Question Paper with Solutions

CAT 2006

CAT 2006 Actual Paper

Instructions:

1. The Test Paper contains 75 questions. The duration of the test is 150 minutes.
2. The paper is divided into three sections. Section-I: 25 Q:, Section-II: 25 Q:, Section-III: 25 Q.
3. Wrong answers carry negative marks. There is only one correct answer for each question.

Section – I

Directions for questions 1 to 5: Answer the questions on the basis of the information given below:
K, L, M, N, P, Q, R, S, U and W are the only ten members in a department. There is a proposal to form a team from within the members of the department, subject to the following conditions:

1. A team must include exactly one among P, R, and S.
2. A team must include either M or Q, but not both.
3. If a team includes K, then it must also include L, and vice versa.
4. If a team includes one among S, U, and W, then it must also include the other two.
5. L and N cannot be members of the same team.
6. L and U cannot be members of the same team.

The size of a team is defined as the number of members in the team.

1. Who cannot be a member of a team of size 3?
   (1) L (2) M (3) N (4) P (5) Q

2. Who can be a member of a team of size 5?
   (1) K (2) L (3) M (4) P (5) R

3. What would be the size of the largest possible team?
   (1) 8 (2) 7 (3) 6 (4) 5 (5) Cannot be determined

4. What could be the size of a team that includes K?
   (1) 2 or 3 (2) 2 or 4 (3) 3 or 4 (4) Only 2 (5) Only 4

5. In how many ways a team can be constituted so that the team includes N?
   (1) 2 (2) 3 (3) 4 (4) 5 (5) 6

Directions for questions 6 to 10: Answer questions on the basis of the information given below:

In a Class X Board examination, ten papers are distributed over five Groups - PCB, Mathematics, Social Science, Vernacular and English. Each of the ten papers is evaluated out of 100. The final score of a student is calculated in the following manner. First, the Group Scores are obtained by averaging marks in the papers within the Group. The final score is the simple average of the Group Scores. The data for the top ten students are presented below. (Dipan's score in English Paper II has been intentionally removed in the table.)

Name of the student	PCB Group			Mathematics Group	Social Science Group		Vernacular Group		English Group		Final Score
	Phy.	Chem.	Bio.		Hist.	Geo.	Paper I	Paper II	Paper I	Paper II	
Ayesha (G)	98	96	97	98	95	93	94	96	96	98	96.2
Ram (B)	97	99	95	97	95	96	94	94	96	98	96.1
Dipan (B)	98	98	98	95	96	95	96	94	96	??	96.0
Sagnik (B)	97	98	99	96	96	98	94	97	92	94	95.9
Sanjiv (B)	95	96	97	98	97	96	92	93	95	96	95.7
Shreya (G)	96	89	85	100	97	98	94	95	96	95	95.5
Joseph (B)	90	94	98	100	94	97	90	92	94	95	95
Agni (B)	96	99	96	99	95	96	82	93	92	93	94.3
Pritam (B)	98	98	95	98	83	95	90	93	94	94	93.9
Tirna (G)	96	98	97	99	85	94	92	91	87	96	93.7

Note: B or G against the name of a student respectively indicates whether the student is a boy or a girl.

6. How much did Dipan get in English Paper II?
(1) 94 (2) 96.5 (3) 97 (4) 98 (5) 99

7. Among the top ten students, how many boys scored at least 95 in at least one paper from each of the groups?
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5

8. Had Joseph, Agni, Pritam and Tirna each obtained Group Score of 100 in the Social Science Group, then their standing in decreasing order of final score would be:
(1) Pritam, Joseph, Tirna, Agni
(2) Joseph, Tirna, Agni, Pritam
(3) Pritam, Agni, Tirna, Joseph
(4) Joseph, Tirna, Pritam, Agni
(5) Pritam, Tirna, Agni, Joseph

9. Students who obtained Group Scores of at least 95 in every group are eligible to apply for a prize. Among those who are eligible, the student obtaining the highest Group Score in Social Science Group is awarded this prize. The prize was awarded to:
(1) Shreya (2) Ram
(3) Ayesha (4) Dipan
(5) No one from the top ten

10. Each of the ten students was allowed to improve his/her score in exactly one paper of choice with the objective of maximizing his/her final score. Everyone scored 100 in the paper in which he or she chose to improve. After that, the topper among the ten students was:
(1) Ram (2) Agni (3) Pritam (4) Ayesha (5) Dipan

Directions for questions 11 to 15: Answer the questions on the basis of the information given below:

Mathematicians are assigned a number called Erdös number (named after the famous mathematician, Paul Erdös). Only Paul Erdös himself has an Erdös number of zero. Any mathematician who has written a research paper with Erdös has an Erdös number of 1. For other mathematicians, the calculation of his/her Erdös number is illustrated below:

Suppose that a mathematician X has co-authored papers with several other mathematicians. From among them, mathematician Y has the smallest Erdös number. Let the Erdös number of Y be y. Then X has an Erdös number of y+1 . Hence any mathematician with no co-authorship chain connected to Erdös has an Erdös number of infinity.

In a seven day long mini-conference organized in memory of Paul Erdös, a close group of eight mathematicians, call them A, B, C, D, E, F, G and H, discussed some research problems. At the beginning of the conference, A was the only participant who had an infinite Erdös number. Nobody had an Erdös number less than that of F.

1 On the third day of the conference F co-authored a paper jointly with A and C. This reduced the average Erdös number of the group of eight mathematicians to 3. The Erdös numbers of B, D, E, G and H remained unchanged with the writing of this paper. Further, no other co-authorship among any three members would have reduced the average Erdös number of the group of eight to as low as 3.
2 At the end of the third day, five members of this group had identical Erdös numbers while the other three had Erdös numbers distinct from each other.
3 On the fifth day, E co-authored a paper with F which reduced the group's average Erdös number by 0.5. The Erdös numbers of the remaining six were unchanged with the writing of this paper.
4 No other paper was written during the conference.

11. How many participants in the conference did not change their Erdös number during the conference?
(1) 2 (2) 3 (3) 4 (4) 5 (5) Cannot be determined

12. The person having the largest Erdös number at the end of the conference must have had Erdös number (at that time):
(1) 5 (2) 7 (3) 9 (4) 14 (5) 15

13. How many participants had the same Erdös number at the beginning of the conference?
(1) 2 (2) 3 (3) 4 (4) 5 (5) Cannot be determined

14. The Erdös number of C at the end of the conference was:
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5

15. The Erdös number of E at the beginning of the conference was:
(1) 2 (2) 5 (3) 6 (4) 7 (5) 8

Directions for questions 16 to 20: Answer the questions on the basis of the information given below:

Two traders, Chetan and Michael, were involved in the buying and selling of MCS shares over five trading days. At the beginning of the first day, the MCS share was priced at Rs 100, while at the end of the fifth day it was priced at Rs 110. At the end of each day, the MCS share price either went up by Rs 10, or else, it came down by Rs 10. Both Chetan and Michael took buying and selling decisions at the end of each trading day. The beginning price of MCS share on a given day was the same as the ending price of the previous day. Chetan and Michael started with the same number of shares and amount of cash, and had enough of both. Below are some additional facts about how Chetan and Michael traded over the five trading days.

1 Each day if the price went up, Chetan sold 10 shares of MCS at the closing price. On the other hand, each day if the price went down, he bought 10 shares at the closing price.
2 If on any day, the closing price was above Rs 110, then Michael sold 10 shares of MCS, while if it was below Rs 90, he bought 10 shares, all at the closing price.

16. If Chetan sold 10 shares of MCS on three consecutive days, while Michael sold 10 shares only once during the five days, what was the price of MCS at the end of day 3?
(1) Rs 90 (2) Rs 100 (3) Rs 110 (4) Rs 120 (5) Rs 130

17. If Chetan ended up with Rs 1300 more cash than Michael at the end of day 5, what was the price of MCS share at the end of day 4?
(1) Rs 90 (2) Rs 100 (3) Rs 110
(4) Rs 120 (5) Not uniquely determinable

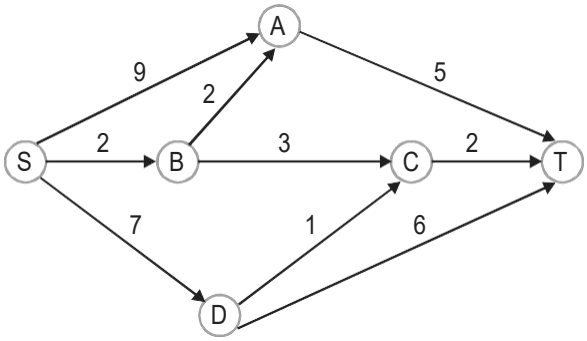
18. If Michael ended up with 20 more shares than Chetan at the end of day 5, what was the price of the share at the end of day 3?
(1) Rs 90 (2) Rs 100 (3) Rs 110 (4) Rs 120 (5) Rs 130

19. If Michael ended up with Rs 100 less cash than Chetan at the end of day 5, what was the difference in the number of shares possessed by Michael and Chetan (at the end of day 5)?
(1) Michael had 10 less shares than Chetan.
(2) Michael had 10 more shares than Chetan.
(3) Chetan had 10 more shares than Michael,
(4) Chetan had 20 more shares than Michael.
(5) Both had the same number of shares.

20. What could have been the maximum possible increase in combined cash balance of Chetan and Michael at the end of the fifth day?
(1) Rs 3700 (2) Rs 4000 (3) Rs 4700 (4) Rs 5000 (5) Rs 6000

Directions for questions 21 to 25: Answer the questions on the basis of the information given below:

A significant amount of traffic flows from point S to point T in the one-way street network shown below. Points A, B, C, and D are junctions in the network, and the arrows mark the direction of traffic flow. The fuel cost in rupees for travelling along a street is indicated by the number adjacent to the arrow representing the street.



Motorists travelling from point S to point T would obviously take the route for which the total cost of travelling is the minimum. If two or more routes have the same least travel cost, then motorists are indifferent between them. Hence, the traffic gets evenly distributed among all the least cost routes.

The government can control the flow of traffic only by levying appropriate toll at each junction. For example, if a motorist takes the route S-A-T (using junction A alone), then the total cost of travel would be Rs 14 (i.e., Rs 9 + Rs 5) plus the toll charged at junction A.

