

INSTRUCTIONS

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

SECTION – I

Number of Questions = 20

DIRECTIONS for questions 1 to 4: Answer the questions on the basis of the information given below.

The following table gives the production capacity of the five refineries – P, Q, R, S and T – of the oil company SPCL, the demand at the company's four outlets – A, B, C and D – and the transportation costs involved in transporting the oil from different refineries to different outlets.

Transportation cost (in rupees/kilolitre)

Refinery (Production capacity in kilolitres/day)	Outlet (Demand in kilolitres/day)			
	A (40)	B (30)	C (10)	D (20)
P (30)	500	300	600	200
Q (10)	600	400	400	100
R (30)	300	400	700	400
S (20)	200	300	400	200
T (10)	400	300	600	100

In the above table, the number given in the brackets alongside each refinery gives the production capacity (in kilolitres per day) of that refinery and the number given in the brackets alongside each outlet gives the demand (in kilolitres per day) at that outlet. The number given in the cell corresponding to a refinery and an outlet, gives the transportation cost (in rupees per kilolitre) incurred for transporting oil from that refinery to that outlet.

For example, the production capacity of refinery P is 30 kilolitres/day and the demand at outlet A is 40 kilolitres/day and the cost of transporting one kilolitre of oil from refinery P to outlet A is Rs.500.

DIRECTIONS for questions 5 to 8: Answer the questions on the basis of the information given below.

A study conducted by an independent group of researchers revealed the following information about adults who are 'financially unserved' – adults who do not avail the various financial services currently available to others:

Region	Number of Adults Financially Unserved (million) – U	U as a percentage of adult population	Ratio of men and women among adults financially unserved
East Asia	866	58	2 : 3
South Asia	632	56	2 : 8
Sub-Saharan Africa	330	75	1 : 9
Latin America	260	66	6 : 4
Central Asia and Eastern Europe	190	50	3 : 7
Arab States	140	72	5 : 9
High Income OECD	70	10	1 : 3
Overall (including some regions not listed above)	3489	52	– not available –

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5. For the region in which approximately one-third of the adults are financially served, what is the approximate number of men (in million) who are financially served, if the ratio of adult men to adult women in that region is 52 : 48?
 (1) 46.8 (2) 86.2 (3) 213.2 (4) 93.6
6. If it was discovered that 50 million people who belong to Central Asia and Eastern Europe are incorrectly included in the statistics for Sub-Saharan Africa, what is the maximum percentage point difference between the revised percentages of adults financially served in these two regions? (Approximately)
 (1) 15 (2) 40 (3) 25 (4) 34
7. The average percentage of financially unserved adults for which two regions combined is farthest from the overall percentage of financially unserved adults?
 (1) Arab States & East Asia
 (2) Arab States & South Asia
 (3) Arab States & Central Asia and Eastern Europe
 (4) Arab States & High Income OECD
8. If the governments of the regions mentioned in the table above implement a micro-finance program as part of the development strategy, enabling 40% of the adult women presently financially unserved and 10% of the adult men presently financially unserved to become financially served, which region will register the highest increase in the number of financially served adults?
 (1) East Asia
 (2) High Income OECD
 (3) Central Asia and Eastern Europe
 (4) Sub-Saharan Africa

DIRECTIONS for questions 9 to 12: Answer the questions on the basis of the information given below.

Five students – P, Q, R, S and T – take an assessment test. The test had three sections, namely Quantitative, Verbal and Reasoning, and the cut-off scores for the three sections were 10, 15 and 12 respectively, with the maximum possible score in each section being 50. While evaluating the papers, it was found that in each section,

- (i) the score obtained by each student is a distinct integer and the person with the highest score gets rank 1, the one with 2nd highest score gets rank 2 and so on.
- (ii) the difference between the highest score and lowest score is four.
- (iii) the lowest score in the section is twice the cut-off score in that section.

Further, for any student,

- (a) the rank obtained in any two sections is not the same.
- (b) the total score is the sum of the scores obtained in all the three sections.

9. If it was known that the total score of Q is more than that of any other student, which of the following can be his maximum possible total score?
 (1) 80 (2) 82
 (3) 83 (4) None of these

10. What can be the maximum possible difference in the total scores of any two students?
 (1) 12 (2) 6 (3) 8 (4) 10

11. If it was known that the total score of T is less than that of any other student, the total score of T is at most
 (1) 78. (2) 79. (3) 80. (4) 81.
12. The total score of any student is at least
 (1) 74. (2) 75.
 (3) 76. (4) None of these
- DIRECTIONS for question 13:** Answer the question independently of each other.
13. In an institute which has 100 students, each student is given a unique roll number. If all the students were made to sit around a very large circular table such that the maximum difference between the roll numbers of any two adjacent students is 10, then what is the maximum possible difference between the roll numbers of any two students?
 (1) 10 (2) 11 (3) 499 (4) 509

DIRECTIONS for questions 14 and 15: Answer the questions on the basis of the information given below.

100 children attended a summer camp which conducted three activities – Swimming, Taekwondo and Cricket. Each child enrolled for at least one of the three activities. The number of children who enrolled for both Swimming and Taekwondo was 26, while the number of children who enrolled for Cricket but not Swimming was 25. Swimming was enrolled for by 61 children and the number of children who enrolled for only Cricket and Swimming was 12. It is also known that the number of children who enrolled for only Swimming and Taekwondo was more than the number of children who enrolled for only Swimming and Cricket, which, in turn, was more than the number of children who enrolled for only Cricket and Taekwondo.

14. What is the maximum number of children who enrolled for Taekwondo in the summer camp?
 (1) 14 (2) 40 (3) 25 (4) 51
15. If all the children who enrolled for Taekwondo in the camp are to be given a free Taekwondo costume, and you, equipped with only the information given above, are assigned the task of buying the costumes, with the condition that no child who is eligible for a costume is denied a costume due to inadequate number of costumes purchased, then what is the maximum number of excess costumes that you may be left with?
 (1) 9 (2) 12 (3) 11 (4) 13

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

Seven chess players participated in a chess tournament. The players were ranked from 1 to 7, based on their ratings before the tournament. In the tournament, each player played two games against every other player, i.e., one game with black pieces and the other with white pieces. The games were scheduled on consecutive days, such that on any day exactly three games were scheduled involving six of the seven players, while the remaining player was rested on that day and no particular order was followed for resting the players.

For any player, one point was awarded for a win, half a point for a draw and zero points for a loss. The person with the highest total number of total points at the end of the tournament is said to have finished first, the one with the next highest total points, second and so on. If two or

more players end up with the same total number of total points, their ranks before the tournament are considered and the one with the best rank (i.e., the numerically lowest rank) before the tournament is considered to have finished ahead of the other player/s.

16. For how many days did the tournament take place?
(1) 11 (2) 14 (3) 13 (4) 12
17. Which of the following cannot be the total number of points of the player who finished first?
(1) 6.0 (2) 7.0
(3) 8.0 (4) None of these
18. If exactly one player ended up with the highest total number of points, what is the minimum possible difference between the points of the player who

finished first and that of the player who finished last in the tournament?

- (1) 0.5 (2) 1.0 (3) 1.5 (4) 2.0

19. If the winner had 9.5 points, which of the following can be the number of points scored by the player who finished last?
(1) 4.5 (2) 6.5
(3) 5.5 (4) More than one of the above
20. At the end of the tournament, it was found that only players A and B finished with the same number of points and no other pair of players from the seven players finished with the same number of points. What is the minimum possible total number of points of the person who finished first?
(1) 6.5 (2) 7.0 (3) 7.5 (4) 8.0

SECTION – II

Number of Questions = 20

DIRECTIONS for questions 21 and 22: In each question, there are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar, spelling and usage. Then, choose the **most appropriate** option.

