

CAT

2005

SOLVED PAPER

(PDF Format)



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SECTION I

Sub-section I-A : Number of Questions = 10

Note : Question 1 to 10 carry one mark each.

DIRECTIONS for Questions 1 to 6 : Answer the questions independently of each other.

- A chemical plant has four tanks (A, B, C and D) each containing 1000 litres of a chemical. The chemical is being pumped from one tank to another as follows :
 From A to B @ 20 litres/minute
 From C to A @ 90 litres/minute
 From A to D @ 10 litres/minute
 From C to D @ 50 litres/minute
 From B to C @ 100 litres/minute
 From D to B @ 110 litres/minute
 Which tank gets emptied first, and how long does it take (in minutes) to get empty after pumping starts?
 (a) A, 16.66 (b) C, 20 (c) D, 20 (d) D, 25
- Two identical circles intersect so that their centres, and the points at which they intersect, form a square of side 1 cm. The area in sq. cm of the portion that is common to the two circles is
 (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2} - 1$ (c) $\frac{\pi}{5}$ (d) $\sqrt{2} - 1$
- If $R = \frac{30^{65} - 29^{65}}{30^{64} + 29^{64}}$, then
 (a) $0 < R \leq 0.1$ (b) $0.1 < R \leq 0.5$ (c) $0.5 < R \leq 1.0$ (d) $R > 1.0$
- What is the distance in cm between two parallel chords of lengths 32 cm and 24 cm in a circle of radius 20 cm?
 (a) 1 or 7 (b) 2 or 14 (c) 3 or 21 (d) 4 or 28
- For which value of k does the following pair of equations yield a unique solution for x such that the solution is positive?

$$x^2 - y^2 = 0$$

$$(x - k)^2 + y^2 = 1$$
 (a) 2 (b) 0 (c) $\sqrt{2}$ (d) $-\sqrt{2}$
- If $x = (16^3 + 17^3 + 18^3 + 19^3)$, then x divided by 70 leaves a remainder of
 (a) 0 (b) 1 (c) 69 (d) 35

DIRECTIONS for question 7 and 8 : Answer the questions on the basis of the information given below

Ram and Shyam run a race between points A and B, 5 km apart. Ram starts at 9 a.m. from A at a speed of 5 km/hr, reaches B and returns to A at the same speed. Shyam starts at 9:45 a.m. from A at a speed of 10 km/hr, reaches B and comes back to A at the same speed.

- At what time do Ram and Shyam first meet each other?
 (a) 10 a.m. (b) 10:10 a.m. (c) 10:20 a.m. (d) 10:30 a.m.
- At what time does Shyam overtake Ram?
 (a) 10:20 a.m. (b) 10:30 a.m. (c) 10:40 a.m. (d) 10:50 a.m.

DIRECTION for questions 9 to 10 : Answer the question independently of each other

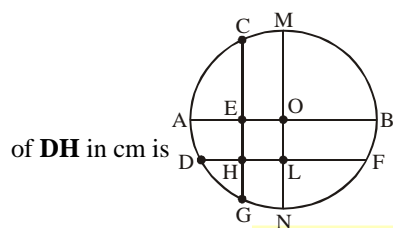
9. A jogging park has two identical circular tracks touching each other and a rectangular track enclosing the two circles. The edges of the rectangles are tangential to the circles. Two friends, **A** and **B**, start jogging simultaneously from the point where one of the circular tracks touches the smaller side of the rectangular track. **A** jogs along the rectangular track, while **B** jogs along the two circular tracks in a figure of eight. Approximately, how much faster than **A** does **B** have to run, so that they take the same time to return to their starting point?
 (a) 3.88% (b) 4.22% (c) 4.44% (d) 4.72%
10. In a chess competition involving some boys and girls of a school, every student had to play exactly one game with every other student. It was found that in 45 games both the players were girls and in 190 games both were boys. The number of games in which one player was a boy and the other was a girl is
 (a) 200 (b) 216 (c) 235 (d) 256

Sub -section I-B : Numbers of questions = 20

Note : Questions 11 to 30 carry two marks each

DIRECTION for question 11 to 30 : Answer the questions independently of each other.

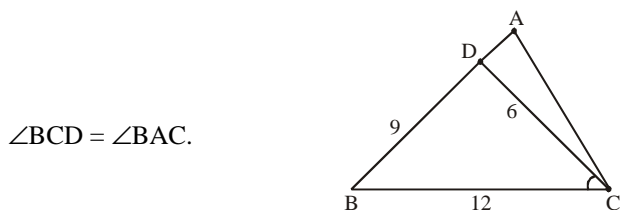
11. In the X-Y plane, the area of the region bounded by the graph $|x + y| + |x - y| = 4$ is
 (a) 8 (b) 12 (c) 16 (d) 20
12. In the following figure, the diameter of the circle is 3 cm. **AB** and **MN** are two diameters such that **MN** is perpendicular to **AB**. In addition, **CG** is perpendicular to **AB** such that **AE : EB = 1 : 2**, and **DF** is perpendicular to **MN** such that **NL : LM = 1 : 2**. The length



of **DH** in cm is

- (a) $2\sqrt{2} - 1$ (b) $\frac{(2\sqrt{2} - 1)}{2}$ (c) $\frac{(3\sqrt{2} - 1)}{2}$ (d) $\frac{(2\sqrt{2} - 1)}{3}$
13. Let $g(x)$ be a function such that $g(x + 1) + g(x - 1) = g(x)$ for every real x . Then for what value of p is the relation $g(x + p) = g(x)$ necessarily true for every real x ?
 (a) 5 (b) 3 (c) 2 (d) 6
14. **P, Q, S** and **R** are points on the circumference of a circle of radius r , such that **PQR** is an equilateral triangle and **PS** is a diameter of the circle. What is the perimeter of the quadrilateral **PQSR**?
 (a) $2r(1 + \sqrt{3})$ (b) $2r(2 + \sqrt{3})$ (c) $r(1 + \sqrt{5})$ (d) $2r + \sqrt{3}$
15. Let **S** be a set of positive integers such that every element n of **S** satisfies the conditions
 1. $1000 \leq n \leq 1200$
 2. every digit in n is odd
 Then how many elements of **S** are divisible by 3?
 (a) 9 (b) 10 (c) 11 (d) 12
16. Let $x = \sqrt{4 + \sqrt{4 - \sqrt{4 + \sqrt{4 - \dots}}}}$ to infinity. Then x equals
 (a) 3 (b) $\left(\frac{\sqrt{13} - 1}{2}\right)$ (c) $\left(\frac{\sqrt{13} + 1}{2}\right)$ (d) $\sqrt{13}$

17. Consider the triangle ABC shown in the following figure where BC = 12 cm, DB = 9 cm, CD = 6 cm and



What is the ratio of the perimeter of the triangle ADC to that of the triangle BDC?

- (a) $\frac{7}{9}$ (b) $\frac{8}{9}$ (c) $\frac{6}{9}$ (d) $\frac{5}{9}$
18. A telecom service provider engages male and female operators for answering 1000 calls per day. A male operator can handle 40 calls per day whereas a female operator can handle 50 calls per day. The male and the female operators get a fixed wages of Rs. 250 and Rs. 300 per day respectively. In addition, a male operator gets Rs. 15 per call he answers and a female operator gets Rs. 10 per call she answer. To minimize the total cost, how many male operators should the service provider employ assuming he has to employ more than 7 of the 12 female operators available for the job?
 (a) 15 (b) 14 (c) 12 (d) 10
19. Three Englishmen and three Frenchmen work for the same company. Each of them knows a secret not known to others. They need to exchange these secrets over person-to-person phone calls so that eventually each person knows all six secrets. None of the Frenchmen knows English, and only one Englishman knows French. What is the minimum number of phone calls needed for the above purpose?
 (a) 5 (b) 10 (c) 9 (d) 15
20. A rectangular floor is fully covered with square tiles of identical size. The tiles on the edges are white and the tiles in the interior are red. The number of the white tiles is the same as the number of red tiles. A possible value of the number of tiles along one edge of the floor is :
 (a) 10 (b) 12 (c) 14 (d) 16
21. Let $n! = 1 \times 2 \times 3 \times \dots \times n$ for integer $n \geq 1$. If $p = 1! + (2 \times 2!) + (3 \times 3!) + \dots + (10 \times 10!)$, then $p + 2$ when divided by $11!$ leaves a remainder of
 (a) 10 (b) 0 (c) 7 (d) 1
22. Consider a triangle drawn on the X-Y plane with its three vertices at (41, 0), (0, 41) and (0, 0), each vertex being represented by its (X, Y) coordinates. The number of points with integer coordinates inside the triangle (excluding all the points on the boundary) is
 (a) 780 (b) 800 (c) 820 (d) 741
23. The digits of a three-digit number A are written in the reverse order to form another three-digit number B. If $B > A$ and $B - A$ is perfectly divisible by 7, then which of the following is necessarily true?
 (a) $100 < A < 299$ (b) $106 < A < 305$ (c) $112 < A < 311$ (d) $118 < A < 317$
24. If $a_1 = 1$ and $a_{n+1} - 3a_n + 2 = 4n$ for every positive integer n, then a_{100} equals
 (a) $3^{99} - 200$ (b) $3^{99} + 200$ (c) $3^{100} - 200$ (d) $3^{100} + 200$
25. Let S be the set of five-digit numbers formed by the digits 1, 2, 3, 4 and 5, using each digit exactly once such that exactly two odd positions are occupied by odd digits. What is the sum of the digits in the rightmost position of the numbers in S?
 (a) 228 (b) 216 (c) 294 (d) 192
26. The rightmost non-zero digit of the number 30^{2720} is
 (a) 1 (b) 3 (c) 7 (d) 9
27. Four points A, B, C and D lie on a straight line in the X-Y plane, such that $AB = BC = CD$ and the length of AB is 1 meter. An ant at A wants to reach a sugar particle at D. But there are insect repellents kept at points B and C. The ant would not go within one meter of any insect repellent. The minimum distance in meters the ant must traverse to reach the sugar particle is
 (a) $3\sqrt{2}$ (b) $1 + \pi$ (c) $4\pi / 3$ (d) 5
28. If $x \geq y$ and $y > 1$, then the value of the expression $\log_x\left(\frac{x}{y}\right) + \log_y\left(\frac{y}{x}\right)$ can never be
 (a) -1 (b) -0.5 (c) 0 (d) 1
29. For a positive integer n, let p_n denote the product of the digits of n, and s_n denote the sum of the digits of n. The number of integers between 10 and 1000 for which $p_n + s_n = n$ is
 (a) 81 (b) 16 (c) 18 (d) 9
30. Rectangular tiles each of size 70 cm by 30 cm must be laid horizontally on a rectangular floor of size 110 cm by 130 cm, such that the tiles do not overlap. A tile can be placed in any orientation so long as its edges are parallel to the edges of the floor. No tile should overshoot any edge of the floor. The maximum number of tiles that can be accommodated on the floor is
 (a) 4 (b) 5 (c) 6 (d) 7

SECTION II**Sub-section II-A : Number of Questions = 10**

Note : Question 31 to 40 carry one mark each.