21. If the government wants to ensure that no traffic flows on the street from D to T, while equal amount of traffic flows through junctions A and C, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:
(1) 1,5,3,3 (2) 1,4,4,3 (3) 1,5,4,2 (4) 0,5,2,3 (5) 0,5,2,2

22. If the government wants to ensure that all motorists travelling from S to T pay the same amount (fuel costs and toll combined) regardless of the route they choose and the street from B to C is under repairs (and hence unusable), then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:
(1) 2,5,3,2 (2) 0,5,3, 1 (3) 1,5,3,2 (4) 2,3,5,1 (5) 1,3,5,1

23. If the government wants to ensure that the traffic at S gets evenly distributed along streets from S to A, from S to B, and from S to D, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:
(1) 0,5,4,1 (2) 0,5,2,2 (3) 1,5,3,3 (4) 1,5,3,2 (5) 0,4,3,2

24. If the government wants to ensure that all routes from S to T get the same amount of traffic, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:
(1) 0,5,2,2 (2) 0,5,4,1 (3) 1,5,3,3 (4) 1,5,3,2 (5)1,5,4,2

25. The government wants to devise a toll policy such that the total cost to the commuters per trip is minimized. The policy should also ensure that not more than 70 per cent of the total traffic passes through junction B. The cost incurred by the commuter travelling from point S to point T under this policy will be:
(1) Rs. 7 (2) Rs. 9 (3) Rs. 10 (4) Rs. 13 (5) Rs. 14

Section – II

Directions for Questions 26 to 30: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

26. Relations between the factory and the dealer are distant and usually strained as the factory tries to force cars on the dealers to smooth out production. Relations between the dealer and the customer are equally strained because dealers continuously adjust prices — make deals — to adjust demand with supply while maximizing profits. This becomes a system marked by a lack of long-term commitment on either side, which maximizes feelings of mistrust. In order to maximize their bargaining positions, everyone holds back information — the dealer about the product and the consumer about his true desires.
    (1) As a result, 'deal making' becomes rampant, without concern for customer satisfaction.
    (2) As a result, inefficiencies creep into the supply chain.
    (3) As a result, everyone treats the other as an adversary, rather than as an ally.
    (4) As a result, fundamental innovations are becoming scarce in the automobile industry.
    (5) As a result, everyone loses in the long run.

27. We can usefully think of theoretical models as maps, which help us navigate unfamiliar territory. The most accurate map that it is possible to construct would be of no practical use whatsoever, for it would be an exact replica, on exactly the same scale, of the place where we were. Good maps pull out the most important features and throw away a huge amount of much less valuable information. Of course, maps can be bad as well as good — witness the attempts by medieval Europe to produce a map of the world. In the same way, a bad theory, no matter how impressive it may seem in principle, does little or nothing to help us understand a problem.
    (1) But good theories, just like good maps, are invaluable, even if they are simplified.
    (2) But good theories, just like good maps, will never represent unfamiliar concepts in detail.
    (3) But good theories, just like good maps, need to balance detail and feasibility of representation.
    (4) But good theories, just like good maps, are accurate only at a certain level of abstraction.
    (5) But good theories, just like good maps, are useful in the hands of a user who knows their limitations.

28. In the evolving world order, the comparative advantage of the United States lies in its military force. Diplomacy and international law have always been regarded as annoying encumbrances, unless they can be used to advantage against an enemy. Every active player in world affairs professes to seek only peace and to prefer negotiation to violence and coercion.
    (1) However, diplomacy has often been used as a mask by nations which intended to use force.
    (2) However, when the veil is lifted, we commonly see that diplomacy is understood as a disguise for the rule of force.

(3) However, history has shown that many of these nations do not practice what they profess.
(4) However, history tells us that peace is professed by those who intend to use violence.
(5) However, when unmasked, such nations reveal a penchant for the use of force.

29. I am sometimes attacked for imposing 'rules'. Nothing could be further from the truth. I hate rules. All I do is report on how consumers react to different stimuli. I may say to a copywriter, "Research shows that commercials with celebrities are below average in persuading people to buy products. Are you sure you want to use a celebrity?" Call that a rule? Or I may say to an art director, "Research suggests that if you set the copy in black type on a white background, more people will read it than if you set it in white type on a black background."
(1) Guidance based on applied research can hardly qualify as 'rules'.
(2) Thus, all my so called 'rules' are rooted in applied research.
(3) A suggestion perhaps, but scarcely a rule.
(4) Such principles are unavoidable if one wants to be systematic about consumer behaviour.
(5) Fundamentally it is about consumer behaviour — not about celebrities or type settings.

30. Age has a curvilinear relationship with the exploitation of opportunity. Initially, age will increase the likelihood that a person will exploit an entrepreneurial opportunity because people gather much of the knowledge necessary to exploit opportunities over the course of their lives, and because age provides credibility in transmitting that information to others. However, as people become older, their willingness to bear risks declines, their opportunity costs rise, and they become less receptive to new information.
(1) As a result, people transmit more information rather than experiment with new ideas as they reach an advanced age.
(2) As a result, people are reluctant to experiment with new ideas as they reach an advanced age.
(3) As a result, only people with lower opportunity costs exploit opportunity when they reach an advanced age.
(4) As a result, people become reluctant to exploit entrepreneurial opportunities when they reach an advanced age.
(5) As a result, people depend on credibility rather than on novelty as they reach an advanced age.

Directions for Questions 31 to 35: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Our propensity to look out for regularities, and to impose laws upon nature, leads to the psychological phenomenon of dogmatic thinking or, more generally, dogmatic behaviour: we expect regularities everywhere and attempt to find them even where there are none; events which do not yield to these attempts we are inclined to treat as a kind of 'background noise'; and we stick to our expectations even when they are inadequate and we ought to accept defeat. This dogmatism is to some extent necessary. It is demanded by a situation which can only be dealt with by forcing our conjectures upon the world. Moreover, this dogmatism allows us to approach a good theory in stages, by way of approximations: if we accept defeat too easily, we may prevent ourselves from finding that we were very nearly right.

It is clear that this dogmatic attitude, which makes us stick to our first impressions, is indicative of a strong belief; while a critical attitude, which is ready to modify its tenets, which admits doubt and demands tests, is indicative of a weaker belief. Now according to Hume's theory, and to the popular theory, the strength of a belief should be a product of repetition; thus it should always grow with experience, and always be greater in less primitive persons. But dogmatic thinking, an uncontrolled wish to impose regularities, a manifest pleasure in rites and in repetition as such, is characteristic of primitives and children; and increasing experience and maturity sometimes create an attitude of caution and criticism rather than of dogmatism.

My logical criticism of Hume's psychological theory, and the considerations connected with it, may seem a little removed from the field of the philosophy of science. But the distinction between dogmatic and critical thinking, or the dogmatic and the critical attitude, brings us right back to our central problem. For the dogmatic attitude is clearly related to the tendency to verify our laws and schemata by seeking to apply them and to confirm them, even to the point of neglecting refutations, whereas the critical attitude is one of readiness to change them — to test them; to refute them; to falsify them, if possible. This suggests that we may identify the critical attitude with the scientific attitude, and the dogmatic attitude with the one which we have described as pseudo-scientific. It further suggests that genetically speaking the pseudo-scientific attitude is more primitive than, and prior to, the scientific attitude: that it is a pre-scientific attitude. And this primitivity or priority also has its logical aspect. For the critical attitude is not so much opposed to the dogmatic attitude as super-imposed upon it: criticism must be directed against existing and influential beliefs in need of critical revision — in other words, dogmatic beliefs. A critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically.

Thus, science must begin with myths, and with the criticism of myths; neither with the collection of observations, nor with the invention of experiments, but with the critical discussion of myths, and of magical techniques and practices. The scientific tradition is distinguished from the pre-scientific tradition in having two layers. Like the latter, it passes on its theories; but it also passes on a critical attitude towards them. The theories are passed on, not as dogmas, but rather with the challenge to discuss them and improve upon them.
The critical attitude, the tradition of free discussion of theories with the aim of discovering their weak spots so that they may be improved upon, is the attitude of reasonableness, of rationality. From the point of view here developed, all laws, all theories, remain essentially tentative, or conjectural, or hypothetical, even when we feel unable to doubt them any longer. Before a theory has been refuted we can never know in what way it may have to be modified.

31. In the context of science, according to the passage, the interaction of dogmatic beliefs and critical attitude can be best described as:

(1) A duel between two warriors in which one has to die.
(2) The effect of a chisel on a marble stone while making a sculpture.
(3) The feedshare (natural gas) in fertilizer industry being transformed into fertilizers.
(4) A predator killing its prey.
(5) The effect of fertilizers on a sapling.

32. According to the passage, the role of a dogmatic attitude or dogmatic behaviour in the development of science is
(1) critical and important, as, without it, initial hypotheses or conjectures can never be made.
(2) positive, as conjectures arising out of our dogmatic attitude become science.
(3) negative, as it leads to pseudo-science.
(4) neutral, as the development of science is essentially because of our critical attitude.
(5) inferior to critical attitude, as a critical attitude leads to the attitude of reasonableness and rationality.

33. Dogmatic behaviour, in this passage, has been associated with primitives and children. Which of the following best describes the reason why the author compares primitives with children?
(1) Primitives are people who are not educated, and hence can be compared with children, who have not yet been through school.
(2) Primitives are people who, though not modern, are as innocent as children.
(3) Primitives are people without a critical attitude, just as children are.
(4) Primitives are people in the early stages of human evolution; similarly, children are in the early stages of their lives.
(5) Primitives are people who are not civilized enough, just as children are not.

34. Which of the following statements best supports the argument in the passage that a critical attitude leads to a weaker belief than a dogmatic attitude does?
(1) A critical attitude implies endless questioning, and, therefore, it cannot lead to strong beliefs.
(2) A critical attitude, by definition, is centred on an analysis of anomalies and "noise".
(3) A critical attitude leads to questioning everything, and in the process generates "noise" without any conviction.
(4) A critical attitude is antithetical to conviction, which is required for strong beliefs.
(5) A critical attitude leads to questioning and to tentative hypotheses.

35. According to the passage, which of the following statements best describes the difference between science and pseudo-science?
(1) Scientific theories or hypotheses are tentatively true whereas pseudo-sciences are always true.
(2) Scientific laws and theories are permanent and immutable whereas pseudo-sciences are contingent on the prevalent mode of thinking in a society.
(3) Science always allows the possibility of rejecting a theory or hypothesis, whereas pseudo-sciences seek to validate their ideas or theories.
(4) Science focuses on anomalies and exceptions so that fundamental truths can be uncovered, whereas pseudo-sciences focus mainly on general truths.
(5) Science progresses by collection of observations or by experimentation, whereas pseudo-sciences do not worry about observations and experiments.