21. (A) Man had been building in statuesque, grandiose and ornate architectural styles
(B) since the time stone was quaried and bricks fired
(C) Imagination, force of will, ornamentation and sheer celebration
(D) is visible in what he has built the world over!
(E) And, that is what I saw in the Blue Mountains, 110 km from Sydney.
(1) A, D and C (2) C and E
(3) A and B (4) A, B and C

DIRECTIONS for questions 23 to 25: Read the following passage and answer the questions that follow it.

The Theory of Moral Sentiments; Adam Smith's first book, was published in 1759. After its immediate success, *Moral Sentiments* went into something of an eclipse from the beginning of the 19th century, and Smith was increasingly seen almost exclusively as the author of his second book, *An Inquiry into the Nature and Causes of the Wealth of Nations*, which, published in 1776, transformed the subject of economics. The neglect of *Moral Sentiments*, which lasted through the 19th and 20th centuries, has had two rather unfortunate effects.

First, even though Smith was in many ways the pioneering analyst of the need for impartiality and universality in ethics (*Moral Sentiments* preceded the better-known and much more influential contributions of Immanuel Kant, who refers to Smith generously), he has been fairly comprehensively ignored in contemporary ethics and philosophy.

Second, since the ideas presented in *The Wealth of Nations* have been interpreted largely without reference to the framework already developed in *Moral Sentiments* (on which Smith draws substantially in the later book), the typical understanding of *The Wealth of Nations* has been constrained, to the detriment of economics as a subject. The neglect applies, among other issues, to the appreciation of the demands of rationality, the need for recognising the plurality of human motivations, the connections between ethics and economics, and the co-dependent rather than free-standing role of institutions in general, and free markets in particular, in the functioning of the economy.

Smith discussed that to explain the motivation for economic exchange in the market, we do not have to invoke any objective other than the pursuit of self-interest. In the most widely quoted passage from *The Wealth of Nations*, he wrote: "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love." In the tradition of interpreting Smith as the guru of selfishness or self-love (as he often called it, not with great admiration), the reading of his writings does not seem to go much beyond those few lines, even though that discussion is addressed only to one very specific issue, namely exchange (rather than distribution or production) and, in particular, the motivation underlying exchange. In the rest of Smith's writings, there are extensive discussions of the role of other motivations that influence human action and behaviour. Beyond self-love, Smith discussed how the functioning of the economic system in general, and of the market in particular, can be helped enormously by other motives.

The spirited attempt to see Smith as an advocate of pure capitalism, with complete reliance on the market mechanism guided by pure profit motive, is altogether misconceived. Smith never used the term "capitalism". More importantly, he was not aiming to be the great champion of the profit-based market mechanism, nor was he arguing against the importance of economic institutions other than the markets.

Smith was convinced of the necessity of a well-functioning market economy, but not of its sufficiency. He argued powerfully against many false diagnoses of the terrible "commissions" of the market economy, and yet nowhere did he deny that the market economy yields important "omissions". He rejected market-excluding interventions, but not market-including interventions aimed at doing those important things that the market may leave undone.

Smith saw the task of political economy as the pursuit of "two distinct objects": "first, to provide a plentiful revenue or subsistence for the people, or more properly to enable them to provide such a revenue or subsistence for themselves; and second, to supply the state or commonwealth with a revenue sufficient for the public services". He defended such public services as free education and poverty relief, while demanding greater freedom for the indigent who receive support than the rather punitive Poor Laws of his day permitted. Beyond his attention to the components and responsibilities of a well-functioning market system (such as the role of accountability and trust), he was deeply concerned about the inequality and poverty that might remain in an otherwise successful market economy. Even in dealing with regulations that restrain the markets, Smith additionally acknowledged the importance of interventions on behalf of the poor and the underdogs of society.

The global reach of Smith's moral and political reasoning is quite a distinctive feature of his thought, but it is strongly supplemented by his belief that all human beings are born with similar potential and, most importantly for policymaking, that the inequalities in the world reflect socially generated, rather than natural, disparities.

There is a vision here that has a remarkably current ring. The continuing global relevance of Smith's ideas is quite astonishing, and it is a tribute to the power of his mind that this global vision is so forcefully presented by someone who, a quarter of a millennium ago, lived most of his life in considerable seclusion in a tiny coastal Scottish town. Smith's analyses and explorations are of critical importance for any society in the world in which issues of morals, politics and economics receive attention. *The Theory of Moral Sentiments* is a global manifesto of profound significance to the interdependent world in which we live.

23. Adam Smith is often derided for over emphasis on selfishness and self love because
(1) he saw selfishness as the root, if not the only, cause of all our activities.
(2) the Wealth of the Nations is read independently of Smith's subsequent works.
(3) what he said in one context is relevant in other contexts also.
(4) quotes from his work are read and interpreted out of context.
24. The author bemoans the neglect of 'Moral Sentiments' because it has led to all of the following in the study of economics EXCEPT:
(1) Treating institutions as if they operate independently of each other.
(2) Neglect of Smith in ethics and philosophy although other philosophers borrowed generously from Moral Sentiments.
(3) Excessive emphasis on reason and the neglect of all other incentives for action.
(4) The neglect of the role of ethics in economic activities.
25. Smith's vision that is remarkably contemporary is:
(1) Lack of education and the unimaginative nature of work leads to neglect of talent in the economically under privileged.
(2) An unregulated market keeps a greater part of the capital from the hands of those most likely to make profitable and advantageous use of it.
(3) Class division reflects inequality of opportunity rather than indicating difference of inborn talents and abilities.
(4) We may have a special obligation to our neighbours but the reach of our concern must transcend that confinement.

DIRECTIONS for questions 26 to 28: Read the following passage and answer the questions that follow it.

We all know the story of Dr. Frankenstein, the scientist so caught up in his own research that he arrogantly tried to create new life and a new man. Today, if you look at people who study how genetics shape human behaviour, you find a collection of anti Frankensteins. As the research moves along, the scientists grow more modest about what we are close to knowing and achieving.

DIRECTIONS for questions 26 to 28: There are two blanks in each of the following sentences. From the pairs of words given below, choose the pair that fills the blanks most appropriately.

26. Religious and communal differences are vulnerable to _____ by sectarian politicians, and have indeed been so used on several occasions, causing massive _____ in the country.
(1) capitalization . . . chaos
(2) utilisation . . . scepticism
(3) modification . . . anarchy
(4) exploitation . . . consternation
27. In a striking _____, Cherrapunji nestled among verdant hills and once the wettest place in India now faces chronic rain deficiency, _____. the fact that global warming is leading to weather systems taking different paths resulting in global circulation anomalies.
(1) justification . . . negating
(2) juxtaposition . . . substantiating
(3) paradox . . . corroborating
(4) contradiction . . . refuting
28. Human beings by nature like to organize themselves _____ – or to put it more precisely, those at the helm find the satisfaction that recognition of their social status is so enjoyable that it frequently _____ money and material wealth as a source of happiness.
(1) culturally . . . outnumbers
(2) socially . . . overrides
(3) hierarchically . . . outweighs
(4) pragmatically . . . overshadows

It wasn't long ago that headlines were blaring about the discovery of an aggression gene, a happiness gene or a depression gene. The implication was obvious: We are beginning to understand the wellsprings of human behaviour, and it won't be long before we can begin to intervene to enhance or transform human life.

Few talk that way now. Studies designed to link specific genes to behaviour have failed to find anything larger than very small associations. It's now clear that one gene almost never leads to one trait. Instead, a specific trait may be the result of the interplay of hundreds of different genes interacting with an infinitude of environmental factors.

First, there is the complexity of the genetic process. As a recent essay in National Review says if a trait like aggressiveness is influenced by just 100 genes, and each of those genes can be turned on or off, then there are a trillion possible combinations of these gene states.