DIRECTIONS for Questions 31 to 34 : *The passage given below is followed by a set of four questions. Choose the best answer to each question.*

A game of strategy, as currently conceived in game theory, is a situation in which two or more “players” make choices among available alternatives (moves). The totality of choices determines the outcomes of the game, and it is assumed that the rank order of preferences for the outcomes is different for different players. Thus the “interests” of the players are generally in conflict. Whether these interests are diametrically opposed or only partially opposed depends on the type of game.

Psychologically, most interesting situations arise when the interests of the players are partly coincident and partly opposed, because then one can postulate not only a conflict among the players but also inner conflicts within the players. Each is torn between a tendency to cooperate, so as to promote the common interests, and a tendency to compete, so as to enhance his own individual interests.

Internal conflicts are always psychologically interesting. What we vaguely call “interesting” psychology is in very great measure the psychology of inner conflict. Inner conflict is also held to be an important component of serious literature as distinguished from less serious genres. The classical tragedy, as well as the serious novel, reveals the inner conflict of central figures. The superficial adventure story, on the other hand, depicts only external conflict; that is, the threats to the person with whom the reader (or viewer) identifies stem in these stories exclusively from external obstacles and from the adversaries who create them. On the most primitive level this sort of external conflict is psychologically empty. In the fist-cuffs between the protagonists of good and evil, no psychological problems are involved or, at any rate, none are depicted in juvenile representations of conflict.

The detective story, the “adult” analogue of a juvenile adventure tale, has at times been described as a glorification of intellectualized conflict. However, a great deal of the interest in the plots of these stories is sustained by withholding the unraveling of a solution to a problem. The effort of solving the problem is in itself not a conflict if the adversary (the unknown criminal) remains passive, like Nature, whose secrets the scientist supposedly unravels by deduction. If the adversary actively puts obstacles in the detective’s path toward the solution, there is genuine conflict. But the conflict is psychologically interesting only to the extent that it contains irrational components such as a tactical error on the criminal’s part or the detective’s insight into some psychological quirk of the criminal or something of this sort. Conflict conducted in a perfectly rational manner is psychologically no more interesting than a standard Western. For example, Tic-tac-toe, played perfectly by both players, is completely devoid of psychological interest. Chess may be psychologically interesting but only to the extent that it is played not quite rationally. Played completely rationally, chess would not be different from Tic-tac-toe.

In short, a pure conflict of interest (what is called a zero-sum game) although it offers a wealth of interesting conceptual problems, is not interesting psychologically, except to the extent that its conduct departs from rational norms.

31. According to the passage, which of the following options about the application of game theory to a conflict-of-interest situation is true?
- Assuming that the rank order of preferences for options is different for different players.
 - Accepting that the interests of different players are often in conflict.
 - Not assuming that the interests are in complete disagreement.
 - All of the above.
32. The problem solving process of a scientist is different from that of a detective because
- scientists study inanimate objects, while detectives deal with living criminals or law offenders.
 - scientists study known objects, while detectives have to deal with unknown criminals or law offenders.
 - scientists study phenomena that are not actively altered, while detectives deal with phenomena that have been deliberately influenced to mislead.
 - scientists study psychologically interesting phenomena, while detectives deal with “adult” analogues of juvenile adventure tales.

33. According to the passage, internal conflicts are psychologically more interesting than external conflicts because
- internal conflicts, rather than external conflicts, form an important component of serious literature as distinguished from less serious genres.
 - only juveniles or very few "adults" actually experience external conflict, while internal conflict is more widely prevalent in society.
 - in situations of internal conflict, individuals experience a dilemma in resolving their own preferences for different outcomes.
 - there are no threats to the reader (or viewer) in case of external conflicts.
34. Which, according to the author, would qualify as interesting psychology?
- A statistician's dilemma over choosing the best method to solve an optimisation problem.
 - A chess player's predicament over adopting a defensive strategy against an aggressive opponent.
 - A mountaineer's choice of the best path to Mt. Everest from the base camp.
 - A finance manager's quandary over the best way of raising money from the market.

DIRECTIONS for Questions 35 to 37 : *The sentences given in each question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.*

35. (A) Similarly, turning to caste, even though being lower caste is undoubtedly a separate cause of disparity, its impact is all the greater when the lower-caste families also happen to be poor.
 (B) Belonging to a privileged class can help a woman to overcome many barriers that obstruct women from less thriving classes.
 (C) It is the interactive presence of these two kinds of deprivation - being low class and being female - that massively impoverishes women from the less privileged classes.
 (D) A congruence of class deprivation and gender discrimination can blight the lives of poorer women very severely.
 (E) Gender is certainly a contributor to societal inequality, but it does not act independently of class.
 (a) EABDC (b) EBDCA (c) DAEBBC (d) BECDA
36. (A) This is now orthodoxy to which I subscribe - up to a point.
 (B) It emerged from the mathematics of chance and statistics.
 (C) Therefore, the risk is measurable and manageable.
 (D) The fundamental concept: Prices are not predictable, but the mathematical laws of chance can describe their fluctuations.
 (E) This is how what business schools now call modern finance was born.
 (a) ADCBE (b) EBDCA (c) ABDCE (d) DCBEA
37. (A) When identity is thus 'defined by contrast', divergence with the West becomes central.
 (B) Indian religious literature such as the *Bhagavad Gita* or the Tantric texts, which are identified as differing from secular writings seen as 'western', elicits much greater interest in the West than do other Indian writings, including India's long history of heterodoxy.
 (C) There is a similar neglect of Indian writing on non-religious subjects, from mathematics, epistemology and natural science to economics and linguistics.
 (D) Through selective emphasis that point up differences with the West, other civilizations can, in this way, be redefined in alien terms, which can be exotic and charming, or else bizarre and terrifying, or simply strange and engaging.
 (E) The exception is the *Kamasutra* in which western readers have managed to cultivate an interest.
 (a) BDACE (b) DEABC (c) BDECA (d) BCEDA

DIRECTIONS for Questions 38 to 40: *In each question, the word at the top of the table is used in four different ways, (a) to (d). Choose the option in which the usage of the word is incorrect or inappropriate.*

38. For

(a)	He has a great eye for detail.
(b)	We are waiting for the day.
(c)	I can't bear for her to be angry.
(d)	It couldn't be done for ever.

39. Hand

(a)	I have my hand full, I cannot do it today.
(b)	The minister visited the jail to see the breach at first hand.
(c)	The situation is getting out of hand here!
(d)	When the roof of my house was blown away, he was willing to lend me a hand.

40. Near

(a)	I got there just after you left – a near miss!
(b)	She and her near friend left early.
(c)	The war led to a near doubling of oil prices.
(d)	They came near to tear seeing the plight of the victims.

Sub-section II-B : Number of Questions = 20

Note : Question 41 to 60 carry one mark each.

DIRECTIONS for Questions 41 to 48 : Each of the two passages given below is followed by a set of four questions. Choose the best answer to each question.

PASSAGE - I

While complex in the extreme, Derrida's work has proven to be a particularly influential approach to the analysis of the ways in which language structures our understanding of ourselves and the world we inhabit, an approach he termed *deconstruction*. In its simplest formulation, deconstruction can be taken to refer to a methodological strategy which seeks to uncover layers of hidden meaning in a text that have been denied or suppressed. The term 'text', in this respect, does not refer simply to a written form of communication, however. Rather, texts are something we all produce and reproduce constantly in our everyday social relations, be they spoken, written or embedded in the construction of material artifacts. At the heart of Derrida's deconstructive approach is his critique of what he receives to be the totalitarian impulse of the Enlightenment pursuit to bring all that exists in the world under the domain of a representative language, a pursuit he refers to as *logocentrism*. Logocentrism is the search for a rational language that is able to know and represent the world and all its aspects perfectly and accurately. Its totalitarian dimension, for Derrida at least, lies primarily in its tendency to marginalize or dismiss all that does not neatly comply with its particular linguistic representations, a tendency that, throughout history, has all too frequently been manifested in the form of authoritarian institutions. Thus logocentrism has, in its search for the truth of absolute representation, subsumed difference and oppressed that which it designates as its alien 'other'. For Derrida, western civilization has been built upon such a systematic assault on alien cultures and ways of life, typically in the name of reason and progress.

In response to logocentrism, deconstruction posits the idea that the mechanism by which this process of marginalization and the ordering of truth occurs is through establishing systems of binary opposition. Oppositional linguistic dualisms, such as rational/irrational, culture/nature and good/bad are not, however, construed as equal partners as they are in, say, the semiological structuralism of Saussure. Rather, they exist, for Derrida, in a series of hierarchical relationships with the first term normally occupying a superior position. Derrida defines the relationship between such oppositional terms using the neologism *difference*. This refers to the realization that in any statement, oppositional terms differ from each other (for instance, the difference between rationality and irrationality is constructed through oppositional usage), and at the same time, a hierarchical relationship is maintained by the deference of one term to the other (in the positing of rationality over irrationality, for instance). It is this latter point which is perhaps the key to understanding Derrida's approach to deconstruction.

For the fact that at any given time one term must defer to its oppositional 'other', means that the two terms are constantly in a state of interdependence. The presence of one is dependent upon the absence or 'absent-presence' of the 'other', such as in the case of good and evil, whereby to understand the nature of one, we must constantly relate it to the absent term in order to grasp its meaning. That is, to do good, we must understand that our act is not evil for without that comparison the term becomes meaningless. Put simply, deconstruction represents an attempt to demonstrate the absent-presence of this oppositional 'other', to show that what we say or write is in itself not expressive simply of what is present, but also of what is absent. Thus, deconstruction seeks to reveal the interdependence of apparently dichotomous terms and their meanings relative to their textual context; that is, within the linguistic

power relations which structure dichotomous terms hierarchically. In Derrida's own words, a deconstructive reading "must always aim at a certain relationship, unperceived by the writer, between what he commands and what he does not command of the patterns of a language that he uses. . . . [It] attempts to make the not-seen accessible to sight."