Directions for Questions 36 to 40: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Fifteen years after communism was officially pronounced dead, its spectre seems once again to be haunting Europe. Last month, the Council of Europe's parliamentary assembly voted to condemn the "crimes of totalitarian communist regimes," linking them with Nazism and complaining that communist parties are still "legal and active in some countries." Now Goran Lindblad, the conservative Swedish MP behind the resolution, wants to go further. Demands that European Ministers launch a continent-wide anti-communist campaign — including school textbook revisions, official memorial days, and museums — only narrowly missed the necessary two-thirds majority. Mr. Lindblad pledged to bring the wider plans back to the Council of Europe in the coming months.

He has chosen a good year for his ideological offensive: this is the 50th anniversary of Nikita Khrushchev's denunciation of Josef Stalin and the subsequent Hungarian uprising, which will doubtless be the cue for further excoriation of the communist record. Paradoxically, given that there is no communist government left in Europe outside Moldova, the attacks have if anything, become more extreme as time has gone on. A clue as to why that might be can be found in the rambling report by Mr. Lindblad that led to the Council of Europe declaration. Blaming class struggle and public ownership, he explained "different elements of communist ideology such as equality or social justice still seduce many" and "a sort of nostalgia for communism is still alive." Perhaps the real problem for Mr. Lindblad and his right-wing allies in Eastern Europe is that communism is not dead enough — and they will only be content when they have driven a stake through its heart.

The fashionable attempt to equate communism and Nazism is in reality a moral and historical nonsense. Despite the cruelties of the Stalin terror, there was no Soviet Treblinka or Sorbibor, no extermination camps built to murder millions. Nor did the Soviet Union launch the most devastating war in history at a cost of more than 50 million lives — in fact it played the decisive role in the defeat of the German war machine. Mr. Lindblad and the Council of Europe adopt as fact the wildest estimates of those "killed by communist regimes" (mostly in famines) from the fiercely contested Black Book of Communism, which also underplays the number of deaths attributable to Hitler. But, in any case, none of this explains why anyone might be nostalgic in former communist states, now enjoying the delights of capitalist restoration. The dominant account gives no sense of how communist regimes renewed themselves after 1956 or why Western leaders feared they might overtake the capitalist world well into the 1960s. For all its brutalities and failures, communism in the Soviet Union, Eastern Europe, and elsewhere delivered rapid industrialization, mass education, job security, and huge advances in social and gender equality. Its existence helped to drive up welfare standards in the West, and provided a powerful counterweight to Western global domination.

It would be easier to take the Council of Europe's condemnation of communist state crimes seriously if it had also seen fit to denounce the far bloodier record of European colonialism — which only finally came to an end in the 1970s. This was a system of racist despotism, which dominated the globe in Stalin's time. And while there is precious little connection between the ideas of fascism and communism, there is an

intimate link between colonialism and Nazism. The terms lebensraum and konzentrationslager were both first used by the German colonial regime in south-west Africa (now Namibia), which committed genocide against the Herero and Nama peoples and bequeathed its ideas and personnel directly to the Nazi party. Around 10 million Congolese died as a result of Belgian forced labour and mass murder in the early twentieth century; tens of millions perished in avoidable or enforced famines in British-ruled India; up to a million Algerians died in their war for independence, while controversy now rages in France about a new law requiring teachers to put a positive spin on colonial history. Comparable atrocities were carried out by all European colonialists, but not a word of condemnation from the Council of Europe. Presumably, European lives count for more.

No major twentieth century political tradition is without blood on its hands, but battles over history are more about the future than the past. Part of the current enthusiasm in official Western circles for dancing on the grave of communism is no doubt about relations with today's Russia and China. But it also reflects a determination to prove there is no alternative to the new global capitalist order — and that any attempt to find one is bound to lead to suffering. With the new imperialism now being resisted in the Muslim world and Latin America, growing international demands for social justice and ever greater doubts about whether the environmental crisis can be solved within the existing economic system, the pressure for alternatives will increase.

36. Among all the apprehensions that Mr. Goran Lindblad expresses against communism, which one gets admitted, although indirectly, by the author?
    (1) There is nostalgia for communist ideology even if communism has been abandoned by most European nations.
    (2) Notions of social justice inherent in communist ideology appeal to critics of existing systems.
    (3) Communist regimes were totalitarian and marked by brutalities and large scale violence.
    (4) The existing economic order is wrongly viewed as imperialistic by proponents of communism.
    (5) Communist ideology is faulted because communist regimes resulted in economic failures.

37. What, according to the author, is the real reason for a renewed attack against communism?
    (1) Disguising the unintended consequences of the current economic order such as social injustice and environmental crisis.
    (2) Idealising the existing ideology of global capitalism.
    (3) Making communism a generic representative of all historical atrocities, especially those perpetrated by the European imperialists.
    (4) Communism still survives, in bits and pieces, in the minds and hearts of people.
    (5) Renewal of some communist regimes has led to the apprehension that communist nations might overtake the capitalists.

38. The author cites examples of atrocities perpetrated by European colonial regimes in order to
    (1) compare the atrocities committed by colonial regimes with those of communist regimes.
    (2) prove that the atrocities committed by colonial regimes were more than those of communist regimes.

(3) prove that, ideologically, communism was much better than colonialism and Nazism.
(4) neutralise the arguments of Mr. Lindblad and to point out that the atrocities committed by colonial regimes were more than those of communist regimes.
(5) neutralise the arguments of Mr. Lindblad and to argue that one needs to go beyond and look at the motives of these regimes.

39. Why, according to the author, is Nazism closer to colonialism than it is to communism?
(1) Both colonialism and Nazism were examples of tyranny of one race over another.
(2) The genocides committed by the colonial and the Nazi regimes were of similar magnitude.
(3) Several ideas of the Nazi regime were directly imported from colonial regimes.
(4) Both colonialism and Nazism are based on the principles of imperialism.
(5) While communism was never limited to Europe, both the Nazis and the colonialists originated in Europe.

40. Which of the following cannot be inferred as a compelling reason for the silence of the Council of Europe on colonial atrocities?
(1) The Council of Europe being dominated by erstwhile colonialists.
(2) Generating support for condemning communist ideology.
(3) Unwillingness to antagonize allies by raking up an embarrassing past.
(4) Greater value seemingly placed on European lives.
(5) Portraying both communism and Nazism as ideologies to be condemned.

Directions for Questions 41 to 45: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

My aim is to present a conception of justice which generalizes and carries to a higher level of abstraction the familiar theory of the social contract. In order to do this we are not to think of the original contract as one to enter a particular society or to set up a particular form of government. Rather, the idea is that the principles of justice for the basic structure of society are the object of the original agreement. They are the principles that free and rational persons concerned to further their own interests would accept in an initial position of equality. These principles are to regulate all further agreements; they specify the kinds of social cooperation that can be entered into and the forms of government that can be established. This way of regarding the principles of justice, I shall call justice as fairness. Thus, we are to imagine that those who engage in social cooperation choose together, in one joint act, the principles which are to assign basic rights and duties and to determine the division of social benefits. Just as each person must decide by rational reflection what constitutes his good, that is, the system of ends which it is rational for him to pursue, so a group of persons must decide once and for all what is to count among them as just and unjust. The choice which rational men would make in this hypothetical situation of equal liberty determines the principles of justice.

In ‘justice as fairness’, the original position is not an actual historical state of affairs. It is understood as a purely hypothetical situation characterized so as to lead to a certain conception of justice. Among the essential features of this situation is that no one knows his place in society, his class position or social status, nor does anyone know his fortune in the distribution of natural assets and abilities, his intelligence, strength, and the like. I shall even assume that the parties do not know their conceptions of the good or their special psychological propensities. The principles of justice are chosen behind a veil of ignorance. This ensures that no one is advantaged or disadvantaged in the choice of principles by the outcome of natural chance or the contingency of social circumstances. Since all are similarly situated and no one is able to design principles to favor his particular condition, the principles of justice are the result of a fair agreement or bargain.

Justice as fairness begins with one of the most general of all choices which persons might make together, namely, with the choice of the first principles of a conception of justice which is to regulate all subsequent criticism and reform of institutions. Then, having chosen a conception of justice, we can suppose that they are to choose a constitution and a legislature to enact laws, and so on, all in accordance with the principles of justice initially agreed upon. Our social situation is just if it is such that by this sequence of hypothetical agreements we would have contracted into the general system of rules which defines it. Moreover, assuming that the original position does determine a set of principles, it will then be true that whenever social institutions satisfy these principles, those engaged in them can say to one another that they are cooperating on terms to which they would agree if they were free and equal persons whose relations with respect to one another were fair. They could all view their arrangements as meeting the stipulations which they would acknowledge in an initial situation that embodies widely accepted and reasonable constraints on the choice of principles. The general recognition of this fact would provide the basis for a public acceptance of the corresponding principles of justice. No society can, of course, be a scheme of cooperation which men enter voluntarily in a literal sense; each person finds himself placed at birth in some particular position in some particular society, and the nature of this position materially affects his life prospects. Yet a society satisfying the principles of justice as fairness comes as close as a society can to being a voluntary scheme, for it meets the principles which free and equal persons would assent to under circumstances that are fair.

41. A just society, as conceptualized in the passage, can be best described as:
    (1) A Utopia in which everyone is equal and no one enjoys any privilege based on their existing positions and powers.
    (2) A hypothetical society in which people agree upon principles of justice which are fair.
    (3) A society in which principles of justice are not based on the existing positions and powers of the individuals.
    (4) A society in which principles of justice are fair to all.
    (5) A hypothetical society in which principles of justice are not based on the existing positions and powers of the individuals.

42. The original agreement or original position in the passage has been used by the author as:
(1) A hypothetical situation conceived to derive principles of justice which are not influenced by position, status and condition of individuals in the society.
(2) A hypothetical situation in which every individual is equal and no individual enjoys any privilege based on the existing positions and powers.
(3) A hypothetical situation to ensure fairness of agreements among individuals in society.
(4) An imagined situation in which principles of justice would have to be fair.
(5) An imagined situation in which fairness is the objective of the principles of justice to ensure that no individual enjoys any privilege based on the existing positions and powers.

43. Which of the following best illustrates the situation that is equivalent to choosing 'the principles of justice' behind a 'veil of ignorance'?
(1) The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck, but have some possibility of returning.
(2) The principles of justice are chosen by a group of school children whose capabilities are yet to develop.
(3) The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck and have no possibility of returning.
(4) The principles of justice are chosen assuming that such principles will govern the lives of the rule makers only in their next birth if the rule makers agree that they will be born again.
(5) The principles of justice are chosen by potential immigrants who are unaware of the resources necessary to succeed in a foreign country.