Second, because genes respond to environmental signals, there's the complexity of the world around. Eric Turkheimer of the University of Virginia conducted research showing that growing up in an impoverished environment harms IQ. He was asked what specific interventions would help children realize their potential. But, he noted, that he had no good reply. Poverty as a whole has this important impact on people, but when you try to dissect poverty and find out which specific elements have the biggest impact, you find that no single factor really explains very much. It's possible to detect the total outcome of a general situation. It's harder to draw a linear relationship showing cause and effect.

Third, there is the fuzziness of the words we use to describe ourselves. We talk about depression, anxiety and happiness, but it's not clear how the words that we use to describe what we feel correspond to biological processes. It could be that we use one word, depression, to describe many different things, or perhaps depression is merely a symptom of deeper processes that we are not aware of.

The bottom line is this: For a time, it seemed as if we were about to use the bright beam of science to illuminate the murky world of human action. Instead, science finds itself enmeshed with social science and the humanities in what researchers call the Gloomy prospect, the ineffable mystery of why people do what they do. The prospect may be gloomy for those who seek to understand human behaviour, but the flip side is the reminder that each of us is a Luxurious Growth. Our lives are not determined by uniform processes. Instead, human behaviour is complex, non-linear and unpredictable. The Brave New World is far away. Novels and history can still produce insights into human behaviour that science can't match.

Just as important is the implication for politics. Starting in the late 19th century, eugenicists used primitive ideas about genetics to try to re-engineer the human race. In the 20th century, communists used primitive ideas about "scientific materialism" to try to re-engineer a New Soviet Man. Today, we have access to our own genetic recipe. But we seem not to be falling into the arrogant temptation to try to re-engineer society on the basis of what we think we know. Saying farewell to the sort of horrible social engineering projects that dominated the 20th century is a major example of human progress.

This age of tremendous scientific achievement has underlined an ancient philosophic truth that there are severe limits to what we know and can know; that the best political actions are incremental, respectful towards accumulated practice and more attuned to particular circumstances than universal laws.

29. Human progress, in the author's view, is illustrated by
- Man realizing his limitations in pursuing scientific research.
 - Scientists abandoning non-productive research projects of the 20th century.
 - Scientists bidding adieu to genetic engineering projects involving humans.
 - Man giving up attempts to change human behaviour through genetic intervention.
30. Who does the author refer to as anti-Frankensteins?
- Scientists who recognize that it is not feasible to transform humans by altering genes.
 - Scientists who are studying genes to shape human behaviour.
 - Scientists who think that it is unethical to tamper with human nature.
 - Those who understand that there are limitations to man's knowledge and achievement.
31. Which of the following titles best suits this passage?
- Rescuing science from Frankensteins
 - Frankensteins versus anti-Frankensteins
 - Limits to what science can achieve
 - Anti-Frankensteins on the rise

DIRECTIONS for questions 32 and 33: In each of the following questions, the word at the top is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

32. COVER
- People started running for cover as soon as it started raining heavily.
 - He tried to cover his embarrassment with a smile.
 - The thieves crept into the house under the cover of darkness.
 - My travel insurance does not cover up for the loss or theft of cash.
33. FIRM
- Patients suffering from chronic back pain are advised to sleep on a firm mattress.
 - I felt reassured by his firm handshake.
 - Jane and Sarah remained firm friends through thick and thin.
 - These impudent teenagers need to be dealt with firm hands.

DIRECTIONS for questions 34 to 36: Read the following passage and answer the questions that follow it.

Each period in history brings new terminologies and acronyms that capture the essence of the time. In late 2006, British historian Niall Ferguson and economist Mortiz Schularick coined the term 'Chimerica' to describe China and America, which, they said, had effectively fused to represent a single economy. Two years later, with the financial storm gathering, the U.S. economist Fred Bergsten said the world should be run by the 'G₂' – China and the U.S.

Against the backdrop of the world's first Group of 20 countries meeting in Washington to deal with the financial crisis, Bergsten's coinage took a new life as the core of the expanded club. However, in spite of the excitement about the new constellation, it has become clear that G₂ is less than meets the eye. Even Ferguson himself has become doubtful of the viability of his own construct and called it a chimera. The fact is that the world has become too intertwined with myriad interests to be run by a duopoly.

Recent events and statements emanating from Washington and Beijing could indeed have conveyed the sense of an emerging co-leadership of the world, if not a condominium. On her trip to China, U.S. secretary of state Hillary Clinton chose to downplay the country's human rights abuses. She, instead, urged it to keep buying U.S. treasuries. Clinton was not the only one to do so. On his maiden trip to China, U.S. Treasury Secretary Timothy Geithner said, 'The world is going to be watching what we do together To help resolve the global financial crisis'. In fact, the recent high-level China-U.S. Strategic and Economic Dialogue held in Washington reinforced the notion of a G₂ in action. Some even enthused about the emerging signs of cooperation, while others in Europe and Asia furrowed their brows wondering what it would mean for them.

But a closer look at the U.S.-China relations could dampen the enthusiasm of G₂ supporters and lessen the concern of the worriers. Ferguson, who saw the symbiotic relations between China and the U.S. driving the world, now thinks their marriage may be on the rocks. But divorce is not a feasible option either. However worried China might be about the value of its dollar holdings, dumping them would risk a further collapse in their value.

The China-U.S. symbiosis appears more like a mutual death grip from which neither side dares make a precipitous move for fear of being pulled over the cliff by the other, says Christopher Clarke, a former official with the U.S. state Department. Such imagery may be overly dramatic, but there is no mistaking Chinese nervousness at being stuck with \$800 billion in dollar-denominated debt. China welcomed Geithner's assurances about maintaining a stable currency, but is clearly seeking to inch away from the cliff, diversify its reserve holdings and open new markets.

While at one level relishing its new status as co-manager of the world economy, China is all too aware of the costs of being bracketed with the hegemony. Not surprisingly, in May, China's premier Wen Jiabao made a 20-hour dash to Prague to attend the 11th China-Europe summit to assure European leaders that China was not interested in G₂.

More than the Europeans, China would like to calm its poorer friends. The country's fast-growing economy is too dependent on raw materials and markets all over the world (and more so as the resources get scarcer and markets shrink) to allow it to join an exclusive club at the expense of its Third World comrades. Wen has taken pains to reassure them that China will 'never seek hegemony', and that to 'develop friendly cooperative relationship with all countries' was a win-win strategy.

This is not merely a question of tactics. Chinese leaders have always been conscious of the deep strategic and security gulf that separates them from the U.S. Hence, it is unlikely that they will buy the high-minded talk on the G₂. China welcomes the promise of an economic and strategic tie-up with the U.S. But it never fails to point out that it is barred from buying high-technology American goods with possible military application. The same suspicions about China's strategic intentions that deny it access to dual-use technology are reinforced by recent confrontations with the U.S. Navy in the South China Sea, at the Pentagon, by Chinese weapons programmes.

So seen, the G₂ is an idea whose time has not come. Given the old suspicions and increasingly intertwining nature of today's world, it is doubtful if it ever will.

34. The 'costs' of being bracketed with the 'hegemony' for China could be

- A. acquire access to technology that could be used for weapons upgradation.
- B. relish its new status as a co-manager of world economy.
- C. provoke suspicion in European and Asian countries.
- D. have a say in shaping the economic policy of the superpower.
- E. lose comrades in Third World countries on whom it is dependent for market and raw materials.

(1) A and D (2) B and E (3) C and E (4) C and D

35. When the author says, 'G₂ is less than meets the eye', we understand that

- (1) China-U.S. co-operation in the international arena is not feasible.
- (2) The China-U.S. duopoly is much hype about nothing.
- (3) The two world powers want to underplay the possibilities of their co-leadership.
- (4) The myriad interest of the world cannot be catered to by the twin powers.