Meaning, then, is never fixed or stable, whatever the intention of the author of a text. For Derrida, language is a system of relations that are dynamic, in that all meanings we ascribe to the world are dependent not only on what we believe to be present but also on what is absent. Thus, any act of interpretation must refer not only to what the author of a text intends, but also to what is absent from his or her intention. This insight leads, once again, Derrida's further rejection of the idea of the definitive authority of the intentional agent or subject. The subject is decentred; it is conceived as the outcome of relations of *différance*. As author of its own biography, the subject thus becomes the ideological fiction of modernity and its logocentric philosophy, one that depends upon the formation of hierarchical dualisms, which repress and deny the presence of the absent 'other'. No meaning can, therefore, ever be definitive, but is merely an outcome of a particular interpretation.

41. According to the passage, Derrida believes that the system of binary opposition
 - (a) represents a prioritization or hierarchy.
 - (b) reconciles contradictions and dualities.
 - (c) weakens the process of marginalization and ordering of truth.
 - (d) deconstructs reality.
42. According to the passage, Derrida believes that :
 - (a) Reality can be construed only through the use of rational analysis.
 - (b) Language limits our construction of reality.
 - (c) A universal language will facilitate a common understanding of reality.
 - (d) We need to uncover the hidden meaning in a system of relations expressed by language.
43. Derrida rejects the idea of 'definitive authority of the subject' because
 - (a) interpretation of the text may not make the unseen visible.
 - (b) the meaning of the text is based on binary opposites.
 - (c) the implicit power relationship is often ignored.
 - (d) any act of interpretation must refer to what the author intends.
44. To Derrida, 'logocentrism' does not imply:
 - (a) A totalitarian impulse.
 - (b) A domain of representative language.
 - (c) Interdependence of the meanings of dichotomous terms.
 - (d) A strategy that seeks to suppress hidden meanings in a text.

PASSAGE - II

Crinoline and croquet are out. As yet, no political activists have thrown themselves in front of the royal horse on Derby Day. Even so, some historians can spot the parallels. It is a time of rapid technological change. It is a period when the dominance of the world's superpower is coming under threat. It is an epoch when prosperity masks underlying economic strain. And, crucially, it is a time when policy-makers are confident that all is *for* the best in the best of all possible worlds. Welcome to the Edwardian Summer of the second age of globalisation.

Spare a moment to take stock of what's been happening in the past *few* months. Let's start with the oil price, which has rocketed to more than \$65 a barrel, more than double its level 18 months ago. The accepted wisdom is that we shouldn't worry our little heads about that, because the incentives are there *for* business to build new production and refining capacity, which will effortlessly bring demand and supply back into balance and bring crude prices back to \$25 a barrel. As Tommy Cooper used to say, 'just like that'. Then there is the result of the French referendum on the European Constitution, seen as thick-headed luddites railing vainly against the modern world. What the French needed to realise, the argument went, was that there was no alternative to the reforms that would make the country more flexible, more competitive, more dynamic. Just the sort of reforms that allowed Gate Gourmet to sack hundreds of its staff at Heathrow after the sort of ultimatum that used to be handed out by Victorian mill owners. An alternative way of looking at the French "non" is that our neighbours translate "flexibility" as "you're fired".

Finally, take a squint at the United States. Just like Britain a century ago, a period of unquestioned superiority is drawing to a close. China is still a long way from matching America's wealth, but it is growing at a stupendous rate and economic strength brings geopolitical clout. Already, there is evidence of a new scramble *for* Africa as Washington and Beijing compete *for* oil stocks. Moreover, beneath the surface of the US economy, all is not well. Growth looks healthy enough, but the competition *from* China and elsewhere has meant the world's biggest economy now imports far more than it exports. The US is living beyond its means, but in this time of

studied complacency a current account deficit worth 6 percent of gross domestic product is seen as a sign of strength, not weakness.

In this new Edwardian summer, comfort is taken *from* the fact that dearer oil has not had the savage inflationary consequences of 1973-74, when a fourfold increase in the cost of crude brought an abrupt end to a postwar boom that had gone on uninterrupted *for* a quarter of a century. True, the cost *of* living has been affected by higher transport costs, but we are talking of inflation at 2.3 per cent and not 27 percent. Yet the idea that higher oil prices are of little consequence is fanciful. If people are paying more to fill up their cars it leaves them with less to spend on everything else, but there is a reluctance to consume less. In the 1970s unions were strong and able to negotiate large, compensatory pay deals that served to intensify inflationary pressure. In 2005, that avenue is pretty much closed off, but the abolition of all the controls on credit that existed in the 1970s means that households are invited to borrow more rather than consume less. The knock-on effects of higher oil prices are thus felt in different ways - through high levels of indebtedness, in inflated asset prices, and in balance of payments deficits.

There are those who point out, rightly, that modern industrial capitalism has proved mightily resilient these past 250 years, and that a sign of the enduring strength of the system has been the way it apparently shrugged off everything - a stock market crash, 9/11, rising oil prices - that have been thrown at it in the half decade since the millennium. Even so, there are at least three reasons *for* concern. First, we have been here before. In terms of political economy, the first era of globalisation mirrored our own. There was a belief in unfettered capital flows, in *free* trade, and in the power of the market. It was a time of massive income inequality and unprecedented migration. Eventually, though, there was a backlash, manifested in a struggle between *free* traders and protectionists, and in rising labour militancy.

Second, the world is traditionally at its most fragile at times when the global balance of power is in flux. By the end of the nineteenth century, Britain's role as the hegemonic power was being challenged by the rise of the United States, Germany, and Japan while the Ottoman and Hapsburg empires were clearly in rapid decline. Looking ahead from 2005, it is clear that over the next two or three decades, both China and India - which together account for half the world's population - will flex their muscles.

Finally, there is the question of what rising oil prices tell us. The emergence of China and India means global demand for crude is likely to remain high at a time when experts say production is about to top out. If supply constraints start to bite, any declines in the price are likely to be short-term cyclical affairs punctuating a long upward trend.

45. Which of the following best represents the key argument made by the author?
- The rise in oil prices, the flux in the global balance of power and historical precedents should make us question our belief that the global economic prosperity would continue.
 - The belief that modern industrial capitalism is highly resilient and capable of overcoming shocks will be belied soon.
 - Widespread prosperity leads to neglect of early signs of underlying economic weakness, manifested in higher oil prices and a flux in the global balance of power.
 - A crisis is imminent in the West given the growth of countries like China and India and the increase in oil prices.
46. What can be inferred about the author's view when he states, 'As Tommy Cooper used to say "just like that"'?
- Industry has incentive to build new production and refining capacity and therefore oil prices would reduce.
 - There would be a correction in the price levels of oil once new production capacity is added.
 - The decline in oil prices is likely to be short-term in nature.
 - It is not necessary that oil prices would go down to earlier levels.
47. What, according to the author, has resulted in a widespread belief in the resilience of modern capitalism?
- Growth in the economies of Western countries despite shocks in the form of increase in levels of indebtedness and inflated asset prices.
 - Increase in the prosperity of Western countries and China despite rising oil prices.
 - Continued growth of Western economies despite a rise in terrorism, an increase in oil prices and other similar shocks.
 - The success of continued reforms aimed at making Western economies more dynamic, competitive and efficient.
48. By the expression 'Edwardian Summer', the author refers to a period in which there is
- unparalleled luxury and opulence.
 - a sense of complacency among people because of all-round prosperity.
 - a culmination of all-round economic prosperity.
 - an imminent danger lurking behind economic prosperity.

DIRECTIONS for Questions 49 to 52 : Each 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).

49. A. The balance of power will shift to the East as China and India evolve.
 B. Rarely the economic ascent of two still relatively poor nations has been watched with such a mixture of awe, opportunism, and trepidation.
 C. Postwar era witnessed economic miracles in Japan and South Korea, but neither was populous enough to power worldwide growth or change the game in a complete spectrum of industries.
 D. China and India, by contrast, possess the weight and dynamism to transform the 21 st-century global economy.
- (a) A,B & C (b) A&D (c) C (d) C&D

50. A. People have good reason to care about the welfare of animals.
 B. Ever since Enlightenment, their treatment has been seen as a measure of mankind's humanity.
 C. It is no coincidence that William Wilberforce and Sir Thomas Foxwell Buxton, two leaders of the movement to abolish the slave trade, helped found the Royal Society for the Prevention of Cruelty to Animals in 1820s.
 D. An increasing number of people go further: mankind has a duty not to cause pain to animals that have the capacity to suffer.
 (a) A & D (b) B (c) A&C (d) C&D
51. A. When virtuoso teams begin their work, individuals are in and group consensus is out.
 B. As project progresses, however, the individual stars harness themselves to the product of the group.
 C. Sooner or later, the members break through their own egocentrism and become a plurality with single-minded focus on the goal.
 D. In short, they morph into a powerful team with a shared identity.
 (a) A & C (b) A & D (c) B & D (d) A, C & D
52. A. Large reductions in the ozone layer, which sits about 15-30 km above the Earth, take place each winter over the polar regions, especially the Antarctic, as low temperatures allow the formation of stratospheric clouds that assist chemical reactions breaking down ozone.
 B. Industrial chemicals containing chlorine and bromine have been blamed for thinning the layer because they attack the ozone molecules, making them to break apart.
 C. Many an offending chemicals have now been banned.
 D. It will still take several decades before these substances have disappeared from the atmosphere.
 (a) D (b) B&D (c) A&D (d) A&C
- been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.*
53. Federer's fifth grand slam win prompted a reporter to ask whether he was the best ever. Federer is certainly not lacking in confidence, but he wasn't about to proclaim himself the best ever. "The best player of this generation, yes", he said, "But nowhere close to ever. Just look at the records that some guys have. I'm a minnow." _____
 (a) His win against Agassi, a genius from the previous generation, contradicts that.
 (b) Sampras, the king of an earlier generation, was as humble.
 (c) He is more than a minnow to his contemporaries.
 (d) The difference between 'the best of this generation' and 'the best ever' is a matter of perception.
54. Thus the end of knowledge and the closing of the frontier that it symbolizes is not a looming crisis at all, but merely one of many embarrassing fits of hubris in civilization's long history. In the end, it will pass away and be forgotten. Ours is not the first generation to struggle to understand the organizational laws of the frontier, deceive itself that it has succeeded, and go to its grave having failed. _____
 (a) One would be wise to be humble.
 (b) But we might be the first generation to actually reach the frontier.
 (c) But we might be the first generation to deal with the crisis.
 (d) However, this time the success is not illusory.
55. Most firms consider expert individuals to be too elitist, temperamental, egocentric, and difficult to work with. Force such people to collaborate on a high-stakes project and they just might come to fisticuffs. Even the very notion of managing such a group seems unimaginable. So most organizations fall into default mode, setting up project teams of people who get along nicely. _____
 (a) The result, however, is disastrous. (b) The result is mediocrity.
 (c) The result is creation of experts who then become elitists. (d) Naturally, they drive innovations.
56. The audiences for crosswords and sudoku, understandably, overlap greatly, but there are differences, too. A crossword attracts a more literary person, while sudoku appeals to a keenly logical mind. Some crossword enthusiasts turn up their noses at sudoku because they feel it lacks depth. A good crossword requires vocabulary, knowledge, mental flexibility and sometimes even a sense of humor to complete. It touches numerous areas of life and provides an "Aha!" or two along the way _____
 (a) Sudoku, on the other hand, is just a logical exercise, each one similar to the last.
 (b) Sudoku, incidentally, is growing faster in popularity than crosswords, even among the literati.
 (c) Sudoku, on the other hand, can be attempted and enjoyed even by children.
 (d) Sudoku, however, is not exciting in any sense of the term.

not make sense. Choose the most appropriate replacement for that word from the options given below the paragraph.