44. Why, according to the passage, do principles of justice need to be based on an original agreement?
(1) Social institutions and laws can be considered fair only if they conform to principles of justice.
(2) Social institutions and laws can be fair only if they are consistent with the principles of justice as initially agreed upon.
(3) Social institutions and laws need to be fair in order to be just.
(4) Social institutions and laws evolve fairly only if they are consistent with the principles of justice as initially agreed upon.
(5) Social institutions and laws conform to the principles of justice as initially agreed upon.

45. Which of the following situations best represents the idea of justice as fairness, as argued in the passage?
(1) All individuals are paid equally for the work they do.
(2) Everyone is assigned some work for his or her livelihood.
(3) All acts of theft are penalized equally.
(4) All children are provided free education in similar schools.
(5) All individuals are provided a fixed sum of money to take care of their health.

Directions for Questions 46 to 50: Each question has a set of four sequentially ordered statements. Each statement can be classified as one of the following:

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

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

46. 1. According to all statistical indications, the Sarva Shiksha Abhiyan has managed to keep pace with its ambitious goals.
2. The Mid-day Meal Scheme has been a significant incentive for the poor to send their little ones to school, thus establishing the vital link between healthy bodies and healthy minds.
3. Only about 13 million children in the age group of 6 to 14 years are out of school.
4. The goal of universalisation of elementary education has to be a pre-requisite for the evolution and development of our country.

(1) IIFJ (2) JIIJ (3) IJFJ (4) IJFI (5) JIFI

47. 1. We should not be hopelessly addicted to an erroneous belief that corruption in India is caused by the crookedness of Indians.
2. The truth is that we have more red tape — we take eighty-nine days to start a small business, Australians take two.
3. Red tape leads to corruption and distorts a people's character.
4. Every red tape procedure is a point of contact with an official, and such contacts have the potential to become opportunities for money to change hands.

(1) JFIF (2) JFJJ (3) JIJF (4) IFJF (5) JFJI

48. 1. So much of our day-to-day focus seems to be on getting things done, trudging our way through the tasks of living — it can feel like a treadmill that gets you nowhere; where is the childlike joy?
2. We are not doing the things that make us happy; that which brings us joy; the things that we cannot wait to do because we enjoy them so much.
3. This is the stuff that joyful living is made of — identifying your calling and committing yourself wholeheartedly to it.
4. When this happens, each moment becomes a celebration of you; there is a rush of energy that comes with feeling completely immersed in doing what you love most.

(1) IIIJ (2) IFIJ (3) JFJJ (4) JJJJ (5) JFII

49. 1. Inequitable distribution of all kinds of resources is certainly one of the strongest and most sinister sources of conflict.
2. Even without war, we know that conflicts continue to trouble us — they only change in character.
3. Extensive disarmament is the only insurance for our future; imagine the amount of resources that can be released and redeployed.
4. The economies of the industrialized western world derive 20% of their income from the sale of all kinds of arms.

(1) IJJI (2) JIJF (3) IIJF (4) JIIF (5) IJIF

50. 1. Given the poor quality of service in the public sector, the HIV/AIDS affected should be switching to private initiatives that supply anti-retroviral drugs (ARVs) at a low cost.
2. The government has been supplying free drugs since 2004, and 35000 have benefited up to now — though the size of the affected population is 150 times this number.
3. The recent initiatives of networks and companies like AIDSCare Network, Emcure, Reliance-Cipla-Cil, would lead to availability of much-needed drugs to a larger number of affected people.
4. But how ironic it is that we should face a perennial shortage of drugs when India is one of the world's largest suppliers of generic drugs to the developing world.

(1) JFIJ (2) JIIJ (3) IFIJ (4) IFFJ (5) JFII

Section – III

51. If $\frac{a}{b} = \frac{1}{3}$, $\frac{b}{c} = 2$, $\frac{c}{d} = \frac{1}{2}$, $\frac{d}{e} = 3$ and $\frac{e}{f} = \frac{1}{4}$, then what is the value of $\frac{abc}{def}$?

(1) $\frac{3}{8}$ (2) $\frac{27}{8}$ (3) $\frac{3}{4}$ (4) $\frac{27}{4}$ (5) $\frac{1}{4}$

52. If x = – 0.5, then which of the following has the smallest value?

(1) $2^{\frac{1}{x}}$ (2) $\frac{1}{x}$ (3) $\frac{1}{x^2}$ (4) 2^x (5) $\frac{1}{\sqrt{-x}}$

53. Consider a sequence where the nth term, $t_n = \frac{n}{(n+2)}$, n = 1, 2, ...

The value of $t_3 \times t_4 \times t_5 \times \ldots\ldots\ldots \times t_{53}$ equals:

(1) $\frac{2}{495}$ (2) $\frac{2}{477}$ (3) $\frac{12}{55}$ (4) $\frac{1}{1485}$ (5) $\frac{1}{2970}$

54. Which among $2^{\frac{1}{2}}$, $3^{\frac{1}{3}}$, $4^{\frac{1}{4}}$, $6^{\frac{1}{6}}$ and $12^{\frac{1}{12}}$ is the largest?

(1) $2^{1/2}$ (2) $3^{1/3}$ (3) $4^{1/4}$ (4) $6^{1/6}$ (5) $12^{1/12}$

55. The length, breadth and height of a room are in the ratio 3 : 2 : 1. If the breadth and height are halved while the length is doubled, then the total area of the four walls of the room will

(1) remain the same (2) decrease by 13.64% (3) decrease by 15%
(4) decrease by 18.75% (5) decrease by 30%

56. A survey was conducted of 100 people to find out whether they had read recent issues of Golmal, a monthly magazine. The summarized information regarding readership in 3 months is given below:

Only September: 18; September but not August: 23;
September and July: 8; September: 28;
July: 48; July and August: 10;
None of the three months: 24.

What is the number of surveyed people who have read exactly two consecutive issues (out of the three)?

(1) 7 (2) 9 (3) 12 (4) 14 (5) 17

57. A semi-circle is drawn with AB as its diameter. From C, a point on AB, a line perpendicular to AB is drawn meeting the circumference of the semi-circle at D. Given that AC = 2 cm and CD = 6 cm, the area of the semi-circle (in sq. cm) will be:

(1) 32π (2) 50π (3) 40.5π (4) 81π (5) undeterminable

Directions for questions 58 and 59: Answer questions on the basis of the information given below:
An airline has a certain free luggage allowance and charges for excess luggage at a fixed rate per kg. Two passengers, Raja and Praja have 60 kg of luggage between them, and are charged Rs 1200 and Rs 2400 respectively for excess luggage. Had the entire luggage belonged to one of them, the excess luggage charge would have been Rs 5400.

58. What is the weight of Praja's luggage?

(1) 20kg (2) 25 kg (3) 30 kg (4) 35 kg (5) 40 kg

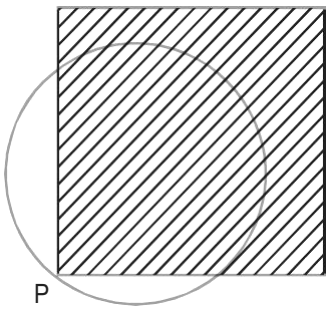
59. What is the free luggage allowance?

(1) 10 kg (2) 15 kg (3) 20 kg (4) 25 kg (5) 30 kg

60. A group of 630 children is arranged in rows for a group photograph session. Each row contains three fewer children than the row in front of it. What number of rows is not possible?

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

Directions for questions 61 and 62: Answer questions on the basis of the information given below:
A punching machine is used to punch a circular hole of diameter two units from a square sheet of aluminium of width 2 units, as shown below. The hole is punched such that the circular hole touches one corner P of the square sheet and the diameter of the hole originating at P is in line with a diagonal of the square.



61. The proportion of the sheet area that remains after punching is:

(1) $\frac{(\pi+2)}{8}$ (2) $\frac{(6-\pi)}{8}$ (3) $\frac{(4-\pi)}{4}$ (4) $\frac{(\pi-2)}{4}$ (5) $\frac{(14-3\pi)}{6}$

62. Find the area of the part of the circle (round punch) falling outside the square sheet.

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

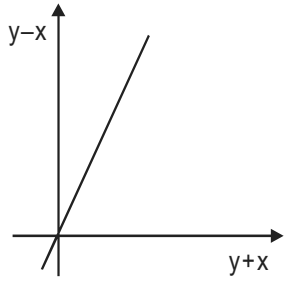
63. What values of x satisfy $x^{\frac{2}{3}} + x^{\frac{1}{3}} - 2 \le 0$ ('x' is a real number)?

(1) $-8 \le x \le 1$ (2) $-1 \le x \le 8$ (3) $1 < x < 8$ (4) $1 \le x \le 8$ (5) $-8 \le x \le 8$

64. Consider the set S = {1, 2, 3, . . ., 1000}. How many arithmetic progressions can be formed from the elements of S that start with 1 and end with 1000 and have at least 3 elements?

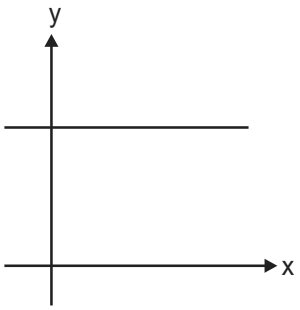
(1) 3 (2) 4 (3) 6 (4) 7 (5) 8

65. The graph of y - x against y + x is as shown below. (All graphs in this question are drawn to scale and the same scale has been used on each axis.)

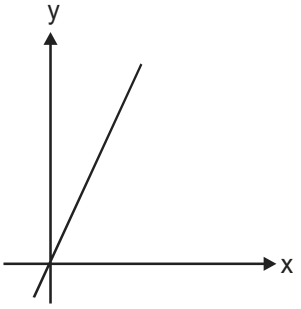


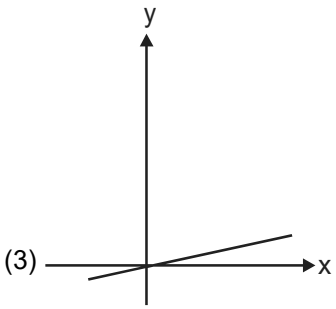
Which of the following shows the graph of y against x?

