from' is redundant. The correction is '...I watch tiny drops of gentle rain fall off.....' Statements A and D are grammatically consistent.
Choice (3)

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