36. We can infer from the passage that

- (1) China is committed to take forward its relationship with America.

- (2) The rest of the world is worried about the possible outcomes of a China-U.S. hegemony.
- (3) A China-U.S. co-operative would help to stabilise the financial crisis the world is facing now.
- (4) America appears more interested in popularising the notion of G₂ than China.

DIRECTIONS for questions 37 and 38: In each question, there are five sentences. Each sentence has pairs of words/phrases that are italicised and highlighted. From the italicised and highlighted word(s)/phrase(s), select the **most appropriate** word(s)/phrase(s) to form correct sentences. Then, from the options given, choose the best one.

37. (i) Several high rise buildings were **raised** (A) / **razed** (B) to the ground in the devastating earthquake.

(ii) Bright colours **compliment** (A) / **complement** (B) her fair complexion perfectly.

(iii) Antisocial elements are disrupting the law and order situation in the city with **impunity** (A) / **immunity** (B).

(iv) The book offers a fascinating **incite** (A) / **insight** (B) into human relationships.

(v) Being a **voracious** (A) / **vociferous** (B) reader he has wide knowledge on various subjects.

(1) BAABA (2) BABBA (3) BBABA (4) BBBAA

38. (i) A **complacent** (A) / **complaisant** (B) attitude is detrimental to progress.
(ii) Those found guilty of **flouting** (A) / **flaunting** (B) the rules will be heavily penalized.
(iii) The profits made by the company in the first six months of the current financial year **auger** (A) / **augur** (B) well for the rest of the year.
(iv) John inherited a huge fortune from his **adopted** (A) / **adoptive** (B) parents.
(v) The hungry children devoured the huge **hoard** (A) / **horde** (B) of tinned food, stored in the larder, within no time.
- (1) AAAAA (2) AABAB (3) BAABA (4) AABBA

DIRECTIONS for questions 39 and 40: The sentences given in each of the following questions, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. From among the four choices given below each question, choose the most logical order of sentences that constructs a coherent paragraph.

39. (A) Provided the particles are about 200 nanometres in diameter their interval-based structure will cause an effect known as Bragg interference at visible wavelengths, which influences the apparent colour of their surface.
(B) For visual displays, these periodic structures, known as photonic crystals, can be made of pretty much anything, from tiny silica beads or liquid crystals to polystyrene balls – or just voids in a substance.
(C) To make this into a display you must be able to tune the crystals by altering the size of the spaces between their particles.

- (D) Arrange microscopic particles in periodic rows and depending on their size and spacing, you can start to influence the way light is reflected off a surface.
(E) It's a trick that has long been used by nature to create iridescence in opals and the vivid colours in chameleons' skins.
(1) DCABE (2) ABDCE (3) EDBAC (4) EACDB

40. (A) In the 1830s, the British naturalist Edward Forbes surveyed ocean beds throughout the Atlantic and Mediterranean and declared that there was no life at all in the seas below 600 metres.
(B) So it came as something of a surprise when, in 1860s, one of the first transatlantic telegraph cables was hauled up for repairs from more than 3 kilometres down and found to be thickly encrusted with corals, clams and other living detritus.
(C) Considering the age-old importance of the sea to us, it is striking how long it took the world to take a scientific interest in them.
(D) It seemed a reasonable assumption : there was no light at that depth, so no plant life, and the pressures of water at such depths were known to be extreme.
(E) Until well into the nineteenth century most of what was known about the oceans was based on what was washed ashore or came up in fishing nets, and nearly all that was written was based more on anecdote and supposition than on physical evidence.
(1) ABDEC (2) CEADB (3) EABCD (4) ADBCE

SECTION – III Number of Questions = 20

DIRECTIONS for questions 41 to 45: Answer the questions independently of each other.

41. What is the remainder when 15^{400} is divided by 1309?
(1) 1308 (2) 2 (3) 1 (4) 15
42. Ramesh and Rahul have an equal number of mangoes. If Ramesh gives m mangoes to Rahul then Rahul would have 4 times as many mangoes as Ramesh. Instead if Rahul gives n mangoes to Ramesh then Ramesh would have twice as many mangoes as Rahul. Find the ratio $n : m$?
(1) 5 : 9 (2) 9 : 5 (3) 10 : 9 (4) 9 : 10
43. Find the area (in sq.units) of the region bounded by the graphs $|x| = 3$ and $|y| = 3$ but lying outside the region bounded by the graph $|x| + |y| = 3$.
(1) 24 (2) 36 (3) 18 (4) 27
44. Yadav was using the following algorithm on his computer. $\text{Rem}(x / t)$ gives the remainder of x divided by t .
Step 1 : Read the positive integer x .
Let $t = 2$, sum = 0
Step 2 : $R = \text{Rem}(x / t)$.
Step 3 : If $R = 0$, sum = sum + 1 and $x = x / t$.
Go to step 2.
Step 4 : If $R \neq 0$, then $t = t + 1$. If $t < x + 1$, then go to step 2. If $t \geq x + 1$, then print sum and stop.

If at the end of program sum = 7, then which of the following could be a possible value of x ?
(1) 960 (2) 3600 (3) 1800 (4) 840

45. X is a set of first 8 consecutive natural numbers. Find the number of ways in which a subset Y of X can be formed such that sum of elements of Y is divisible by 3?
(1) 75 (2) 95 (3) 87 (4) 79

DIRECTIONS for questions 46 and 47: Answer the questions on the basis of the information given below.

The following table gives the concentration of eight different samples of sugar solution.

Sample	Concentration of sugar (as a percentage of volume)
G	10%
H	20%
I	15%
J	12%
K	8%
L	16%
M	4%
N	25%

46. Exactly 3 samples are mixed in some ratio to form a 15% sugar solution. How many such combinations of samples are possible?
(1) 42 (2) 30 (3) 48 (4) 36

47. Exactly 4 samples are mixed in some ratio to form a new sample of sugar concentration more than 16%. How many such combinations of samples are possible?
 (1) 45 (2) 60 (3) 50 (4) 55

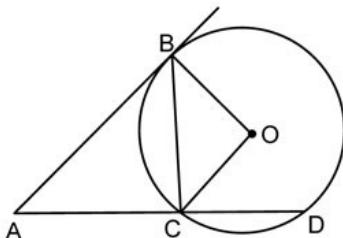
DIRECTIONS for questions 48 to 51: Answer the questions independently of each other.

48. There are two geometric progressions, G_1 and G_2 , whose first terms are 4 and 8 respectively and whose common ratios are $2^{3/2}$ and $2^{7/4}$ respectively. The last term of both progressions is 2^{269} . Find how many terms of G_1 and G_2 are in common.
 (1) 25 (2) 26 (3) 24 (4) 27

49. If $\log_a 12 = x$, $\log_a 75 = y$ and $\log_a 40 = z$, what is the value of $\log_a 120$ in terms of x , y and z ?
 (1) $\frac{3x+y+2z}{4}$ (2) $\frac{x+3y+2z}{4}$
 (3) $\frac{2x+3y+z}{4}$ (4) $\frac{3x+y+z}{4}$

50. A function $f(x)$ is defined for a real variable x , as $f(x) = \max\{3x + 8, 25 - 4x, 12 - x\}$. The minimum possible value of $f(x)$ is
 (1) $-\infty$ (2) 11 (3) $\frac{23}{3}$ (4) $\frac{107}{7}$

51.



In the above figure, AB is tangent (at B) to the circle with centre O. Another line drawn through A, intersects the circle at the points C and D such that the chord BC subtends an angle of 90° at the centre. If AB = 20 cm and the area of the quadrilateral ACOB is 48 sq.cm., find the radius of the circle.
 (1) 6 cm (2) 4 cm (3) 8 cm (4) 7 cm

DIRECTIONS for questions 52 and 53: Answer the questions on the basis of the information given below.