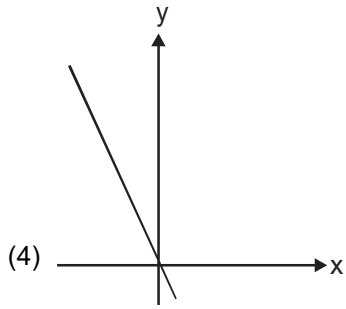
(1)

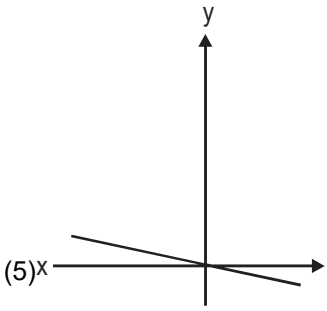


(2)



(3) 

(4) 

(5) 

66. The sum of four consecutive two-digit odd numbers, when divided by 10, becomes a perfect square. Which of the following can possibly be one of these four numbers?
(1) 21 (2) 25 (3) 41 (4) 67 (5) 73

67. The number of solutions of the equation $2x + y = 40$ where both x and y are positive integers and $x \leq y$ is:
(1) 7 (2) 13 (3) 14 (4) 18 (5) 20

68. The number of employees in Obelix Menhir Co. is a prime number and is less than 300. The ratio of the number of employees who are graduates and above, to that of employees who are not, can possibly be:
(1) 101 : 88 (2) 87 : 100 (3) 110 : 111 (4) 85 : 98 (5) 97 : 84

69. There are 6 tasks and 6 persons. Task 1 cannot be assigned either to person 1 or to person 2; task 2 must be assigned to either person 3 or person 4. Every person is to be assigned one task. In how many ways can the assignment be done?
(1) 144 (2) 180 (3) 192 (4) 360 (5) 716

70. If $\log_y x = (a \cdot \log_z y) = (b \cdot \log_x z) = ab$, then which of the following pairs of values for (a, b) is not possible?

(1) $\left(-2, \frac{1}{2}\right)$ (2) (1, 1) (3) (0.4, 2.5) (4) $\left(\pi, \frac{1}{\pi}\right)$ (5) (2, 2)

71. What are the values of x and y that satisfy both the equations?

$$2^{0.7x} \cdot 3^{-1.25y} = \frac{8\sqrt{6}}{27}$$

$$4^{0.3x} \cdot 9^{0.2y} = 8 \cdot (81)^{\frac{1}{5}}$$

(1) x = 2,y = 5 (2) x = 2.5, y = 6 (3) x = 3, y = 5
(4) x = 3,y = 4 (5) x = 5, y = 2

72. Let f(x) = max(2x + 1, 3 - 4x), where x is any real number. Then the minimum possible value of f(x) is:

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

73. When you reverse the digits of the number 13, the number increases by 18. How many other two-digit numbers increase by 18 when their digits are reversed?

(1) 5 (2) 6 (3) 7 (4) 8 (5) 10

74. An equilateral triangle BPC is drawn inside a square ABCD. What is the value of the angle APD in degrees?

(1) 75 (2) 90 (3) 120 (4) 135 (5) 150

75. Arun, Barun and Kiranmala start from the same place and travel in the same direction at speeds of 30, 40 and 60 km per hour respectively. Barun starts two hours after Arun. If Barun and Kiranmala overtake Arun at the same instant, how many hours after Arun did Kiranmala start?

(1) 3 (2) 3.5 (3) 4 (4) 4.5 (5) 5

CAT 2006 Actual Paper

Answers and Explanations

1	1	**2**	3	**3**	4	**4**	5	**5**	5	**6**	3	**7**	1	**8**	1	**9**	4	**10**	5
11	4	**12**	2	**13**	2	**14**	2	**15**	3	**16**	3	**17**	2	**18**	1	**19**	5	**20**	4
21	5	**22**	2,3	**23**	1	**24**	4	**25**	3	**26**	5	**27**	1	**28**	2	**29**	3	**30**	4
31	2	**32**	1	**33**	4	**34**	5	**35**	3	**36**	3	**37**	2	**38**	5	**39**	1	**40**	4
41	3	**42**	1	**43**	4	**44**	2	**45**	4	**46**	3	**47**	5	**48**	4	**49**	2	**50**	1
51	1	**52**	2	**53**	1	**54**	2	**55**	5	**56**	2	**57**	2	**58**	4	**59**	2	**60**	4
61	2	**62**	4	**63**	1	**64**	4	**65**	4	**66**	3	**67**	2	**68**	5	**69**	1	**70**	5
71	5	**72**	5	**73**	2	**74**	5	**75**	3										

	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
LRDI	1 to 25	25					
EU + RC	26 to 50	25					
QA	51 to 75	25					
Total		75					

For questions 1 to 5:

From statement one, team would include exactly one among P, R, S
$\Rightarrow$ P (or) R (or) S.

From statement two, team would include either M, or Q
$\Rightarrow$ M but not Q
(or) Q but not M

From statement three, if a team includes K, it will include L or vice versa.
$\Rightarrow$ K, L always accompany each other.

From statement four, if one of S, U, W is included, then the other two also have to be included.
$\Rightarrow$ S, U, W are always together.

From statement five, L and N cannot be included together
$\Rightarrow$ L, N are never together.

From statement six, L and U cannot be included together.
$\Rightarrow$ L, U are never together.

1. 1 From statements one and two;
one of P, R, S and
one of M, Q are to be selected. We require one more member.
But from statement three; (K, L) are always together.
Hence 'L' cannot be included in a team of 3 members.

2. 3 Again, from statement one;
one of P, R, S has to be selected.

To make a team of '5'
'S' will be chosen (which leaves out P and R)
$\Rightarrow$ If 'S' is chosen 'U' and 'W' have to be chosen (statement four)
$\Rightarrow$ If 'U' is chosen 'L' cannot be chosen (statement five)
$\Rightarrow$ K cannot be chosen (statement three)
And from statement two; one of M (or) Q has to be chosen.

3. 4 From statements one and two
Two members are to be selected.
Of the remaining seven;
To maximize the size of the team.
We would chose S,
$\Rightarrow$ U and W are included in the team (statement four)
We cannot include K (or) L because we would then have to leave out N and U (from statements five and six)

4. 5 If 'K' is included, 'L' has to be included (statement (3))
If 'L' is chosen, neither N nor U can be chosen (statements (5) and (6))
$\Rightarrow$ S, W are also not included because S, U, W have to be always together. (Statement (4))
Hence one of P (or) R would be selected (statement (1)) and one of M (or) Q would be selected (statement (2))
(K, L) and two of the above five have to be included.

5. 5 If a team includes N, it cannot include 'L',
and therefore, not even 'K'. (from statement five and three)
According to statement (1), one of P or R or S has to be included.
According to statement (2), one of M or Q has to be selected.
So the following cases are possible
P Q N,
R Q N
P M N,
R M N
If 'S' is selected, then S U W M N and S U W Q N are the only possible cases.
Hence, in all 4 + 2 = 6 teams can be constituted.

For questions 6 to 10:

6. 3 Let Dipan get x marks in paper II.
Dipan's average in PCB group = 98
Maths group = 95
S.S. group = 95.5
Vernacular group = 95
English group = $\left\lfloor \frac{96+x}{2} \right\rfloor$

Sum of all = 96 × 5

So $95.5 + 96 \times 3 + 48 + \frac{x}{2} = 96 \times 5$

$\Rightarrow \frac{x}{2} = 96 \times 2 - 95.5 - 48$

$x = 2(96.5 - 48) = 2 \times 48.5 = 97$

So (3) is the correct option.

7. 1 The only boy getting 95 in atleast one of the subjects of the group among all the groups is Dipan.
So (1) is the correct option.

8. 1 A group score of 100 in Social Science would have increased the scores as follows:

	Score Increase	Group Score	Final Score Increase	Final group Score
Pritam	22	11	$\frac{11}{5} = 2.2$	96.1
Joseph	9	4.5	$\frac{4.5}{5} = .9$	95.9
Tirna	21	10.5	$\frac{10.5}{5} = 2.1$	95.8
Agni	9	4.5	$\frac{4.5}{5} = .9$	95.2

So the order is Pritam > Joseph > Trina > Agni.
So option (1) is the correct choice.

9. 4 The student having atleast 95 in every group is Dipan, so the answer is Dipan, option (4).

10. 5 Let us increase the score in one of the subjects of the following candidates

	Least Scores	Contribution in net Score	Final Score
Ram	94 in group of 2	3 in 5 groups	96.1 + .6 = 96.7
Agni	82 in group of 2	9 in 5 groups	94.3 + 1.8 = 96.1
Pritam	83 in group of 2	8.5 in 5 groups	93.9 + 1.7 = 95.6
Ayesha	93 in group of 2	3.5 in 5 groups	96.2 + .7 = 96.9
Dipan	95 in group of 1	5 in 5 groups	96 + 1 = 97.0

So, Dipan will end with a highest total.
So the answer is option (5).

For questions 11 to 15:
As only Paul Erdös was having an Erdös number of zero, so the minimum Erdös number among A, B, C, D, E, F, G, H should be 1 or greater than one. At the end of the third day, F co-authored a paper with A and C. F had the minimum Erdös number among the 8 people. So if F's Erdös number is y, then A and C's Erdös number should change to (y + 1) after third day. As A and C decreased the average by maximum possible extent, it means C had the second-height Erdös number among all eight, as A had an Erdös number of infinity. Suppose Erdös numbers of A, B, C, D, E, F, G, H are y + 1, b, y + 1, c, d, e, y, g, h respectively at the end of third day.
$\therefore$ (y + 1 + b + y + 1 + c + d + e + y + g + h) = 24 = (3 × 8)
$\Rightarrow$ 3y + 2 + b + d + e + g + h = 24
When E co-authored with F, the average Erdös number reduced again, it means, E's Erdös number was not the same with A & C initially. As at the end of third day, 5 people had same Erdös number, they should be A, C and any 3 out of B, D, G, H. Suppose those 3 people are B, D, G. Then
(3y + 2 + y + 1 + y + 1 + y + 1 + e + h) = 24
$\Rightarrow$ 6y + h + e = 19 …(i)
On the fifth day, E co-authored a paper with F and hence, Erdös number of E changed to (y + 1). Also the average decreased by 0.5 which means the total decreased by 4.
Hence, e - (y + 1) = 4
$\Rightarrow$ e – y = 5
Putting the value of e in equation (i), we get
6y + h + (5 + y) = 19
$\Rightarrow$ 7y + h = 14
Only possible value of y = 1 as h cannot be zero.
So after 3rd round Erdös number of A, C, E, F were 2, 2, 6, 1 respectively.

11. 4 Only A, C, E changed their Erdös number, rest 5 did not change their Erdös number.

12. 2 At the end of conference 6 people including E were having an Erdös number of 2 and F was having 1 as Erdös number. So 8th person was having an Erdös number of [20 – (2 × 6 + 1)] = 7

13. 2 At the end of 3rd round, 5 people were having same Erdös number. A and C changed their Erdös number after coauthoring with F. So, the other 3 will have same Erdös number in the beginning.