57. Intelligent design derives from an early 19th-century explanation of the natural world given by an English clergyman, William Paley. Paley was the populariser of the famous watchmaker analogy. Proponents of intelligent design are *crupping* Paley's argument with a new gloss from molecular biology.
- (a) destroying (b) testing (c) resurrecting (d) questioning
58. Women squat, heads covered, beside huge piles of limp fodder and *blunk* oil lamps, and just about all the cows in the three towns converge upon this spot. Sinners, supplicants and yes, even scallywags hand over a few coins for a crack at redemption and a handful of grass.
- (a) shining (b) bright (c) sputtering (d) effulgent
59. It is *klang* to a sensitive traveler who walks through this great town, when he sees the streets, the roads, and cabin doors crowded with beggars, mostly women, followed by three, four, or six children, all in rags and importuning every passenger for alms.
- (a) amusing (b) irritating (c) disgusting (d) distressing
60. Or there is the most *fingummy* diplomatic note on record: when Philip of Macedon wrote to the Spartans that, if he came within their borders, he would leave not one stone of their city, they wrote back the one word - "If".
- (a) witty (b) rude (c) simple (d) terse



SECTION III**Sub-section III-A : Number of Questions = 10**

Note : Question 61 to 70 carry one mark each.

Answer Questions 61 to 63 on the basis of the information given below :

The table below reports the gender, designation and age-group of the employees in an organization. It also provides information on their commitment to projects coming up in the months of January (Jan), February (Feb), March (Mar) and April (Apr), as well as their interest in attending workshops on: Business Opportunities (BO), Communication Skills (CS), and E-Governance (EG).

Sl. NO.	Name	Gender	Designation	Age group	Committed to	Interested in
					projects during	workshop on
1.	Anshul	M	Mgr	Y	Jan, Mar	CS, EG
2.	Bushkant	M	Dir	I	Feb, Mar	BO, EG
3.	Charu	F	Mgr	I	Jan, Feb	BO, CS
4.	Dinesh	M	Exe	O	Jan, Apr	BO, CS, EG
5.	Eashwaran	M	Dir	O	Feb, Apr	BO
6.	Fatima	F	Mgr	Y	Jan, Mar	BO, CS
7.	Gayatri	F	Exe	Y	Feb, Mar	EG
8.	Hari	M	Mgr	I	Feb, Mar	BO, CS, EG
9.	Indira	F	Dir	O	Feb, Apr	BO, EG
10.	John	M	Dir	Y	Jan, Mar	BO
11.	Kalindi	F	Exe	I	Jan, Apr	BO, CS, EG
12.	Lavanya	F	Mgr	O	Feb, Apr	CS, EG
13.	Mandeep	M	Mgr	O	Mar, Apr	BO, EG
14.	Nandlal	M	Dir	I	Jan, Feb	BO, EG
15.	Parul	F	Exe	Y	Feb, Apr	CS, EG
16.	Rahul	M	Mgr	Y	Mar, Apr	CS, EG
17.	Sunita	F	Dir	Y	Jan, Feb	BO, EG
18.	Urvashi	F	Exe	I	Feb, Mar	EG
19.	Yamini	F	Mgr	O	Mar, Apr	CS, EG
20.	Zeena	F	Exe	Y	Jan, Mar	BO, CS, EG

M=Male, F= Female; Exe=Executive, Mgr=Manager, Dir=Director; Y=Young, I=In-between, O=Old

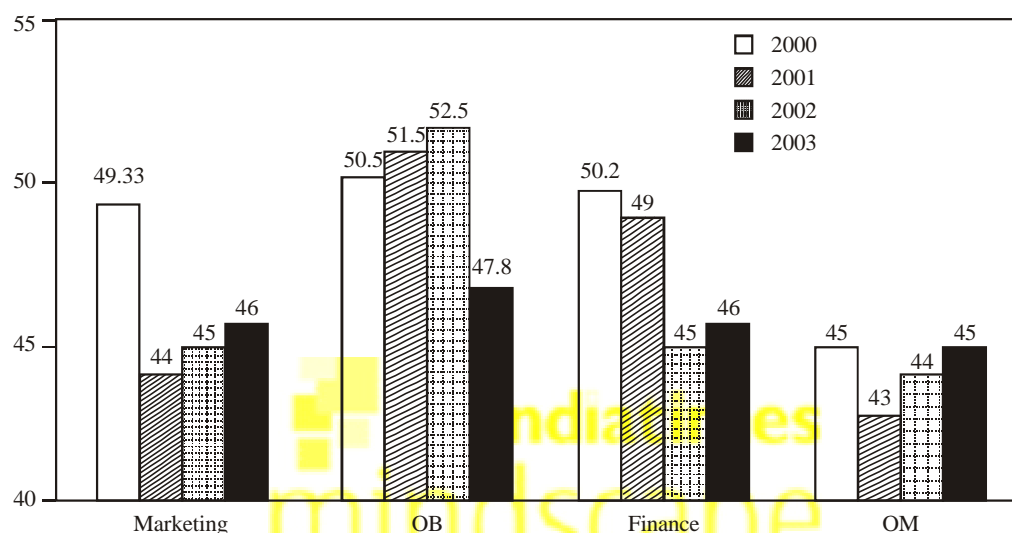
For each workshop, exactly (our employees are to be sent, of which at least two should be Females and at least one should be Young. No employee can be sent to a workshop in which he/she is not interested in. An employee cannot attend the workshop on

- Communication Skills, if he/she is committed to internal projects in the month of January;
- Business Opportunities, if he/she is committed to internal projects in the month of February;
- E-governance, if he/she is committed to internal projects in the month of March.

61. Assuming that Parul and Hari are attending the workshop on Communication Skills (CS), then which of the following employees can possibly attend the CS workshop?
- (a) Rahul and Yamini (b) Dinesh and Lavanya
(c) Anshul and Yamini (d) Fatima and Zeena
62. How many Executives (Exe) cannot attend more than one workshop?
- (a) 2 (b) 3 (c) 15 (d) 16
63. Which set of employees cannot attend any of the workshops?
- (a) Anshul, Charu, Eashwaran and Lavanya (b) Anshul, Bushkant, Gayatri and Urvashi
(c) Charu, Urvashi, Bushkant and Mandeep (d) Anshul, Gayatri, Eashwaran and Mandeep

Answer Questions 64 to 67 on the basis of the information given below :

A management institute was established on January 1, 2000 with 3, 4, 5, and 6 faculty members in the Marketing, Organisational Behaviour (OB), Finance, and Operations Management (OM) areas respectively, to start with. No faculty member retired or joined the institute in the first three months of the year 2000. In the next four years, the institute recruited one faculty member in each of the four areas. All these new faculty members, who joined the institute subsequently over the years, were 25 years old at the time of their joining the institute. All of them joined the institute on April 1. During these four years, one of the faculty members retired at the age of 60. The following diagram gives the area-wise average age (in terms of number of completed years) of faculty members as on April 1 of 2000, 2001, 2002 and 2003.



64. In which year did the new faculty member join the Finance area?
 (a) 2000 (b) 2001 (c) 2002 (d) 2003
65. What was the age of the new faculty member, who joined the OM area, as on April 1, 2003?
 (a) 25 (b) 26 (c) 27 (d) 28
66. From which area did the faculty member retire?
 (a) Finance (b) Marketing (c) OB (d) OM
67. Professors Naresh and Devesh, two faculty members in the Marketing area, who have been with the Institute since its inception, share a birthday, which falls on 20th November. One was, born in 1947 and the other one in 1950. On April 1, 2005, what was the age of the third faculty member, who has been in the same area since inception?
 (a) 47 (b) 50 (c) 51 (d) 52

Answer Questions 68 to 70 on the basis of the information given below :

The table below reports annual statistics to rice production in select states of India for a particular year.

State	Total Area	% of Area Under	Production	Population
	(in million hectares)	Rice Cultivation	(in million tons)	(in millions)
Himachal Pradesh	6	20	1.2	6
Kerala	4	60	4.8	32
Rajasthan	34	20	6.8	56
Bihar	10	60	12	83
Karnataka	19	50	19	53
Haryana	4	80	19.2	21
West Bengal	9	80	21.6	80
Gujarat	20	60	24	51
Punjab	5	80	24	24
Madhya Pradesh	31	40	24.8	60
Tamilnadu	13	70	27.3	62
Maharashtra	31	50	48	97
Uttar Pradesh	24	70	67.2	166
Andhra Pradesh	28	80	112	76

68. How many states have a per capita production of rice (defined as total rice production divided by its population) greater than Gujarat?
 (a) 3 (b) 4 (c) 5 (d) 6
69. An intensive rice producing state is defined as one whose annual rice production per million of I population is at least 400,000 tons. How many states are intensive rice producing states?
 (a) 5 (b) 6 (c) 7 (d) 8
70. Which two states account for the highest productivity of rice (tons produced per hectare of rice ,cultivation)?
 (a) Haryana and Punjab (b) Punjab and Andhra Pradesh
 (c) Andhra Pradesh and Haryana (d) Uttar Pradesh and Haryana

Sub-section III-B: Number of Questions = 20

Note : Questions 71 to 90 carry two marks each.