Two taps A and B can fill a tank in a and b minutes respectively. Shiva opened both taps and went out. He mistakenly thought that B was an emptying tap and that it could empty the tank in b minutes and calculated that the tank would fill in m minutes. Since, his watch was gaining time, he returned after ' n ' minutes, thinking that exactly m minutes had passed and noticed that the fraction of the tank that had filled up was only y .

52. If $n = m/2$, which of the following cannot be the value of $b : a$?
 (1) 3 : 1 (2) 4 : 1 (3) 5 : 1 (4) 6 : 1

53. If $n = m/3$ and $y = 5/9$, then find $b : a$.
 (1) 3 : 1 (2) 4 : 1 (3) 1 : 5 (4) 5 : 1

DIRECTIONS for questions 54 to 60: Answer the questions independently of each other.

54. The sum of the reciprocals of the roots of $ax^2 + bx + c = 0$ is $11/28$ and the product of the roots of $cx^2 + bx + a = 0$ is $1/28$. Find the sum of the roots of $bx^2 + ax + c = 0$.
 (1) $28/11$ (2) $-28/11$ (3) $1/11$ (4) $-1/11$

55. In a nuclear reaction, two species A and B are formed at different times. A reference time to ($t_0 = 0$) is selected. At time t equal to $-2 \mu s$ (microseconds), the age of A is $18 \mu s$ more than three times that of B. When is the age of A exactly three times that of B?
 (1) $t = -7 \mu s$ (2) $t = 7 \mu s$
 (3) $t = -9 \mu s$ (4) $t = 9 \mu s$

56. A playground is in the form of a regular hexagon ABCDEF. A flag post, standing at A, subtends an angle of 60° at point C. Find the ratio of the height of flag post to the length of the side of the hexagon.
 (1) 3 : 1 (2) 1 : 3 (3) $1 : \sqrt{3}$ (4) $\sqrt{3} : 1$

57. The lecturers of a certain college contributed for a charity programme. All lectures of the college are classified as either senior lecturers or junior lecturers. The senior lecturers contributed an average of Rs.250 and the junior lecturers contributed an average of Rs.100. If the average contribution per lecturer was Rs.160 on the whole, what percentage of the lecturers are junior lecturers?
 (1) 55% (2) 60% (3) 65% (4) 80%

58. $X = (12)_N + (34)_N + \dots ([2M-1][2M])_N$, where N is the base of the number system, $N = 2M + 1$ and $M > 2$. Express $X + M + 2$ in base M.
 (1) $(2222)_M$ (2) $(1110)_M$
 (3) $(1111)_M$ (4) $(2220)_M$

59. A teacher asked Raju to write the cubes of the first $(2m + 1)$ natural numbers on the board and sum them. Raju missed out the cubes of two numbers. The sum of these two numbers was $(2m + 1)$. Raju added all the other $2m - 1$ cubes and gave his answer to his teacher. Not knowing that Raju had missed out the cubes of two numbers, she found the average of the sum and it turned out to be less than 6750. Find the greatest possible value of m ?
 (1) 16 (2) 15 (3) 17 (4) 14

60. How many three-digit numbers satisfy all the following conditions?
 I. When divided by 11 or 12, they leave a remainder of 7 and 8 respectively.
 II. When divided by 33 or 24 they leave a remainder of 29 and 20 respectively.
 III. When divided by 7 or 8 leaves a remainder 4 in each case.
 (1) 5 (2) 3
 (3) 1 (4) None of these

(Key and Solutions for AIMCAT1111)

Key

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

Solutions

SECTION – I

Solutions for questions 1 to 4:

1. The lowest cost of transportation occurs when the oil is transported along the cheapest routes available, which are shown below.

$$T - D \rightarrow 10 \text{ kl} \rightarrow 10 \times 100 = \text{Rs.1000}$$

$$Q - D \rightarrow 10 \text{ kl} \rightarrow 10 \times 100 = \text{Rs.1000}$$

$$P - B \rightarrow 30 \text{ kl} \rightarrow 30 \times 300 = \text{Rs.9000}$$

$$S - A \rightarrow 10 \text{ kl} \rightarrow 10 \times 200 = \text{Rs.2000}$$

$$R - A \rightarrow 30 \text{ kl} \rightarrow 30 \times 300 = \text{Rs.9000}$$

$$S - C \rightarrow 10 \text{ kl} \rightarrow 10 \times 400 = \text{Rs.4000}$$

$$\text{Total} = \text{Rs.26,000}$$

Choice (2)

2. As P can be used for supplying only to A or C, the minimum cost of transportation in this case would be

$$P - C \rightarrow 10 \text{ kl} \rightarrow \text{Rs.6,000}$$

$$P - A \rightarrow 20 \text{ kl} \rightarrow \text{Rs.10,000}$$

$$Q - D \rightarrow 10 \text{ kl} \rightarrow \text{Rs.1,000}$$

$$T - D \rightarrow 10 \text{ kl} \rightarrow \text{Rs.1,000}$$

$$R - B \rightarrow 30 \text{ kl} \rightarrow \text{Rs.12,000}$$

$$S - A \rightarrow 20 \text{ kl} \rightarrow \text{Rs.4,000}$$

$$\text{Total} = \text{Rs.34,000}$$

Choice (4)

3. The cheapest supply lines were already determined in the first question of the set. Now we have to determine the supply line whose disruption would cause the transportation cost to increase by the maximum amount. Choices (2), (3) and (4) can be straight away ignored as they are not part of the cheapest route. Hence, the increase in transportation cost would be highest, if the supply line P – B is disrupted.

Choice (1)

4. As far as the cost of transporting at each of the outlets is considered, most of the outlets receive the oil at a low transportation cost from the refinery S, hence if the capacity of refinery S is doubled, the saving in the expenditure will be more.

Choice (1)

Solutions for questions 5 to 8:

5. Since approximately one-third are financially served, two-third are financially unserved.

∴ The region is Latin America. Let the fraction of men in the (financially served) adult population be x.

$$\therefore \frac{x}{3} + \frac{2}{3} \times \frac{6}{10} = \frac{52}{100} \Rightarrow x = \frac{36}{100} = 36\%$$

∴ 36% of financially served adults are men in Latin America.

Number of financially served adults in Latin America $\approx \frac{1}{2} \times 260 = 130$ million.

∴ Number of men financially served $= \frac{36}{100} \times 130 = 46.8$ million.

Choice (1)

6.

Region	Adults financially unserved	% Population	Adults financially served
Central Asia and Eastern Europe (CAEE)	190	50	190
Sub-Saharan Africa (SSA)	330	75	110

To maximize the difference in terms of percentage points between financially served adults in CAEE & SSA, the percentage of financially served adults must be maximum in CAEE & minimum in SSA.

∴ This is the case when the 50 million adults were incorrectly included in the financially served category in SSA and would have to be now counted in the financially served category in CAEE.

∴ We have

	Financially unserved	Financially served	% Population (financially served)
Central Asia and Eastern Europe	190	240	55.81
Sub-Saharan Africa	330	60	15.38

Percentage point difference = 40.43 Choice (2)

7. Total population of Arab States $= \frac{140}{0.72}$ million

For East Asia, total population $= \frac{866}{0.58}$ million,

For High Income OECD, total population $= \frac{70}{0.10}$ million,

For South Asia, total population $= \frac{632}{0.56}$ million,

For Central Asia & Eastern Europe, total population $= \frac{190}{0.50}$ million.