14. 2 2

15. 3 After co-authoring with F, E was having Erdös number of 2, which was 4 less than initial Erdös number of E. So answer is 2 + 4 = 6.

For questions 16 to 20:
The MCS share price at the beginning of first day is Rs.100 and at the close of day 5 is Rs.110.
The following cases of the closing prices can be derived.

At the end of	Day 1	Day 2	Day 3	Day 4	Day 5
1	90	80	90	100	110
2	90	100	90	100	110
3	90	100	110	120	110
4	90	100	110	100	110
5	110	100	90	100	110
6	110	100	110	100	110
7	110	120	110	100	110
8	110	120	110	120	110
9	110	120	130	120	110
10	110	120	110	100	110

16. 3 As Chetan sold 10 shares on three consecutive days, therefore, of the five days, there must be an increase for three of the five days and a decrease for the remaining two days. It is given that Michael sold 10 shares only once. Hence, the price is more than 110

for only one day and on all the remaining days, it cannot exceed 110. The only satisfying case is ***(3)***. Hence, the price at the end of Day 3 is Rs.110.

17. 2 The satisfying cases are ***(1), (2), (4), (5), (6).*** Hence, the price at the end of Day 4 is Rs.100.

18. 1 Let Chetan and Michael start with x number of shares initially.
From case ***(1)***, we get that the number of shares with Michael = x + 10
and number of shares with Chetan = x + 10 + 10 – 10 – 10 – 10 = x – 10.
So Michael has 20 more shares than Chetan. This is the only satisfying case.
Hence, the share price at the end of Day 3 is Rs.90.

19. 5 Consider cases ***(3) and (7).*** Only these two satisfies the condition that Michael had Rs.100 less than Chetan at the end of day 5.
For case ***(3),***
Number of shares with Chetan = x + 10 – 10 – 10 – 10 + 10 = x – 10
And with Michael = x – 10
For case ***(7),***
Number of shares with Chetan = x – 10 – 10 + 10 + 10 – 10 = x – 10
And with Michael = x – 10
In either case, number of shares with Michael and Chetan are the same.

20. 4 To maximise the amount gathered by both of them, we need to look into those cases wherein we have maximum number of 110 excess figures. It is only then that Michael and Chetan both will make money. So we check for case ***(9)***.
For case ***(9)***,
Extra cash with Chetan by the end of day 5 = 1100 + 1200 + 1300 – 1200 – 1100 = Rs.1300
And that with Michael = 1200 + 1300 + 1200 = Rs.3700
Total extra cash with both of them = 1300 + 3700 = Rs.5000

For questions 21 to 25:
In this set, the fuel cost for each of the path is given. In addition, there are four toll collection junctions.

21. 5 No traffic flows on the street from D to T.
Now, we have fuel cost on different paths as
SAT : 9 + 5 = Rs. 14 + toll at junction A
SBAT : 2 + 2 + 5 = Rs. 9 + toll at junction B and A
SBCT : 2 3 + 2 = Rs. 7 + toll at junction B and C
SDCT : 7 + 1 + 2 = Rs. 10 + toll at junction D and C
Now, checking the options we find that toll at junction A is 0 or 1.
When toll is 0, fuel cost on SAT = 14 + 0 = Rs. 14
When toll is 1, fuel cost on SAT = 14 + 1 = Rs. 15
The fuel cost on all the paths should be equal.
Options (1), (2), (3) can be ruled out as in all these options toll at C and D add up to more than Rs. 5. As fuel cost on SDCT is Rs. 10 without toll, so with toll it cannot exceed Rs. 15 (i.e. toll of path SAT).
Option (4) is ruled out as in this option SAT comes out to be Rs. 14 and SDCT sums up to Rs.15.
So correct answer is option (5).

22. 2 & 3
Note: Both the options b and c are correct.
Available routes are:
SAT $\rightarrow$ Rs. 14
SBAT $\rightarrow$ Rs. 9
SDCT $\rightarrow$ Rs. 10
SDT $\rightarrow$ Rs. 13
Now, fuel cost of SAT - fuel of SDT = 14 – 13 = Rs. 1.
Hence toll at junction D should be 1 more than the toll at A. So option (a), (d) and (e) are ruled out.
Now, fuel cost of SAT - fuel cost of SBAT = 14 – 9 = Rs. 5. So toll at junction B should be Rs. 5. So answer could be either (2) or option (3).

23. 1 Available paths considering no toll are
SAT $\rightarrow$ Rs. 14
SBCT $\rightarrow$ Rs. 7
SBAT $\rightarrow$ Rs. 9
SDCT $\rightarrow$ Rs. 10
SDT $\rightarrow$ Rs. 13
It is very likely that option (4) is selected. But, if all the five routes have the same cost, then there will be an equal flow on all the five routes i.e., 20% on each route. But, then the percentage of traffic. on
S – A $\rightarrow 20\%$
S – B $\rightarrow 40\%$ (As there are two routes involving S – B.)
S – D $\rightarrow 40\%$ (As there are two routes involving S – D.)
But, it is given that traffic on S – A = traffic on S – B = traffic on S – D.

24. 4 Available routes are
SAT $\rightarrow$ Rs. 14
SBAT $\rightarrow$ Rs. 9
SBCT $\rightarrow$ Rs. 7
SDCT $\rightarrow$ Rs. 10
SDT $\rightarrow$ Rs. 13
Fuel cost on path SAT - fuel cost on path SDT = 14 - 13 = Rs. 1.
So the toll at junction D should be 1 more than toll at junction A. So option a and c are ruled out.
Fuel cost on path SAT - fuel cost on path SBCT = 14 - 7 = Rs. 7.
So sum of toll at junction B and C should be 7 more than the toll at A. Hence, only option (d) matches.

25. 3 We have to find a path on which minimum cost is incurred and such that total traffic through B does not exceed 70%.
So option (5) is ruled out because we can send all the traffic through SDCT or SDT and meet all conditions.
Option (1) is also ruled out as in that case all traffic will

be passed through SBCT [not possible as traffic at B can't be more than 70%]
Option (2) is also ruled out as it is possible only when toll at junction C is 2. In that case also all traffic will pass through B.
Option (3) can be the answer, when toll at junction B is 4 and toll at junction C is 0. Then SDCT will have toll equal to Rs. 10.
As Rs. 10 is less than Rs. 13, so option (4) is also ruled out.
Hence, option (3) is the correct choice.

26. 5 The paragraph stresses on the relationships between the factories, dealers and the consumers. Every entity has certain short-term expectations from each other. This makes these relationships strenuous. This strain leads to feelings of mistrust and lack of commitment. So the longer this continues, the more the chances of everyone succumbing to this vicious trap and they would soon realize that they have sacrificed long-term stability and gain for short-term benefits. Hence Option (5). Option (4) is too specific to industry (at the cost of the other players – dealers and customers), option (2) suffers from the same short-comings together with throwing the technical (unexplained) jargon 'supply chain' to us. Option (1) takes into account only 2 players and repeats what is stated in the passage about "dealers adjusting prices and making deals" in the term 'Deal making'; option (3) seems close but can be eliminated as the word 'adversary' is too strong. The passage implies that everyone tries to maximize his benefits, not that they 'oppose' one another.

27. 1 The passage heads towards describing the functions that bad / good maps (and therefore theories) serve. Just as a 'Bad theory' does not help us understand a problem, a 'good theory' is invaluable to us, though it may be simplified. 'Simplified' here implies that less valuable information is left out. According to this logic, option (2), (3), (4), get eliminated. Option (5) is close but more negative in tone than required. The word 'limitation' here indicates a short coming whereas the passage implies that it is a simplification as it would not be of practical use otherwise.

28. 2 Going with the direction of the passage, the last line is stating 'now all players "profess" to seek only peace'. Profess means to mask or to pretend. Thus option (2) which talks about the veil being lifted is the most logical statement that completes the passage. More so this also follows from the source of the text.

29. 3 The answer is very direct. With every statement of his, the author seeks to show how foolish those people are who call his advice 'rules'. After his first statement he has posed the rhetorical question "Call that a rule?" The same should follow after his second "scarcely a rule!"

30. 4 In the first part of the passage, the author seeks to explain why one who is young would exploit an entrepreneurial opportunity. Thus, in the second part of the passage once the "however" is established, evidence will seek to show how older people will be reluctant to exploit entrepreneurial opportunity. Option (2) seems correct but it only gives a general statement that with age, people become reluctant to new ideas. Between option (2) and (4), option (4) goes in continuation with the text as it states that at a mature age, people are unwilling to utilize entrepreneurial opportunities. So option (4) is correct.

31. 2 According to the passage, "A critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically". Therefore, our critical attitude is the tool by which we shape our dogmatic beliefs. Thus, the relationship of dogmatic beliefs and critical attitude is equivalent to that of a chisel and that of a marble stone.

32. 1 Option (3), (4) and (5) are ruled out because they are not supported by the passage. (negative, neutral, inferior) - Option (1) and (2) are close but (1) is better because the question is about the role of dogmatic behaviour with respect to the development of science. In the third paragraph, 8th line, it is mentioned that dogmatic attitude is pseudo/pre-scientific attitude. Science needs dogmatic beliefs for their critical revision. Beginning of fourth paragraph states that science begins with myths and criticism of myths. Thus, dogmatic behavior is required to develop science because the former serves as the base on which science is made.

33. 4 Refer to the last sentence of the second paragraph. It is clear from the context (especially from the words - 'experience', 'maturity') that time has a direct effect on the evolution of thinking. Option (4) is the only option which takes into account the element of time (the word - 'stages').

34. 5 Option (5) is correct because this statement suggests that critical attitude is a process of questioning which leads to tentative hypothesis. A critical attitude by itself is not opposed to conviction, but it tries to modify the conviction according to reason.

35. 3 Refer to the third last paragraph of the passage; dogmatic attitude is pseudo-scientific because its aim is only to verify its laws and schemata even if it has to neglect the refutations. Whereas critical attitude is flexible enough to change, refute or falsify its tenets and therefore has a questioning attitude.

36. 3 We refer to the tenth line of the third paragraph. Here Mr. Goran Lindblad admits that communism did commit brutalities but it also had positive consequences like rapid industrialization. Hence option (3) is the best answer.

37. 2 Option (4) is very blatant, but is not the 'real' reason for the attack. The reason that the West repeatedly attacks communism (as stated by the author in the last para) is that they want to establish the current capitalist order as supreme i.e. they idealise 'global capitalism'. Option (5) is close, but wrongly states that communist nations might overtake the capitalists. This is not given in the passage.