Answer Questions 74 on the basis of the information given below :

Venkat, a stockbroker, invested a part of his money in the stock of four companies — A, B, C and D. Each of these companies belonged to different industries, viz., Cement, Information Technology (IT), Auto, and Steel, in no particular order. At the-time of investment, the price of each stock was Rs. 100. Venkat purchased only one stock of each of these companies. He was expecting returns of 20%, 10%, 30% and 40% from the stock of companies A, B, C and D, respectively. Returns are defined as the change in the value of the stock after one year, expressed as a percentage of the initial value. During the year, two of these companies announced extraordinarily good results. One of these two companies belonged to the Cement or the IT industry, while the other one belonged to either the Steel or the Auto industry. As a result, the returns on the stocks of these two companies were higher than the initially expected returns. For the company belonging to the Cement or the IT industry with extraordinarily good results, the returns were twice that of the initially expected returns. For the company belonging to the Steel or the Auto industry, the returns on announcement of extraordinarily good results were only one and a half times that of the initially expected returns. For the remaining two companies.

Which do not announce extraordinarily good results, the returns realized during the year were the same as initially expected.

71. What is the minimum average return Venkat would have earned during the year?
 (a) 30% (b) $31\frac{1}{4}\%$ (c) $32\frac{1}{2}\%$ (d) Cannot be determined
72. If Venkat earned a 35% return on average during the year, then which of these statements would necessarily be true?
 I. Company A belonged either to Auto or to Steel Industry.
 II. Company B did not announce extraordinarily good results.
 III. Company A announced extraordinarily good results.
 IV. Company D did not announce extraordinarily good results.
 (a) I and II only (b) II and III only (c) III and IV only (d) II and IV only
73. If Venkat earned a 38.75% return on average during the year, then which of these statement(s) would necessarily be true?
 I. Company C belonged either to Auto or to Steel Industry.
 II. Company D belonged either to Auto or to Steel Industry.
 III. Company A announced extraordinarily good results.
 IV. Company B did not announce extraordinarily good results.
 (a) I and II only (b) II and III only (c) III and IV only (d) II and IV only
74. If Company C belonged to the Cement or the IT industry and did announce extraordinarily good results, then which of these statement(s) would necessarily be true?
 I. Venkat earned not more than 36.25% return on average.
 II. Venkat earned not less than 33.75% return on average.
 III. If Venkat earned 33.75% return on average, Company A announced extraordinarily good results.
 IV. If Venkat earned 33.75% return on average, Company B belonged either to Auto or to Steel Industry.
 (a) I and II only (b) II and IV only (c) II and III only (d) III and IV only

Answer Questions 75 to 78 on the basis of the information given below :

The table below presents the revenue (in million rupees) of four firms in three states. These firms, Honest Ltd., Aggressive Ltd., Truthful Ltd. and Profitable Ltd. are disguised in the table as A,B,C and D, in no particular order.

States	Firm A	Firm B	Firm C	Firm D
UP	49	82	80	55
Bihar	69	72	70	65
MP	72	63	72	65

Further, it is known that :

- In the state of MP, Truthful Ltd. has the highest market share.
- Aggressive Ltd.'s aggregate revenue differs from Honest Ltd.'s by Rs. 5 million.

75. What can be said regarding the following two statements?

Statement 1: Honest Ltd. has the highest share in the UP market.

Statement 2: Aggressive Ltd. has the highest share in the Bihar market.

- (a) Both statements could be true. (b) At least one of the statements must be true.
 (c) At most one of the statements is true. (d) None of the above.

76. What can be said regarding the following two statements?

Statement 1 : Aggressive Ltd.'s lowest revenues are from MP.

Statement 2 : Honest Ltd.'s lowest revenues are from Bihar.

- (a) If Statement 2 is true then Statement 1 is necessarily false.
 (b) If Statement 1 is false then Statement 2 is necessarily true.
 (c) If Statement 1 is true then Statement 2 is necessarily true.
 (d) None of the above.

77. What can be said regarding the following two statements?

Statement 1: Profitable Ltd. has the lowest share in MP market.

Statement 2 : Honest Ltd.'s total revenue is more than Profitable Ltd.

- (a) If Statement 1 is true then Statement 2 is necessarily true.
 (b) If Statement 1 is true then Statement 2 is necessarily false.
 (c) Both Statement 1 and Statement 2 are true.
 (d) Neither Statement 1 nor Statement 2 is true.

78. If Profitable Ltd.'s lowest revenue is from UP, then which of the following is true?

- (a) Truthful Ltd.'s lowest revenues are from MP.
 (b) Truthful Ltd.'s lowest revenues are from Bihar.
 (c) Truthful Ltd.'s lowest revenues are from UP.
 (d) No definite conclusion is possible.

Answer Questions 79 to 82 on the basis of the information given below:

In the table below is the listing of players, seeded from highest (#1) to lowest (#32), who are due to play in an Association of Tennis Players (ATP) tournament for women. This tournament has four knockout rounds before the final, i.e., first round, second round, quarterfinals, and semi-finals. In the first round, the highest seeded player plays the lowest seeded player (seed # 32) which is designated match No.1 of first round; the 2nd seeded player plays the 31 st seeded player which is designated match No.2 of the first round, and so on. Thus, for instance, match No. 16 of first round is to be played between 16th seeded player and the 17th seeded player. In the second round, the winner of match No.1 of first round plays the winner of match No. 16 of first round and is designated match No.1 of second round. Similarly, the winner of match No.2 of first round plays the winner of match No. 15 of first round, and is designated match No.2 of second round. Thus, for instance, match No.8 of the second round is to be played between the winner of match No.8 of first round and the winner of match No.9 of first round. The same pattern is followed for later rounds as well.

Seed #	Name of Player	Seed #	Name of Player	Seed #	Name of Player
1	Maria Sharapova	12	Mary Pierce	23	Silvia Farina Elia
2	Lindsay Davenport	13	Anastasia Myskina	24	Tatiana Golovin
3	Amelie Mauresmo	14	Alicia Molik	25	Shinobu Asagoe
4	Kim Clijsters	15	Nathalie Dechy	26	Francesca Schiavone
5	Svetlana Kuznetsova	16	Elena Bovina	27	Nicole Pietrangeli
6	Elena Dementieva	17	Jelena Jankovic	28	Gisela Dulko
7	Justine Henin	18	Ana Ivanovic	29	Flavia Pennetta
8	Serena Williams	19	Vera Zvonareva	30	Anna Chakvetadze
9	Nadia Petrova	20	Elena Likhovtseva	31	Ai Sugiyama
10	Venus Williams	21	Daniela Hantuchova	32	Anna-lena Groenefeld
11	Patty Schnyder	22	Dinara Safina		

79. If Elena Dementieva and Serena Williams lose in the second round, while Justine Henin and Nadia Petrova make it to the semi-finals, then who would play Maria Sharapova in the quarterfinals, in the event Sharapova reaches quarterfinals?
 (a) Dinara Safina (b) Justine Henin (c) Nadia Petrova (d) Patty Schnyder
80. If the top eight seeds make it to the quarterfinals, then who, amongst the players listed below, would definitely not play against Maria Sharapova in the final, in case Sharapova reaches the final?
 (a) Amelie Mauresmo (b) Elena Dementieva (c) Kim Clijsters (d) Lindsay Davenport
81. If there are no upsets (a lower seeded player beating a higher seeded player) in the first round, and only match Nos. 6, 7, and 8 of the second round result in upsets, then who would meet Lindsay Davenport in quarter finals, in case Davenport reaches quarter finals?
 (a) Justine Henin (b) Nadia Petrova (c) Patty Schnyder (d) Venus Williams
82. If, in the first round, all even numbered matches (and none of the odd numbered ones) result in upsets, and there are no upsets in the second round, then who could be the lowest seeded player facing Maria Sharapova in semi-finals?
 (a) Anastasia Myskina (b) Flavia Pennetta (c) Nadia Petrova (d) Svetlana Kuznetsova

Answer Questions 83 to 86 on the basis of the information given below :

Help Distress (HD) is an NGO involved in providing assistance to people suffering from natural disasters. Currently, it has 37 volunteers. They are involved in three projects: Tsunami Relief (TR) in Tamil Nadu, Flood Relief (FR) in Maharashtra, and Earthquake Relief (ER) in Gujarat. Each volunteer working with Help Distress has to be involved in at least one relief work project.

- A Maximum number of volunteers are involved in the FR project. Among them, the number of volunteers involved in FR project alone, is equal to the volunteers having additional involvement in the ER project.
 - The number of volunteers involved in the ER project alone is double the number of volunteers involved in all the three projects.
 - 17 volunteers are involved in the TR project.
 - The number of volunteers involved in the TR project alone is one less than the number of volunteers involved in ER project alone.
 - Ten volunteers involved in the TR project are also involved in at least one more project.
83. Based on the information given above, the minimum number of volunteers involved in both FR and TR projects, but not in the ER project is:
 (a) 1 (b) 3 (c) 4 (d) 5
84. Which of the following additional information would enable to find the exact number of volunteers involved in various projects?
 (a) Twenty volunteers are involved in FR.
 (b) Four volunteers are involved in all the three projects.
 (c) Twenty three volunteers are involved in exactly one project.
 (d) No need for any additional information.
85. After some time, the volunteers who were involved in all the three projects were asked to withdraw from one project. As a result, one of the volunteers opted out of the TR project, and one opted out of the ER project, while the remaining ones involved in all the three projects opted out of the FR project. Which of the following statements, then, necessarily follows?
 (a) The lowest number of volunteers is now in TR project.
 (b) More volunteers are now in FR project as compared to ER project.
 (c) More volunteers are now in TR project as compared to ER project.
 (d) None of the above.

86. After the withdrawal of volunteers, as indicated in Question 85, some new volunteers joined the NGO. Each one of them was allotted only one project in a manner such that, the number of volunteers working in one project alone for each of the three projects became identical. At that point, it was also found that the number of volunteers involved in FR and ER projects was the same as the number of volunteers involved in TR and ER projects. Which of the projects now has the highest number of volunteers?
- (a) ER (b) FR (c) TR (d) Cannot be determined

Answer Questions 87 to 90 on the basis of the information given below :

The year is 2089. Beijing, London, New York, and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC with each member representing a different city. All the four cities in contention are also represented in IOC.

- In any round of voting; the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.
- A member is allowed to cast votes for at most two different cities in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities (s)he voted for in earlier rounds are out of contention in that round of voting.)
- A member is also ineligible to cast a vote in a round if the city (s)he represents is in contention in that round of voting.
- As long as the member is eligible, (s)he must vote and vote for only one candidate city in any round of voting.

The following incomplete table shows the information on cities that received the maximum and minimum votes in different rounds, the number of votes cast in their favour, and the total votes that were cast in those rounds.