Choice (1) → Arab States & East Asia

% of financially unserved adult population

$$\begin{aligned}
 &= \left(\frac{\text{Total number of financially unserved people}}{\text{Total population}} \right) \\
 &= \frac{140 + 866}{140 + 0.72} \approx 59.6\% \\
 &\quad \frac{866}{0.72} + \frac{140}{0.58} \\
 \text{For Arab States & High Income OECD, it is } &\frac{140 + 70}{140 + 0.72} \approx \\
 &\frac{70}{0.72} + \frac{140}{0.10} \\
 &23.5\% \\
 \text{For Arab States & South Asia } &\frac{140 + 632}{140 + 0.72} \approx 58.4\% \\
 &\frac{632}{0.72} + \frac{140}{0.56}
 \end{aligned}$$

For Arab States & Central Asia and Eastern Europe, it is

$$\frac{140 + 190}{140 + 0.72} \approx 57.4\%$$

Given overall percentage of financially unserved adults = 52%.
∴ Choice (4) gives the percentage farthest from the overall figure of 52%.

Alternative solution:

Consider $\frac{140 + 190}{140 + 0.72} = \frac{\left(\frac{140}{0.72}\right)0.72 + \left(\frac{190}{0.50}\right)(.50)}{\frac{140}{0.72} + \frac{190}{0.50}}$

∴ It is of the form $\frac{w_1(72\%) + w_2(50\%)}{w_1 + w_2} = P$ (say) where w_1

$$= \frac{140}{0.72} \text{ & } w_2 = \frac{190}{0.50}. \text{ Then } 50\% < P < 72\%. \text{ Since } w_2 > w_1,$$

P will be closer to 50% than it is to 72% $\Rightarrow 50\% < P < 61\%$

$$\left[\frac{50 + 72}{2} = 61\% \right]$$

For choice (2),

$$P = \frac{140 + 632}{140 + 0.72} \therefore 56\% < P < 72\%$$

P is far closer to 56% than it is to 72% since $\frac{632}{0.56} > \frac{140}{0.72}$

$$\Rightarrow 56\% < P < 64\%$$

For choice (3), $50\% < P < 72\%$ & P is closer to 50% than it is to 72% $\Rightarrow 50\% < P < 61\%$

For choice (4), $10\% < P < 72\%$ & P is far closer to 10% than it is to 72% since $\frac{70}{0.10} > \frac{140}{0.72}$

$$\therefore 10\% < P < 41\%$$

Clearly choice (4) is the answer. Choice (4)

8. This question can be best solved using the choices given. Clearly, of the choices mentioned, East Asia has the highest number of financially unserved adults.

For East Asia, increase in financially served adults = $\left(\frac{2}{5} \times 10\% + \frac{3}{5} \times 40\%\right) \times 866 = 28\% \text{ of } 866 > 25\% \text{ of } 866 \approx 216 \text{ million.}$

For Sub-Saharan Africa, increase in number of financially served adults = $\left(\frac{1}{10} \times 10\% + \frac{9}{10} \times 40\%\right) \times 330 = 37\% \text{ of } 330 < 40\% \text{ of } 330 = 132 \text{ million}$

Clearly, the increase is more in East Asia.

There is no need to check for choices (3) & (4) since the number of financially unserved people is far lesser.
Choice (1)

Solutions for questions 9 to 12:

Cut-off marks in Quantitative Section is 10. ∴ Lowest score = 20
Since difference in highest & lowest score is 4, the scores obtained in Quantitative Section are 20, 21, 22, 23, 24.
Similarly, in verbal, the scores obtained are 30, 31, 32, 33, 34.
In reasoning, the scores obtained are 24, 25, 26, 27, 28.

9. If Q was the overall topper, his ranks in the three sections would be 1, 2 and 3 and so his marks would be 24, 33 and 26 or a total of 83. Choice (3)

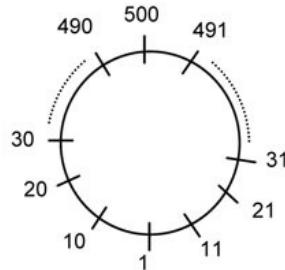
10. The least possible marks for a student happens when his ranks in the different sections are 5, 4 and 3.
∴ His marks can be 20, 31 and 26 or a total of 77.
As maximum possible is 83, the difference is six marks.
Choice (2)

11. Total score obtained by all students in all sections is 400. If all get equal scores, they get 80 each. The maximum possible marks scored by the person with the least marks can be 79, i.e., when three persons score a total marks of 80 and another one scores 81. Choice (2)

12. The minimum marks would be 77. Choice (4)

Solution for question 13:

13. Let us assume that at one place a student whose roll number is 1 is sitting.
On either side of him we can have student whose roll numbers are 10 and 11. (As the maximum difference between roll numbers of any two adjacent students is 10).
Now two maximise the required difference, we continue on either side with maximum possible difference between adjacent seats. So we get the roll numbers on either side of the seat exactly opposite to 1 as 490 and 491.

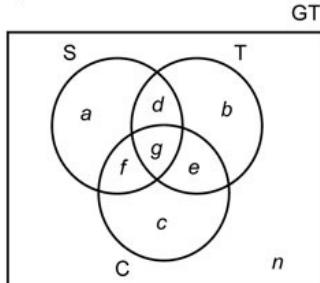


Hence, maximum roll number can be 500, sitting between 490 and 491.

Hence maximum difference between the roll numbers of any two students is $(500 - 1) = 499$. Choice (3)

Solutions for questions 14 and 15:

Consider the representation below:



Given, each student has enrolled for at least one of the three activities. Hence, $n = 0$.

- (2) $d + g = 26$
- (3) $c + e = 25$
- (4) $a + d + g + f = 61$
- (5) $f = 12$

And the condition $d > f > e$

We know $f = 12$ hence minimum value of $d = 13$

As we know d, g, f , values $\therefore a = 23$

$$GT = a + b + c + d + e + f + g$$

$$b = 100 - 61 - 25 = 14$$

14. Maximum value of Taekwondo enrolments is obtained when e is maximum $\Rightarrow e = 11$

$$\therefore T = 51 \quad \text{Choice (4)}$$

15. The maximum number of excess costumes that one would be left with is the difference between the maximum and the minimum possible number of students who enrolled for Taekwondo.

Minimum value of Taekwondo is obtained when e is minimum $\Rightarrow e = 0$

$$\therefore T = 40$$

$$\therefore \text{Required difference} = 51 - 40 = 11 \quad \text{Choice (3)}$$

Solutions for questions 16 to 20:

16. Only three matches are played on every day and as a total of 42 matches are to be scheduled, it will take a total of 14 days.

Choice (2)

17. Each player will play 12 games. The total number of points available is 42. Even if all the players end up with the same number of points, each will have $42/7 = 6$ points and the winner would be one of the players with six points. All other values, 6.5 to 12 are also possible.

Choice (4)

18. As the total number of points available is 42, if one person ends up with the highest number of points, he would at least have 6.5 points, which means the person who finished last can have at most 5.5 points or the least difference is one point.

Choice (2)

19. Using the same logic as above, as the winner has 9.5 points, the maximum score of the person who finished last would be 5 points. Only 4.5 is possible among the choices.

Choice (1)

20. Here, we are looking for the least possible score of person, who finished first. By comparing the values, the number of points of the person who finished first cannot be less than 7.5, in any other case, A and B cannot have the same number of points.

Choice (3)

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

SECTION – II

Solutions for questions 21 and 22:

21. Statement A is erroneous because of the incorrect tense 'had been building'. Since the reference is to an action which began sometime in the past and is still continuing, the present perfect continuous tense is apt here. Therefore

the correction is 'man, has been building'. Statement B is erroneous because the word 'quarried' is misspelt. In statement D 'is' should be replaced by 'are', because three different aspects (subjects) are referred to and hence they should be denoted by are. Statements C and E are error free.

Choice (2)

22. Statement A is incorrect because there is no agreement between the subject and the verb. The word Christie's refers to a single entity (a single organisation), therefore the correction is 'Christie's is facing a bitter.....'. In statement C the word millions should be in the singular. Therefore, the correction is '..... £100 million'. Statement D is erroneous because the expression Jeanne Marching is a parenthetical expression and should be preceded and followed by comma. Only statements B and E are error free.