38. 5 The answer can be found in the first line of the last paragraph, which in essence implies that it is important to go beyond and look at the motives of atrocities perpetrated by different regimes. The motive is global capitalism as described in the last paragraph. Therefore, Option (5) is correct.

39. 1 (1) is the correct answer. In the fourth paragraph the author explains the 'intimate link' between colonialism and Nazism. A peripheral view of this relationship suggests that the answer should be (3) which explains the terms and ideas that were imported and used by the Nazi party. But the next few lines explain the deeper relationship that exists between the two. These lines refer to the atrocities that one race has committed upon the other. The British imposed their rule on the Indian people. Similarly, the Belgian forced labour and mass murder led to the death of 10 million Congolese. These references are clearly race centric. Therefore, (1) is correct.

40. 4 On the basis of the given choices the best answer is option (4). In the second last paragraph, the author attempts to portray the magnitude of the atrocities committed by the European Colonialists. In doing so he mentions in a sarcastic tone "Presumably European lives count for more." Thus, this is not an inference that can be drawn from the passage. The rest of the statements can be easily inferred from the passage.

41. 3 A careful scrutiny of the second paragraph reveals that the concept of "justice as fairness" is a hypothetical situation in a real society. Thus options (1), (2) and (5) can be eliminated. The possible answers are (3) or (4). (3) is more specific in comparison to option (4). Thus (3) is the correct answer.

42. 1 Refer to para 1. "Rather, the idea is that the principles...initial position of equality." Associate these lines with paragraph 2. So, option (1) can be inferred from the passage.

43. 4 Refer to the latter half in the second paragraph. In essence it states that the principles of justice should be so chosen that they neither favour or disfavour a particular class of society. A law maker who chooses the principle of justice without being aware of his status in society in the next birth exemplifies the situation that has been described as choosing the principles of justice behind a veil of ignorance. Thus option (4) is the most appropriate choice. Option (1) is incorrect because if there is a possibility of return then the businessmen would obviously choose those principles which will favour their situation. Option (2) is incorrect because the reference to school children is quite vague. Option (3) is incorrect because if businessmen were to choose these principles then they might choose those which favour their family. Also, these businessmen are aware that there is no possibility of their return. Option (5) is incorrect because they may or may not migrate ('potential immigrants'). It also suggests that the current principles of justice in their society do not contribute to their success. If they are unsuccessful in their own society then why would they choose certain principles which do not favour their situation.

44. 2 Option (2) is correct because 'fair' in this option means 'just'. We cannot choose option (4) though it's a close choice because 'fairly' means 'gradually'. Here, the choice clearly depends upon the usage and the context of this word.

45. 4 When all children are provided free education, it indicates that the decision to do so has not been taken with any other consideration in mind, save the children's benefit. Thus, the children's family background and social status do not matter, in accordance with the passage's theme.

46. 3 Statement 3 is a fact because it is open to discovery or verification. This eliminates option (2). The words "has to be…." make statement 4 a judgement as it expresses a personal viewpoint. This eliminates options (4) & (5). As "… statistical indications…" have been referred to in statement 1, it is definitely an inference. This is because it is a conclusion about the unknown which is based on the known. The second statement is a judgement because this statement is open to debate. Therefore option (3) is the correct answer.

47. 5 Statement 3 is a judgement because it expresses a personal viewpoint regarding the consequences of red tape. This eliminates option (1). Statement 2 is a fact because the latter half of the sentence is given by way of an example and not by way of a conclusion. This eliminates option (3). Statement 1 describes what "we should…." do. This statement explains the speaker's disapproval regarding the consequences of red tape. Therefore, it is a judgement. This eliminates option (4). Statement 4 is an inference. It is known to us that a red tape procedure is a point of contact with an official. That this point of contact offers a potential opportunity is a conclusion based on this information. This makes option (5) correct.

48. 4 Statement 1 is a judgement as it is based on the author's opinion. This eliminates option (1) & (2). Statement 2 uses the general term "we ". This makes it a judgement. If it had been about "I" or "us" then it would have been

a fact. Statements 3 and 4 are personal opinions. Hence, the correct answer is option (4).

49. 2 Looking at the 1st statement, if you mark the keywords 'is certainly' then it gives us a clear idea that it is a point of view expressed by the author.Therefore, it is a judgement. The 2nd statement is an inference as it arrives at a conclusion from a stated premise. The 3rd statement, where the author mentions 'is the only insurance' (although there may be other insurances, that the author negates) qualifies it as a judgement. The 4th statement is a pure fact. So, option (2) is correct.

50. 1 Statement 1 is a judgement because it expresses an approval/disapproval. It is a subjective opinion- an advice given to HIV affected patients. So, options (3) & (4) can be eliminated. Statement 2 is clearly factual. This eliminates option (2). Statement 3 is a conclusion about the future scenario which is based on the "recent initiatives". Hence, this statement is an inference. In statement 4, "But how ironic …" shows the author's disapproval. So statement 4 is a judgement. Thus, option (1) is the correct answer.

51. 1 $\frac{a}{b}=\frac{1}{3}\quad\frac{b}{c}=\frac{2}{1}$

$\Rightarrow a:b:c=2:6:3$

Similarly $a:b:c:d:e:f=6:18:9:18:6:24$

$\therefore \frac{abc}{def}=\frac{6\times18\times9}{18\times6\times24}=\frac{3}{8}$

Hence, option (1) is the correct answer.

Alternate method:

$\frac{a}{b}\times\frac{b}{c}\times\frac{c}{d}\times\frac{d}{e}\times\frac{e}{f}=\frac{a}{f}=\frac{1}{3}\times2\times\frac{1}{2}\times3\times\frac{1}{4}=\frac{1}{4}$

$\frac{b}{c}\times\frac{c}{d}\frac{b}{d}=2\times\frac{1}{2}=1$

$\frac{c}{d}\times\frac{d}{c}=\frac{c}{c}=\frac{1}{2}\times3=\frac{3}{2}$

So, $\frac{abc}{def}=\frac{a}{f}\times\frac{b}{d}\times\frac{c}{e}=\frac{1}{4}\times1\times\frac{3}{2}=\frac{3}{8}$

52. 2 Going by options, we put $x=\frac{-1}{2}$

(1) $2^{-2}=\frac{1}{4}$

(2) $\frac{1}{x}\Rightarrow\frac{1}{-1/2}=-2$

(3) $\frac{1}{x^2}\Rightarrow\frac{1}{(-1/2)^2}=4$

(4) $2^{-1/2}=\frac{1}{\sqrt{2}}$

(5) $\frac{1}{\sqrt{-x}}=\frac{1}{\frac{1}{\sqrt{2}}}=\sqrt{2}$.

Clearly, $\frac{1}{x}$ bears a negative value only and hence, is the smallest.

53. 1 $t_3\times t_4\times t_5\times\ldots\ldots\times t_{53}$

$=\frac{3}{5}\times\frac{4}{6}\times\frac{5}{7}\times\ldots\ldots\times\frac{51}{53}\times\frac{52}{54}\times\frac{53}{55}=\frac{3\times4}{54\times55}=\frac{2}{495}$

Hence, option (1) is the correct answer.

54. 2 LCM of 2, 3, 4, 6, 12 = 12

We can rewrite the given surds as

$\sqrt[12]{2^6}$, $\sqrt[12]{3^4}$, $\sqrt[12]{4^3}$, $\sqrt[12]{6^2}$, $\sqrt[12]{12^1}$

$\therefore 3^4$ is the greatest.

Note: $n^{1/n}$ is maximum when n = e (2.718). Among the given options, n = 3 is closest to the value of e.

55. 5 Let the initial length, breadth and height of the room be 3x, 2x and x respectively.

Initial area of the four walls = 2 (3x + 2x) x = 10x2

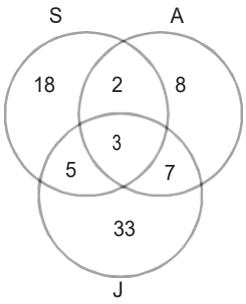
The new dimensions are: length = 6x, breadth = x and height $=\frac{x}{2}$.

New area of the four walls = $2(6x+x)\frac{x}{2}=7x^2$

Therefore, percentage decrease

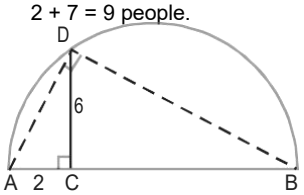
$=\frac{10x^2-7x^2}{10x^2}\times100=30\%$.

56. 2



So, total people reading the newspaper in consecutive months i.e. July and August and August and Sept. is 2 + 7 = 9 people.

57. 2



$\angle ADB = 90°$ (Angle in semicircle)

$CD^2 = AC \times CB$

$(6)^2 = 2 \times CB$

$36 = 2 \times CB$

$CB = 18$

Hence $AB = AC + CB = 20$

Area of semicircle $= \frac{1}{2}\pi(10)^2 = 50\pi$

Option is (2).

For questions 58 and 59:

Let for Raja allowed luggage be A and excess luggage be E

$\therefore$ For Praja, his luggage must be A + 2E.

If all luggage belongs to one, (A + 3E) is the excess.

E corresponds to Rs. 1200.

$\therefore$ A must correspond to (5400 - 3600) = Rs. 1800

If E = 2x, A = 3x

So total weight = 2(A) + 3E = 12x

$\Rightarrow$ x = 5

Hence, Praja's luggage weight = 7x = 35 kg

Alternate method:

Let, Raja = x kg Free allowance = F kg

Praja = (60 – x) kg

According to the question,

(x – F)V = 1200 … (i)

{V = rate of levy on excess luggage}

(60 – x – F)V = 2400 … (ii)

(60 – F)V = 5400 … (iii)

Dividing equation (ii) by (i),

$\frac{60 - x - F}{x - F} = 2$

$\Rightarrow 60 - x - F = 2x - 2F$

$\Rightarrow 3x - F = 60$ …(iv)

Dividing (iii) by (i), we get

$\Rightarrow \frac{60 - F}{x - F} = 4.5$

$\Rightarrow 60 - F = 4.5x - 4.5F$

$\Rightarrow 4.5x - 3.5F = 60$ …(v)

Multiplying equation (iv) by 1.5,

4.5x – 1.5F = 90

4.5x – 3.5F = 60

2F = 30

$\Rightarrow$ F = 15

Putting value of F in (iv),

3x = 75 $\Rightarrow$ x = 25

58. 4 Praja have 35 kg luggage

59. 2 15 kg.

60. 4 Let the no. of students in front row be x.