Round	Total votes cast	Maximum votes cast		Eliminated	
		City	No. of votes	City	No. of votes
1		London	30	New York	12
2	83	Paris	32	Beijing	21
3	75				

It is also known that :

- All those who voted for London and Paris in round 1, continued to vote for the same cities in subsequent rounds as long as these cities were in contention. 75% of those who voted for Beijing in round 1, voted for Beijing in round 2 as well.
 - Those who voted for New York in round 1, voted either for Beijing or Paris in round 2.
 - The difference in votes cast for the two contending cities in the last round was 1.
 - 50% of those who voted for Beijing in round 1, voted for Paris in round 3.
87. What percentage of members from among those who voted for New York in round 1, voted for Beijing in round 2?
- (a) 33.33 (b) 50 (c) 66.67 (d) 75
88. What is the number of votes cast for Paris in round I?
- (a) 16 (b) 18 (c) 22 (d) 24
89. What percentage of members from among those who voted for Beijing in round 2 and were eligible to vote in round 3, voted for London?
- (a) 33.33 (b) 38.10 (c) 50 (d) 66.67
90. Which of the following statements must be true?
- (a) IOC member from New York must have voted for Paris in round 2.
 (b) IOC member from Beijing voted for London in round 3.
 (a) Only a (b) Only b (c) Both a and b (d) Neither a nor b

HINTS & SOLUTIONS

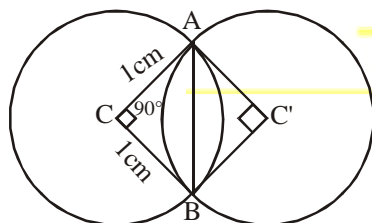
ANSWER KEY																	
1	c	11	c	21	d	31	a	41	a	51	b	61	a	71	a	81	d
2	b	12	b	22	a	32	c	42	d	52	c	62	b	72	b	82	a
3	d	13	d	23	b	33	c	43	a	53	b	63	b	73	c	83	c
4	d	14	a	24	c	34	b	44	c	54	b	64	c	74	b	84	a
5	c	15	a	25	b	35	b	45	c	55	b	65	c	75	c	85	b
6	a	16	c	26	a	36	b	46	b	56	a	66	a	76	c	86	a
7	b	17	a	27	b	37	d	47	c	57	c	67	d	77	b	87	d
8	b	18	d	28	d	38	c	48	b	58	c	68	b	78	c	88	d
9	d	19	c	29	d	39	a	49	b	59	d	69	d	79	c	89	d
10	a	20	b	30	c	40	b	50	c	60	d	70	a	80	c	90	a

SUB-SECTION I-A

1. (c) Water entering (positive sign) or leaving (negative sign) from,
 Tank A = $(90 - 20 - 10) = 60$ litres/min.
 Tank B = $(110 - 100 + 20) = 30$ litres/min.
 Tank C = $(100 - 90 - 50) = -40$ litres/min.
 Tank D = $(10 + 50 - 110) = -50$ litres/min.
 Hence, Tank D gets emptied first.

Time taken by tank D to get empty = $\frac{1000}{50} = 20$ min.

2. (b)



Area of each circle = $\pi r^2 = \pi$ sq cm

Area of sector ACB = $\frac{90^\circ}{360^\circ} \times \pi = \frac{\pi}{4}$

= Area of sector AC'B

Area of the square ACBC' = 1 sq. cm.

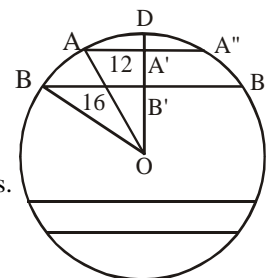
Common Area = Area of sector ACB + Area of sector AC'B - Area of Square = $\frac{\pi}{4} + \frac{\pi}{4} - 1 = \frac{\pi}{2} - 1$

3. (d) As $x^n - y^n$ is divisible by $x - y$ if n is odd.
 $x^n - y^n = (x - y)(x^{n-1}y^0 + x^{n-2}y^1 + \dots + x^0y^{n-1})$
 Hence numerator becomes = $(30 - 29)(30^{64} + \dots + 29^{64})$
 $= 30^{64} + \dots + 29^{64}$

$\therefore R = \frac{30^{64} + \dots + 29^{64}}{30^{64} + 29^{64}}$

Clearly the numerator is greater than the denominator.
 Hence $R > 1.0$

4. (d) Remember that a perpendicular from the centre to a chord



divides it into two equal parts.

In $\triangle OBB'$,

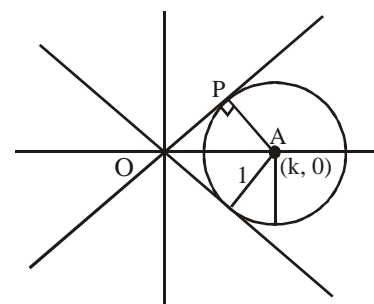
$OB^2 = 20^2 = BB'^2 + OB'^2 = 16^2 + OB'^2$

or $OB' = \sqrt{20^2 - 16^2} = 12$

Similarly in $\triangle OAA'$, $OA' = \sqrt{20^2 - 12^2} = 16$

\therefore Distance between the two parallel chords = $16 - 12 = 4$ cm or $16 + 12 = 28$ cm

5. (c)

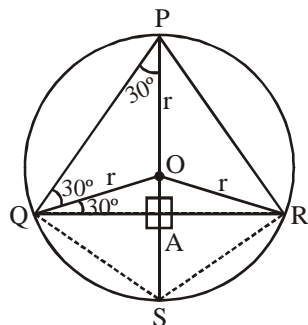


$(x - k)^2 + y^2 = 1$, represents a circle with centre $(k, 0)$ and radius = 1.

For a positive unique solution the line $y = x$ will be tangent to the circle at point P.

$OA^2 = AP^2 + OP^2 \Rightarrow OA = \sqrt{1^2 + 1^2} = \sqrt{2}$

14. (a)



As PQR is an equilateral triangle, hence PS will be perpendicular to QR and will divide it into 2 equal parts. $\angle P$ & $\angle S$ will be supplementary so $\angle S = 120^\circ$ and $\angle QSA = \angle RSA = 60^\circ$.

$$PA = PQ \cos 30^\circ \text{ and } OA = OQ \sin 30^\circ = \frac{r}{2}$$

$$\Rightarrow AS = OA = \frac{r}{2}$$

$$\text{Hence, } PQ = \frac{PA}{\cos 30^\circ} = \frac{r + \frac{r}{2}}{\frac{\sqrt{3}}{2}} = \sqrt{3}r$$

$$AS = QS \cos 60^\circ \Rightarrow QS = \frac{r/2}{1/2} = r$$

$$\therefore \text{Perimeter of PQSR} = 2(PQ + QS) = 2(\sqrt{3} + 1)r$$

15. (a) For a number to be divisible by 3, the sum of its digits has to be divisible by 3.

$$\text{Given : } 1000 \leq n \leq 1200 \quad \dots(1)$$

Again, for every digit of n to be odd, the four digits can be selected from 1, 3, 5, 7 & 9. Again with (1), the first two digits can be 1 & 1 only. So the sum of the remaining two digits +2 has to be divisible by 3. So the possible digits can be 19, 73, 79, 13 and 55.

These can be organised in $2 + 2 + 2 + 2 + 1 = 9$ ways.

16. (c) The given expression can be reduced to $x = \sqrt{4 + \sqrt{4 - x}}$

$$\Rightarrow x^2 - 4 = \sqrt{4 - x} \Rightarrow (x^2 - 4)^2 = 4 - x$$

Putting the values of x in the options we find that

$$\left(\frac{\sqrt{13} + 1}{2}\right) \text{ is the correct option.}$$

$$\text{CHECK : } \left[\left(\frac{\sqrt{13} + 1}{2}\right)^2 - 4\right]^2 = 4 - \frac{\sqrt{13} + 1}{2} = \frac{7\sqrt{13}}{2}$$

$$\text{L.H.S.} = \left(\frac{13 + 1 + 2\sqrt{13}}{4} - 4\right)^2 = \left(\frac{7 + \sqrt{13}}{2} - 4\right)^2$$

$$= \left(\frac{\sqrt{13} - 1}{2}\right)^2 = \frac{7\sqrt{13}}{2}$$

17. (a) In $\triangle ABC$ and $\triangle BDC$

$$BC = BC \quad (\text{common})$$

$$\angle BCD = \angle BAC \quad (\text{given})$$

$$\angle DBC = \angle ABC \quad (\text{common})$$

$$\Rightarrow \triangle ABC \sim \triangle BDC$$

$$\therefore \frac{AC}{DC} = \frac{BC}{BD} = \frac{AB}{BC} \text{ or } AC = \frac{12}{9} \times 6 = 8$$

$$\text{and } AB = \frac{12}{9} \times 12 = 16$$

$$\therefore AD = 16 - 9 = 7$$

$$\frac{\text{Perimeter of } \triangle ADC}{\text{Perimeter of } \triangle BDC} = \frac{AD + DC + AC}{BD + DC + BC}$$

$$= \frac{7 + 6 + 8}{9 + 6 + 12} = \frac{21}{27} = \frac{7}{9}$$

18. (d) Cost of a male operator per call

$$= \frac{250}{40} + 15 = 6.25 + 15 = 21.25$$

$$\text{Cost of a female operator per call} = \frac{300}{50} + 10 = 16$$

As cost of a female operator is cheaper so he shall employ maximum no. of females, i.e., 12.

$$\therefore 12 \times 50 + x \times 40 = 1000$$

$$\text{or } 40x = 1000 - 600 = 400 \Rightarrow x = 10$$

\Rightarrow Males employed = 10

19. (c) For each person to know all the secrets the communication has to be between the Englishmen (who knows say E1 French) and one Frenchmen (say F1). The other two in each case will communicate with E1 & F1 respectively. So for minimum no. of calls, E2 gives information to E1 & receives it after E1 interacts with F1. So 2 calls for each of the four E2, E3, F2 and F3, i.e., 8 calls + 1 call (between E1 & F1). Hence 9 calls in all.

20. (b) Consider a unit length tile and let the dimensions of the rectangular floor be x and y.

$$\text{No. of tiles on the edges} = 2x + 2(y - 2)$$

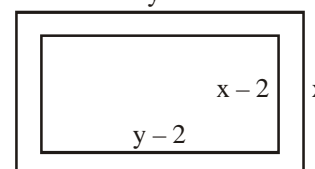
$$\text{No. of tiles in the interior} = (x - 2)(y - 2)$$

$$\therefore 2x + 2(y - 2) = (x - 2)(y - 2)$$

$$\Rightarrow 2x = (y - 2)(x - 4) \text{ or } y = \frac{2x}{x - 4} + 2$$

Hence $x > 4$, at $x = 5, y = 12$.