Choice (4)

Solutions for questions 23 to 25:

Number of words and Explanatory notes for RC:

Number of words : 865

23. Refer to para 4. The author uses the oft-quoted lines from Smith and shows that it was said in a certain context (barter) and not in the context of production or distribution. This is the reason Adam Smith is criticized for emphasizing selfishness.

Choice (4)

24. Refer to para 3 where the consequences of the neglect of 'Moral Sentiments' are given. All the statements are true but statement 2 does not pertain to economics.

Choice (2)

25. Refer to the penultimate para which supports option 3. The other statements, though true, do not reveal his vision as being contemporary.

Choice (3)

Solutions for questions 26 to 28:

26. Sectarian politicians are likely to exploit religious and communal differences, thereby causing consternation in the country. Hence, option 4 is most appropriate. The words capitalization and utilisation can also fit into the first blank but option 1 can be ruled out because the word chaos is too mild in this context. Exploitation of religious and communal differences is not likely to cause chaos but something more serious. Choice 2 can be ruled out because the word scepticism is a misfit here. Choice 4 is most logical.

Choice (4)

27. Cherrapunji was once considered the wettest place in India. It is now facing chronic rain deficiency. This aberration is nothing but a paradox (a situation or statement which seems impossible or is difficult to understand because it contains two opposite facts or characteristics). Hence, choice 3 is most apt in the context. The words justification (defence), juxtaposition (placed close together) are inappropriate in comparison. Although the word, contradiction fits in the first blank, the word refuting (prove a statement to be wrong) does not make sense in the second blank. Choice 3 is most logical because the Cherrapunji paradox corroborates (confirms) the fact that global warming results in global circulation anomalies.

Choice (3)

28. The sentence states that human beings crave for recognition of their social status. Hence it is likely that human beings like to organize themselves hierarchically (a hierarchical society is a system in which people are ranked one above the other according to status or authority). This desire, of their social status being recognized, is so strong among humans that it far outweighs money and material wealth as a source of happiness. Hence, it is obvious that choice 3 is most logical in the given context.

Choice (3)

Solutions for questions 29 to 31:

Number of words and Explanatory notes for RC:

Number of words : 680

29. Refer to the penultimate para. Choice (1) is not correct because pursuing scientific research includes all area of research. The passage talks of social re-engineering projects. Choice (2) is also not apt. 'Non productive research projects' does not capture this idea. Choice (3) is not specific and does not include the key word 'behaviour'. Choice (4) is the best answer, since the projects being spoken of are those that seek to modify outlook or behaviour, eg. "scientific materialism".

Choice (4)

30. Choice (1) is correct. Refer to para (1), where the term is used. Choice (1) captures the idea best. The passage states that there is a collection of anti-Frankensteins among those scientists who study human behaviour. Choice (2) incorrectly includes all the scientists. Choices (3) talks of ethics, an idea which is not suggested in the passage. Choice (4) is generalized.

Choice (1)

31. Choice (1) is not suitable because the passage does not sound alarming. It does not state that Frankensteins are growing in number and we need to guard against this. Choice (2) is not correct because there is no comparison or contrast between the two sects. Choice (4) is discussed, but not the focus. Choice (3) is the best pick. It captures the overall idea.

Choice (3)

Solutions for questions 32 and 33:

32. The usage of cover is inappropriate in choice 4. In this context cover should be followed by against. The correction is 'my travel insurance does not cover me against'.

Choice (4)

33. Choice 4 is erroneous. The correction here is, 'These impudent teenagers need to be dealt with a firm hand'. 'To deal with someone or something, with a firm hand' is an idiomatic expression, it means to strongly discipline or control someone.

Choice (4)

Solutions for questions 34 to 36:

Number of words and Explanatory notes for RC:

Number of words : 750

34. The phrase is from para 6 and costs are negative not positive. Hence A, B and D which are benefits can be ruled out.

Choice (3)

35. The idiom 'more than meets the eyes' means something is more complicated or interesting than is apparent at first. Hence, 'less than meets the eye' conveys the reverse, something has less potential than expected. Choice 1 is ruled out because it is categorical. Choice 2 is appropriate.

Choice (2)

36. Choice 4 can be inferred because as given in the passage in para 3 the American political establishment appears keen on the idea. China's reservations is seen in para 6 to end.

Choice (4)

Solutions for questions 37 and 38:

37. The word razed which means (completely destroy a city, building etc is more apt when compared to the word raised (elevated).

A compliment is a remark that expresses approval, admiration or respect. Complement is to make something else seem better or more attractive when combining with it. Only the latter suits the context.

The word impunity meaning freedom from punishment or from the unpleasant results of something that has been done is suitable in the given context. The word immunity which means to be protected from a disease or legal action is inapt here. To incite is to encourage someone to do or feel something unpleasant or violent. The word insight, which means a clear, deep and sometimes sudden understanding of a complicated problem or situation makes sense in the given context.

Only the word voracious meaning very eager for something is apt in the context and collocates with reader. Vociferous which means expressing opinions and complaints loudly and repeatedly is a misfit here. Therefore, BBABA is the correct sequence.

Choice (3)

38. The word complacent (feeling satisfied with your own abilities is more appropriate when compared to the word complaisant (willing to please others by being polite and meek).

Only the word flouting (intentionally disobeying a rule etc) suits the context. Flaunting (showing off something you are proud of) is a misfit here.

To augur is to be a sign of especially good or bad things in the future, auger is a tool consisting of a twisted rod of metal). Hence, B is apt in the context. To adopt a child is to take another person's child into your own family and legally raise him or her as your own child. An adoptive parent is one who has adopted a child. Hence, B is apt.

Hoard refers to a large amount of something kept in a safe, often secret place. Horde, which refers to a large group of people, does not suit the context. Therefore, AABBA is the appropriate sequence.

Choice (4)

Solutions for questions 39 and 40:

39. It is clear that the para describes a process by which things appear colourful. In this context E is introductory in nature, introducing the idea of colours in nature. The 'trick' in E is elaborated in the remaining sentences. D and B are linked by references to periodic rows and periodic structure. So they go together (as they do in choices 3 and 4). 'This' in C refers to 'the apparent colour of thin surface' in A and so C follows A. A follows B because the 'particles' in A refer to the beads or crystals or voids in B. Hence EDBAC.

Choice (3)

40. A and B seem to go together but D has to come between them since 'the reasonable assumption' in D refers to the assumption in A. So we have ADB. C and E supply the background and lead to the ideas in ADB. Hence CEADB.

Choice (2)

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

SECTION – III

Solutions for questions 41 to 45:

41. $1309 = 11 \times 7 \times 17$

$$\begin{aligned} \text{Rem} \left[\frac{15^{400}}{11} \right] &= \text{Rem} \left[\frac{4^{400}}{11} \right] = \text{Rem} \left[\frac{(32)^{160}}{11} \right] \\ &= \text{Rem} \left[\frac{(-1)^{160}}{11} \right] = 1 \end{aligned}$$

$$\text{Similarly, } \text{Rem} \left[\frac{15^{400}}{7} \right] = \text{Rem} \left[\frac{1^{400}}{7} \right] = 1$$

$$\text{Similarly, } \text{Rem} \left[\frac{15^{400}}{17} \right] = \text{Rem} \left[\frac{(-2)^{400}}{17} \right]$$

$$= \text{Rem} \left[\frac{16^{100}}{17} \right] = \text{Rem} \left[\frac{(-1)^{100}}{17} \right] = 1$$

$$\therefore 15^{400} = 11k_1 + 1 = 17k_2 + 1 = 7k_3 + 1$$

$$\therefore 15^{400} - 1 = [\text{LCM of } (11, 17, 7)]k_4 = 1309k_4$$

$$\therefore 15^{400} = 1309k_4 + 1$$

$$\therefore \text{Required remainder} = 1 \quad \text{Choice (3)}$$

42. Let the number of fruits with Ramesh or Rahul = y

$$y + m = 4(y - m) \text{ (given)}$$

$$\Rightarrow \frac{y+m}{y-m} = \frac{4}{1} \Rightarrow \frac{y}{m} = \frac{5}{3} \quad \text{--- (1)}$$

$$\text{Similarly } y + n = 2(y - n) \text{ (given)}$$

$$\Rightarrow \frac{y+n}{y-n} = \frac{2}{1} \Rightarrow \frac{y}{n} = \frac{3}{1} \quad \text{--- (2)}$$

$$\therefore \text{From (1) and (2)} \frac{y}{m} \times \frac{x}{y} = \frac{5}{3} \times \frac{1}{3} = \frac{5}{9}$$

Alternative solution:

It is given that after ' m ' mangoes are given to Rahul, Rahul has 4 times the number of mangoes as Ramesh does.