So, the no. of students in next rows be x – 3, x - 6, x – 9…. so on

If n i.e. no. of rows be 3, then

x + (x – 3) + (x – 6) = 630

$\Rightarrow$ 3x = 639

$\Rightarrow$ x = 213

So possible.

Similarly, for n = 4,

x + (x – 3) + (x – 6) + (x - 9) = 630

$\Rightarrow$ 4x – 18 = 630

$\Rightarrow x = \frac{648}{4} = 162$

$\therefore$ x = 4 to possible.

If n = 5,

(4x – 18) + (x - 12) = 630

$\Rightarrow$ 5x – 30 = 630

$\Rightarrow$ x = 120

Again n = 5 is possible.

If n = 6,

(5x - 30) + (x - 15) = 630

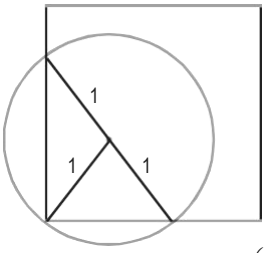
$\Rightarrow$ 6x - 45 = 630

$\Rightarrow$ 6x = 675

$\Rightarrow$ x $\neq$ IntegerHence,

n $\neq$ 6.

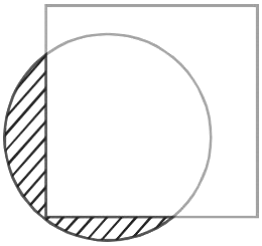
61. 2



Remaining area $= 4 - \left(\frac{\pi}{2} + \frac{1}{2} \times 1 \times 2\right) = \frac{6 - \pi}{2}$

Remaining proportion $= \frac{6 - \pi}{8}$

62. 4



Area = $\pi(1)^2 - \left(\frac{\pi}{2}+1\right) = \pi - \frac{\pi}{2} - 1 = \frac{\pi-2}{2}$

63. 1 $x^{2/3} + x^{1/3} - 2 \le 0$

$\Rightarrow x^{2/3} + 2x^{1/3} - x^{1/3} - 2 \le 0$

$\Rightarrow \left(x^{1/3}-1\right)\left(x^{1/3}+2\right) \le 0$

$\Rightarrow -2 \le x^{1/3} \le 1$

$\Rightarrow -8 \le x \le 1$

64. 4 Let number of elements in progression be n, then

$1000 = 1 + (n-1)d$

$\Rightarrow (n-1)d = 999 = 3^3 \times 37$

Possible values of d = 3, 37, 9, 111, 27, 333, 999
Hence, 7 progressions are possible.

65. 4 From the graph of (y - x) vs. (y + x), it is obvious that inclination is more than 45°.

Slope of line = $\frac{y-x}{y+x} = \tan(45° + \theta)$

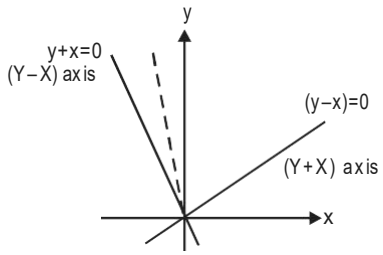
$\Rightarrow \frac{y-x}{y+x} = \frac{1+\tan\theta}{1-\tan\theta}$

By componendo-dividendo, $\frac{y}{x} = -\tan\theta$ which is nothing but the slope of the line that shows the graph of y Vs. x.
And as $0° < \theta < 45°$, absolute value of tan θ is less than 1.

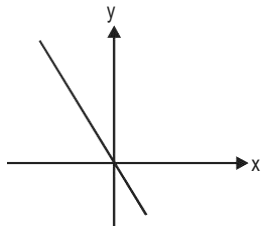
$\frac{-1}{\tan\theta}$ is negative and also, greater than 1.

$\Rightarrow$ The slope of the graph y Vs. x must be negative and greater than 1. Accordingly, only option (d) satisfies.
We can also try by putting the values of (y + x) = 2(say) and (y - x) = 4(anything more than 2 for that matter). We can solve for values of y and x and cross check with the given options.

Alternate method:
In the normal X-Y coordinate plane the X-axis corresponds to y = 0
And Y-axis corresponds to x = 0
y + x = 0 and y - x = 0 are perpendicular lines on this plane.



And y-x = 0 is the axis Y+X and y+x = 0 is the axis Y-X
So, the dotted line is the graph drawn in the question.
When you observe w.r.t to X-axis it looks like



66. 3 By option (3), if four consecutive odd numbers are 37, 39, 41 and 43, then sum of these 4 numbers is 160. When divided by 10, we get 16, which is a perfect square.
$\therefore$ 41 is one of the odd numbers.

67. 2 $2x + y = 40$
$x \le y$
$\Rightarrow y = 40 - 2x$
Values of x and y that satisfy the equation

x	y
1	38
2	36
3	34
.	.
.	.
.	.
13	14

$\therefore$ 13 values of (x, y) satisfy the equation such that $x \le y$

68. 5 Using options, the sum of the numerator and denominator of the ratio should be a prime number. Only option (5) satisfies [97 + 84 = 181]

69. 1 Task 2 can only be given to two persons i.e. (3 and 4)
$\therefore$ Number of ways = 2 ways
First task can be done in 3 ways by 3 persons.
Third task can be done by 4 persons.
$\therefore$ 4 ways similarly for fourth, five and six tasks, number of ways is 3, 2 and 1 respectively.
$\therefore$ Total number of ways = 144 ways

70. 5 $\log_y^x = a.\log_z^y = b.\log_x^z = a \times b$

$$a = \frac{\log_y^x}{\log_z^y} \text{ and } b = \frac{\log_y^x}{\log_z^y}$$

$$\Rightarrow a \times b = \frac{\log_y^x}{\log_z^y} \times \left(\frac{\log_y^x}{\log_z^y}\right)$$

$$= \frac{\left(\frac{\log_k^x}{\log_k^y}\right)}{\left(\frac{\log_k^y}{\log_k^z}\right)} \times \frac{\left(\frac{\log_k^x}{\log_k^y}\right)}{\left(\frac{\log_k^y}{\log_k^z}\right)} \quad [\text{For some base } k]$$

$$= \left(\frac{\log_k^x}{\log_k^z}\right)^3 = \left(\log_y^x\right)^3 = (ab)^3$$

So, $ab - a^3 b^3 = 0$

$$a \times b\left(1 - a^2b^2\right) = 0$$

$\Rightarrow ab = \pm 1$

Only option (5) does not satisfy.

71. 5 Equation (ii) can be written as

$$4^{0.3x} \times 9^{0.2y} = 8 \times (81)^{1/5}$$

$$\Rightarrow (2^2)^{0.3x}(3^2)^{0.2y} = 8 \cdot (81)^{1/5}$$

$$\Rightarrow 2^{0.6x}\ 3^{0.4y} = 2^3 \cdot (3^4)^{1/5} = 2^3 \cdot 3^{4/5}$$

$\Rightarrow 0.6x = 3 \Rightarrow x = 5$

and $0.4y = \frac{4}{5}$

$\Rightarrow y = 2$

If we put the values of x and y in first equation these values satisfy the first equation also.
So the answer is x = 5, y = 2
Hence, option (5) is the correct option.

72. 5 f(x) = max (2x + 1, 3 - 4x)
So, the two equations are y = 2x + 1 and y = 3 - 4x
y – 2x = 1

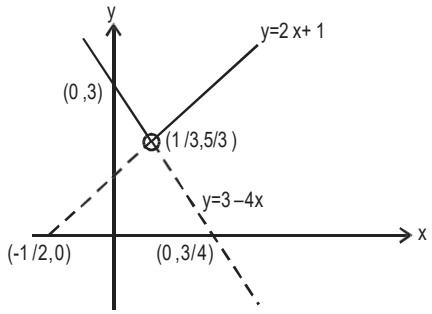
$$\Rightarrow \frac{y}{1} + \frac{x}{-1/2} = 1$$

Similarly, y + 4x = 3

$$\Rightarrow \frac{y}{3} + \frac{x}{3/4} = 1$$

Their point of intersection would be
2x + 1 = 3 - 4x
$\Rightarrow 6x = 2$

$$\Rightarrow x = \frac{1}{3}$$



So when $x \le \frac{1}{3}$, then $f(x)_{max} = 3 - 4x$

and when $x \ge \frac{1}{3}$, then $f(x)_{max} = 2x + 1$

Hence, the minimum of this will be at x = $\frac{1}{3}$

i.e. $y = \frac{5}{3}$

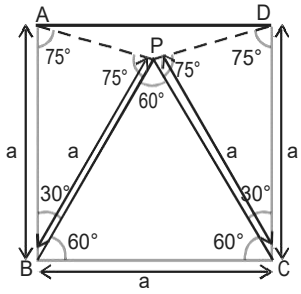
Alternative method:
As f(x) = max (2x + 1, 3 - 4x)
We know that f(x) would be minimum at the point of intersection of these curves
i.e. 2x + 1 = 3 - 4x
$\Rightarrow 6x = 2$

$$\Rightarrow x = \frac{1}{3}$$

Hence, min f(x) is $\frac{5}{3}$

73. 2 Let the number be 10x + y so when number is reversed the number because 10y + x. So, the number increases by 18
Hence (10y + x) - (10x + y) = 9 (y - x) = 18
y - x = 2
So, the possible pairs of (x, y) is (3, 1) (4, 2) (5, 3) (6, 4), (7, 5) (8, 6) (9, 7)
But we want the number other than 13 so, there are 6 possible numbers, i.e. 24, 35, 46, 57, 68, 79.
So total possible numbers are 6.

74. 5



$\angle PBC = \angle CPB = \angle BPC = 60°$ (L's of equilateral triangle)

PC = CD (both a)

Also $\angle CPD = \angle PDC = \frac{180° - 30°}{2} = 75°$

Similarly, $\angle BAP = \angle BPA = 75°$

$\angle APD = 360° - 75° - 75° - 60° = 150°$

75. 3 Let us assume that Arun started running at 10 a.m. and Barun started at 12 noon. So, in these two hours distance traveled by Arun is 60 km and the relative speed of Barun w.r.t Arun is 10 km/hr. So Barun will overtake Arun after = $\frac{60}{10}$ = 6 hours

So, Barun reaches there at 6 p.m.
So, Kiranmala also overtakes Arun at 6 p.m.
Let us assume Kiranmala takes 't' time to overtake Arun and the relative speed of Kiranmala w.r.t Arun is 30 km/hr and Arun ran for 8 hrs.
So, distance travelled by Arun is = 30 × 8 = 240 km while distance travelled by Kiranmala = 60t
$\therefore 240 = 6t \Rightarrow t = 4$
Hence, Kiranmala start running 4 hours after Arun had st off.