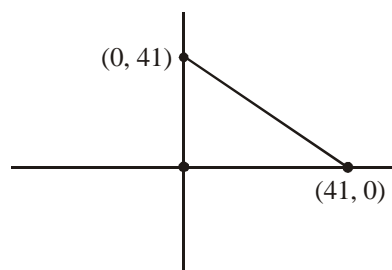
21. (d)



$$\begin{aligned} p + q &= 1! + (2 \times 2!) + (3 \times 3!) + \dots + (10 \times 10!) + 2 \\ &= (1! + 2) + (2 \times 2!) + \dots + (10 \times 10!) \\ &= 1 + 2! + (2 \times 2!) + \dots + (10 \times 10!) \\ &= 1 + 2! + (1 + 2) + (3 \times 3!) + \dots + (10 \times 10!) \\ &= 1 + 3! + (3 \times 3!) + \dots + (10 \times 10!) \\ &= 1 + 10! + (10 \times 10!) = 1 + 11! \end{aligned}$$

Hence $p + 2$ leaves 1 as remainder when divided by $11!$

22. (a) The equation of the line becomes $\frac{x}{41} + \frac{y}{41} = 1$



The (x, y) co-ordinates (x & y ∈ I) satisfying this equation are (1, 40) (2, 39).....(40, 1)

Total required points are :

(1, 1) (1, 2).....(1, 39) = 39 points

(2, 1) (2, 2).....(2, 38) = 38 points and so on.

So total integral points = 39 + 38 + 37 ++ 1 which is a A.P.

Hence $S_{39} = \frac{39}{2}(1+39) = 780$

23. (b) Let the 3 digits of A be xyz

Hence $A = 100x + 10y + z$

∴ $B = zyx$ or $B = 100z + 10y + x$

As $B > A \Rightarrow z > x$... (1)

$B - A = 99z - 99x = 99(z - x)$

As 99 is not divisible by 7 so (z - x) has to be divisible by 7. ... (2)

Using (1) & (2), the only possible values of z and x are (8, 1) and (9, 2)

So the minimum and maximum range of A are 108 and 299. which $\in 106 < A < 305$

24. (c) $a_{n+1} = 3a_n + 4n - 2$

Given,

$a_1 = 1 = 3^1 - 2$

$a_2 = 3 \times 1 + 4 - 2 = 5 = 3^2 - 4$

$a_3 = 3 \times 5 + 4 \times 2 - 2 = 21 = 3^3 - 6$

or $a_n = 3^n - 2n \Rightarrow a_{100} = 3^{100} - 2 \times 100 = 3^{100} - 200$

25. (b) There can be 2 possibilities – last digit is odd or even.

Case I : Last digit is odd. Fixing one out of 1, 3 & 5 in the last position. Then only one odd number can occupy odd position which can be chosen in 2C_1 ways = 2.

One of the two odd digits can be selected for this position in again, 2C_1 ways = 2.

The other odd number can be put in either of the two even places in 2 ways.

Finally the two even numbers can be arranged in 2! ways.

Hence sum of last digit of these nos. = $(2 \times 2 \times 2 \times 2)(1 + 3 + 5) = 144$ ways

Case II : Last digit is even. Then 2 odd nos. out of 3 can be arranged in ${}^3P_2 = 3!$ ways.

Again the even nos. can be arranged in 2! ways

∴ Sum = $(3! \times 2)(2 + 4) = 72$ ways.

Total ways = $144 + 72 = 216$.

26. (a) The number 30^{2720} will have 2720, zero's.

For the right most non-zero digit we have to check the power cycle of 3 and find when their multiplication again leads to a 3 as the right most digit.

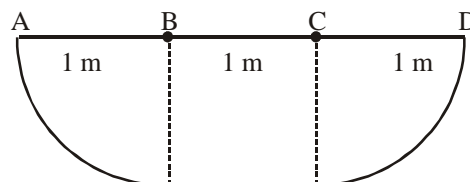
$3^1 = 3; 3^2 = 9; 3^3 = 27; 3^4 = 81; 3^5 = 243$

Hence 3 will appear after every fourth power of 3.

Hence $30^{2720} = 3^{2720} \times 10^{2720} = (3^4)^{680} \times 10^{2720}$

As the number 2720 is an exact multiple of 4, hence the last digit will be 1 similar to what we find in 3^4 .

27. (b) The ant would follow the path :



Hence it follows 2 quarter circles of radius 1 m and a distance of 1 m.

∴ minimum distance covered = $\frac{2\pi r}{2} + 1 = \pi + 1$

28. (d) Let $A = \log_x \left(\frac{x}{y} \right) + \log_y \left(\frac{y}{x} \right)$

$= \log_x x - \log_x y + \log_y y - \log_y x$

$\Rightarrow A = 2 - (\log_y x + \log_x y) = 2 - \left(\log_y x + \frac{1}{\log_y x} \right)$

We know, $a + \frac{1}{a} > 1 \Rightarrow A > 2 - 1$ or $A > 1$ or $A \neq 1$

29. (d) The no. can be 2 or 3 digit.

Firstly let $n = 10x + y$

$P_n + S_n = xy + x + y = 10x + y \Rightarrow xy - 9x = 0 \Rightarrow y = 9$ as $x \neq 0$

So the nos. can be 19, 29.....99, i.e., 9 values.

For 3 digits $n = 100x + 10y + z$

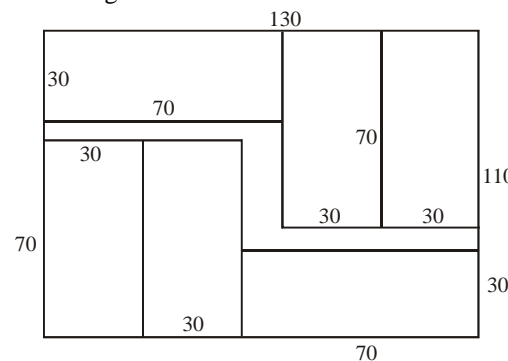
$\Rightarrow xyz + x + y + z = 100x + 10y + z$

$\Rightarrow xyz = 99x + 9y$ or $xz = \frac{9(11x + y)}{y}$

It can be verified using various values of y that this equation do not have any solution.

Eg. : For $y = 9, x(z - 11) = y$ which is not possible. So in all 9 integers.

30. (c)



SUB-SECTION II-A

31. (d) The first para of the passage clearly takes about all the first three options. So the answer is (d)
32. (c) The problem solving process of the scientist and detective has been talked about in the second last para. The third and the fourth sentence, " The effort of genuine conflict", clearly says that scientists study phenomena like nature, which are not altered with. Whereas when the criminal is actively involved, as in the case of detectives, he puts so many obstacles in the detectives path.
33. (c) Internal conflicts involves psychological dilemma, as talked in para 3, and are thus more interesting.
34. (b) The second para talks about psychologically interesting situations. Further the fourth para says, " Chess may be Tic - tac -toe". The situation given in option 2 makes it a psychologically interesting because of the irrational behaviour of one of the players.
35. (b) B has to follow E. Further A would be the last sentence of the passage as it talks about caste, where as EBDC talk about class.
36. (b) The passage must open with E, as it initiates the idea followed by B. Further C follows D and A culminates the passage as the author compares to what has been said in EBDC his view point.
37. (d) Definitely E has to follow C which is shown in options (a) and (d) only. D must follow CE and A is a conclusive statement.
38. (c) This sentence is incorrect as 'Bear for her' do not make any sense. The correct sentence is : I can't bear her to be angry.
39. (d) The correct sentence is :
I have my hands full, I cannot do it today
40. (b) 'near friend' is not appropriate and must be replaced with close friend.

SUB-SECTION II-B

41. (a) The paragraph (2) talks about the system of binary opposition . Read the line, Rather, they superior position. Here they refers to binary opposition.
42. (d) The first para talks about Derrida's deconstructive approach.
43. (a) The last paragraph, "Thus any actagent or subject", clearly gives the answer as option (a)
44. (c) The first paragraph speaks about in the 11th line. It clearly talks about (a), (b) and (d).
45. (c) It is the correct choice as discussed in the first three paragraphs of the passage.
46. (b) This has been talked in the 2nd paragraph.
47. (c) Refer paragraph 6 of passage, the first line talks about modern capitalism, "There are those the millennium".

48. (b) The para 1 and 5 talks about 'Edwardian Summer', which shows a sense of complacency among people because of all round development.
49. (b) A & D are grammatically correct. In B, the sentence shall begin with " Rarely as the" and C shall begin with " The postwar era".
50. (c) B is wrong as the use of mankind's is redundant. D is wrong as it does not form a coherent paragraph.
51. (b) A and D are correct. B is wrong as the word harness' can not be used for individuals. C is wrong as 'own' can not be used with 'egocentrism'.
52. (c) B is wrong as chlorine and bromine (chemicals) can not be blamed but held responsible. C is wrong because of the wrong usage of the adjective offending with chemicals.
53. (b) Federer made a very humble statement, so (b) is the most appropriate. (c) is clearly wrong as he said that he is the best of this generation.
54. (b) It is the most appropriate choice. Option (c) is wrong as ours is not the first generation to deal with the crisis, others have also dealt with it. (b) is correct as we might be the first generation to succeed. (a) do not make any sense. (d) is wrong as success was not illusory earlier as well.
55. (b) The option which fits perfectly in this situation is (b). As the passage says the experts are difficult to handle with, so organisations compromise and hire people who get along well (in teams). In the tone of the passage they can not be experts for sure and will do a mediocre job.
56. (a) The passage is clearly written by someone who feels crossword is superior as compared to Sudoku. The passage talks about the multi-dimensionality of crossword. So the contrasting sentence, in context to the passage, will be the one which shows Sudoku as a routine exercise.
57. (c) In the last sentence, crupping new gloss' shows that the word, ' crupping has been used to favour Paley's argument, as with a gloss' means making it look more attractive than it actually is. So destroying, testing and questioning are negative words in the context of the passage.
58. (c) In the opening line of the first sentence, the tone (i.e., negative) of blunk oil limps is similar to lamp fodder (useless). So it can not mean shining, bright or effulgent (shining) and the correct option is sputtering (burning or working in and uneven way).
59. (d) Seeing the wretched condition of the state no one can be amused (happy). Among irritated (annoyed), disgusting (sickening, distasteful) and distressing (disturbing, painful, traumatic) the last one seems to be most appropriate.
60. (d) The context here is diplomatic, so simple is ruled out as a simple statement or remark can not be diplomatic similarly a rude remark can not be diplomatic as it is straightforward and tactless. Witty is also ruled out as a witty remark must contain an element of humour. So the correct option is 'terse, which means to the point, laconic.

SUB-SECTION III-A

61. (a) Parul (F, Y) and Hari (M, I) are attending the CS workshop.
So atleast one female has to be present. Further there should be no commitment in January.
Dinesh, Anshul and Zeena have a project in Jan, so option (b), (c) and (d) are ruled out.

62. (b) Three executives Gayatri, Zeena and Urvashi can not attend more than one workshop. Gayatri and Urvashi can not attend even one workshop because of their project commitments. Zeena can attend only BO.

63. (d) Anshul can not attend any workshop because of projects in Jan (CS) and March (EG).
Similarly, Charu, Eashwarn, Bushkant, Gayatri and Urvashi cannot attend any of the workshops. Lavanya can attend 2, CS & EG, Mandeep can attend only BO.

64. (c) Looking carefully at the four bars in finance, we clearly understand that a faculty retired in 2001.

CHECK : $\frac{50.2 \times 5 - 60 + 4}{4} = \frac{195}{4} \cong 49$

Again the dip in average age clearly shows that the new faculty joined in 2002.

CHECK : $\frac{49 \times 4 + 4 + 25}{5} = \frac{225}{5} = 45$

65. (c) Clearly the dip in 2001 shows that the faculty joined on April 1, 2001. So age on April 1, 2003 is $25 + 2 = 27$ years

66. (a) From Q. 64, we clearly see that the faculty member retired from Finance.
Note : - The area (from which a faculty retires) will show two drops in the average ages.

67. (d) As in 2000,
Age of the faculty born in 1947 = 52 yrs
Age of the faculty born in 1950 = 49 yrs
Average age on April 1, 2000 = 49.33
 \therefore Age of the 3rd faculty = $49.33 \times 3 - (52 + 49) = 47$ yrs
So his age in 2005 is $47 + 5 = 52$ yrs

68. (b) See the following table

State	Total Area (in million hectares)	% of Area Under Rice Cultivation	Production (in million tons)	Population (in millions)	Productivity	Per capita production
Himachal Pradesh	6	20	1.2	6	1.00	0.20
Kerala	4	60	4.8	32	2.00	0.15
Rajasthan	34	20	6.8	56	1.00	0.12
Bihar	10	60	12	83	2.00	0.14
Karnataka	19	50	19	53	2.00	0.36
Haryana	4	80	19.2	21	6.00	0.91
West Bengal	9	80	21.6	80	3.00	0.27
Gujarat	20	60	24	51	2.00	0.47
Punjab	5	80	24	24	6.00	1.00
Madhya Pradesh	31	40	24.8	60	2.00	0.41
Tamilnadu	13	70	27.3	62	3.00	0.44
Maharashtra	31	50	48	97	3.10	0.49
Uttar Pradesh	24	70	67.2	166	4.00	0.40
Andhra Pradesh	28	80	112	76	5.00	1.47

So clearly 4 states — Haryana, Punjab, Maharashtra and Andhra Pradesh — have higher per capita production as compared to Gujarat (0.47)

69. (d) The per capita production in the table is given in million tons/million
400,000 tons \cong 0.4 million tons
So intensive producing state are 8 in number, who have higher than this production.

70. (a) The productivities can be seen from the given table in Q.68
So Haryana and Punjab have the highest productivity.

SUB-SECTION III-B

71. (a) One of the companies with extraordinary results belongs to cement or IT industry (double return) stored and the other one belong to steel or auto industry ($1\frac{1}{2}$ times return)

	A	B	C	D	Total	Avg. Return
Return	20	10	30	40	100	25%
For min. Return	30	20	30	40	120	30%

72. (b)

	A	B	C	D	Total	Avg. Return
Return	20	10	30	40	100	25%
Possibilities	30	10	60	40	140	35%
For 35% rtn.	40	10	30	60	140	35%

So, II and III are correct.

73. (c)

	A	B	C	D	Total	Avg.
Return	20	10	30	40	100	25%
For 38.75 rtn.	20	10	45	80	155	38.75%

So I & IV are correct.

74. (b)

	A	B	C	D	Total	Avg.
Return	20	10	30	40		
For max. rtn.	20	10	60	60	150	37.5%
For min. rtn.	20	15	60	40	135	33.75%

So clearly II and IV are true.

75-78.

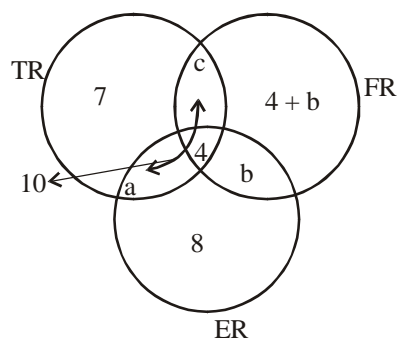
	A	B	C	D
UP	49	82	80	55
Bihar	69	72	70	65
MP	72	63	72	65
Total	190	217	222	185

Hence it is clear from condition (2) that B and C have their names between Aggressive Ltd. & Honest Ltd.

75. (c) If statement (1) is true then B is Honest Ltd.
If statement (2) is true then B is Aggressive Ltd.
So (c) i.e., at most one of these is true.

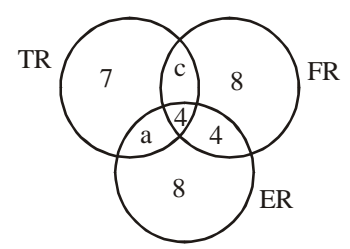
76. (c) As per 1 B is Aggressive Ltd.
As per 2, C is Honest Ltd.
So if 1 is true than 2 has to be true.
77. (b) As per 1, B is profitable Ltd.
As per 2, C should be Honest Ltd., Which has the highest aggregate revenue of 222 m. But as per the given condition in M.P, Truthful Ltd, has the highest market share. So 2 is necessarily false.
78. (c) If profitable Ltd.'s is lowest revenue is form UP, then it is either A or D. In either case the other one (A or D) is truthful Ltd. Hence the lowest revenue is from up again.
79. (c) In the second sound, Elena Dementieva ($\neq 6$) will lose to the winner of Patty Schnyder ($\neq 11$) and Dinara ($\neq 22$) and Serena Williams ($\neq 8$) will lose to Nadia Petrova ($\neq 9$). Further in round 3 (quarter finals), Nadia Petrova will play with Maria Sharapova and defeat her.
80. (c) In question final Maria will defeat Serena and play with the winner of $\neq 4$ and $\neq 5$ and will defeat her in the semi finals. So she will definitely not play Kim Clijsters in the finals.
81. (d) In the IInd round there will be the top 16 players.
As there is upset in the 6th, 7th and 8th match of the 2nd round, so the quarter finalists will be : $\neq 1, \neq 2, \neq 3, \neq 4, \neq 5, \neq 9, \neq 10, \neq 11$.
So Lindsay Davenport ($\neq 2$) plays $\neq 10$ (Venus Williams) in the quarters.
82. (a) The line up for second round becomes
1, 31, 2, 29, 5, 27, 7, 25, 9, 23, 11, 21, 13, 19, 15, 17
The line up for 3rd round is :
1, 15, 3, 13, 5, 11, 7, 9
So in the semifinal Maria Sharapova will meet $\neq 13$ or $\neq 5$. So Anastasia Myskina is the answer.

83. (c) $n(\text{TR}) = 17$
 $n(\text{involved in TR \& atleast 1 more}) = 10$
 $n(\text{only TR}) = 17 - 10 = 7$; $n(\text{only ER}) = 7 + 1 = 8$
 $n(\text{TR} \cap \text{ER} \cap \text{FR}) = 8/2 = 4$
 $n(\text{FR only}) = n(\text{FR volunteers involved in ER}) = b + 4$

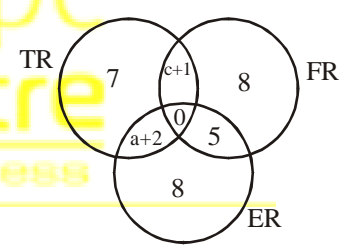


$n(\text{FR} \cap \text{TR but not ER}) = c = 6 - a$ (1)
Total volunteers = 37
 $\Rightarrow 17 + 8 + 4 + 2b = 37$
 $\Rightarrow 2b = 8$ or $b = 4$
From (1), $a + c = 6$

- As FR has to have maximum volunteers so c can have the following possible values
(1) $c = 4, a = 2$ (2) $c = 5, a = 1$
But for minimum volunteers in FR & TR, $c = 4$.
84. (a) Only 1st option is useful
 $20 = 4 + 4 + 8 + c$ or $c = 4$
Using the value of c and b we can get all required values.
85. (b) The Venn-diagram looks like,



Now the 4 students common to all the three projects are asked to shift
1 moves from TR and remains in ER & FR
1 moves from ER and remains in FR & TR
2 moves from FR and in remains in ER & TR
So the new diagram becomes



$n(\text{TR}) = 10 + a + c$
 $n(\text{FR}) = 9 + 5 + c = 14 + c$
 $n(\text{ER}) = 8 + 5 + a + 2 = 15 + a$
Further, $a + c = 6$ for which either $c = 5$ & $a = 1$
or $c = 4$ & $a = 2$
Thus FR has maximum volunteers for any values of c & a.

86. (a) TR
-

$a + 2 = 5 \Rightarrow a = 3$
 $a + c = 6 \Rightarrow c = 3$
 $n(\text{TR}) = 8 + 4 + 5 = 17$
 $n(\text{FR}) = 8 + 5 + 4 = 17$
 $n(\text{ER}) = 8 + 5 + 5 = 18$

So maximum volunteers are in ER = 18

87-90.

Round	Total	L	P	B	N	
1	82	30	24	16	12	
2	83	30	24+3(N)+ 4(B)+1new	21	-	1 new member from N votes
3	75	30+50% of 16(B in round I)	32+4(B)+1	-	-	1 new member from B votes

In all 9 members could not vote in round 3 [83 – (75 – 1)] as both the countries they voted for — New York & Beijing lost in the first two rounds. So the remaining members who voted for Beijing in round 2 (i.e., 21 – 9 = 12) are equivalent to the 75% of members who voted Beijing in round 1.

Hence Members voting for Beijing in round 1 = $\frac{12}{.75} = 16$

Total votes in round 1 = 83 – 1 = 82

87. (d) Members who voted for NY in round 1 but for Beijing in round 2

$$= \frac{9 \times 100}{12} = 75\%$$

88. (d) Votes for Paris in round 1 = 24

89. (d) Votes who voted for London in round 3 but voted for

$$\text{Beijing in round 2} = \frac{8}{12} \times 100 = 66.67\%$$

(Note : 9 out of 21 members of Beijing left)

90. (a) Clearly the new member from NY voted for Paris in round 2. Further the new member from Beijing also voted for Paris in round 3.