\therefore Total number of mangoes must be a multiple of 5. (\because If Ramesh has x mangoes, Rahul has $4x$ of them)

Similarly, after ' n ' mangoes are given to Ramesh, Ramesh has 2 times the number of mangoes as Rahul.

\therefore Number of mangoes must be a multiple of 3.

Combining the two conditions, the total number of mangoes must be a multiple of 15. It is also, given that Ramesh & Rahul have the same initial number of mangoes.

\therefore Number of mangoes must also be an even number.

\therefore Total number of mangoes must be of the form $30k$. For $k = 1$, number of mangoes is 30.

\therefore If Rahul has 4 times the mangoes Ramesh has, Rahul must have 24 mangoes & Ramesh 6 mangoes.

$\therefore m = 9$ [\because Initially, both had 15 mangoes each]

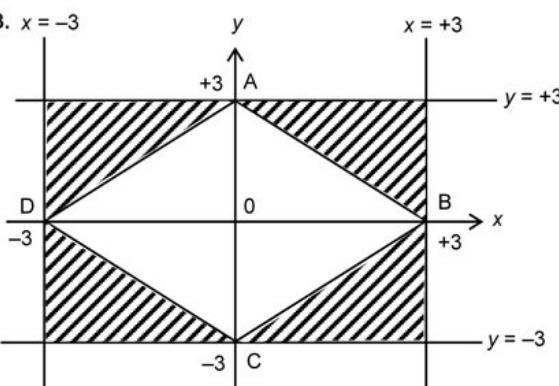
If Ramesh has 2 times the mangoes Rahul has, Ramesh must have 20 mangoes & Ramesh 10 mangoes.

$$\therefore n = 5.$$

$$\therefore n : m = 5 : 9$$

$$\quad \text{Choice (1)}$$

43. $x = -3$



$|x| = 3$ is represented by two parallel vertical lines $x = 3$ & $x = -3$

$|y| = 3$ is represented by two parallel horizontal lines $y = 3$ & $y = -3$

$|x| + |y| = 3$ is represented by the four line segments AB, BC, CD and DA.

To draw $|x| + |y| = 3$, observe that the graph must be symmetric about x & y axes.

\therefore Draw the graph in the 1st quadrant with both $x, y > 0$ and reflect about x & y axes.

Required area is the shaded area = $\frac{1}{2}$ area of the square

$$= \frac{1}{2} \times 36 = 18 \text{ sq.units} \quad \text{Choice (3)}$$

44. The program actually gives the sum of the indices of the prime numbers when the number is factorised into prime factors.

For example if $x = 18 = 2^1 3^2$, the output is $1 + 2 = 3$ as shown in the table below.

Step	x	t	$R = \text{Rem} \frac{x}{t}$	Sum
1	18	2		0
2.1			0	
3.1	9			1
2.2			1	
3.2		3		
2.3			0	
3.3	3			2
2.4			0	
3.4	1			3
2.5			1	
3.5		4		

From among the choices, the sum of the indices in only $1800 = 2^3 \times 3^2 \times 5^2$ is $3 + 2 + 2 = 7$ Choice (3)

45. The numbers can be categorized as

$3k + 1$	$3k + 2$	$3k$
1, 4, 7	2, 5, 8	3, 6

Consider $3k + 1$ and $3k + 2$ form of numbers.

$3k + 1$	$3k + 2$	Number of ways
1	1	${}^3C_1 \times {}^3C_1$
2	2	${}^3C_2 \times {}^3C_2$
3	3	${}^3C_3 \times {}^3C_3$
3	0	${}^3C_3 \times {}^3C_0$
0	3	${}^3C_0 \times {}^3C_3$
0	0	${}^3C_0 \times {}^3C_0$

\therefore Total number of ways in which numbers of the first two categories can be selected.

$$= [{}^3C_1 \times {}^3C_1 + {}^3C_2 \times {}^3C_2 + {}^3C_3 \times {}^3C_3 + {}^3C_3 \times {}^3C_0 + {}^3C_0 \times {}^3C_3]$$

$$+ [{}^3C_0 \times {}^3C_0]. \text{ Each number of form } 3k \text{ has 2 choices. } \therefore \text{The total number of subjects of the required kind}$$

$$= [9 + 9 + 1 + 1 + 1 + 1] \times 2^2 = 22 \times 4 = 88$$

\therefore Excluding the one case when the subset is a null set, we get $88 - 1 = 87$ subsets.
Choice (3)

Solutions for questions 46 and 47:

46. As the concentration of sugar should be 15%.
Possible cases are

Sugar concentration less than 15%	Sugar concentration exactly 15%	Sugar concentration more than 15%
2	0	1
1	1	1
1	0	2

$$\therefore \text{Number of ways} \\ = {}^4C_2 \times {}^1C_0 \times {}^3C_1 + {}^4C_1 \times {}^1C_1 \times {}^3C_1 + {}^4C_1 \times {}^1C_0 \times {}^3C_2 \\ = (6 \times 3) + (4 \times 3) + (4 \times 3) = 18 + 12 + 12 = 42 \\ \text{Choice (1)}$$

47. There are six samples of concentration $\leq 16\%$ (taking any number of which will not give the desired concentration) and exactly two samples of concentration more than 16% (at least one of which must be taken).
Possible cases are

Sugar concentration $\leq 16\%$	Sugar concentration $> 16\%$
3 samples	1 sample
2 samples	2 samples

$$\therefore \text{Number of ways} = {}^6C_3 \times {}^2C_1 + {}^6C_2 \times {}^2C_2 = 55 \\ \text{Choice (4)}$$

Solutions for questions 48 to 51:

48. The indices of the terms in the two GPs are in AP.

$$G_1 : 2^2, 2^{3.5}, 2^5, \dots, 2^{269} \\ G_2 : 2^3, 2^{4.75}, 2^{6.5}, \dots, 2^{269}$$

The two APs are

$$A_1 : 2, 3.5, 5, \dots, 269$$

$$A_2 : 3, 4.75, 6.5, \dots, 269$$

We can get rid of fractions by considering

$$4A_1 : 8, 14, 20, 26, \dots, 1076$$

$$4A_2 : 12, 19, 26, \dots, 1076$$

The common differences are 6 and 7 (LCM = 42) respectively. Therefore the AP of the common terms is

$$A : 26, 68, 110, \dots, 1076$$

$$\text{Number of terms} = \frac{1076 - 26}{42} + 1 = 26 \quad \text{Choice (2)}$$

49. This question can be best solved by taking help from the answer choices.

$$\log_a 120 = \log_a 5 + \log_a 24$$

$$\therefore \text{Coefficient of } \log_a 5 = 1$$

\therefore We look for a combination of x, y, z which gives 1 as the coefficient of $\log_a 5$.

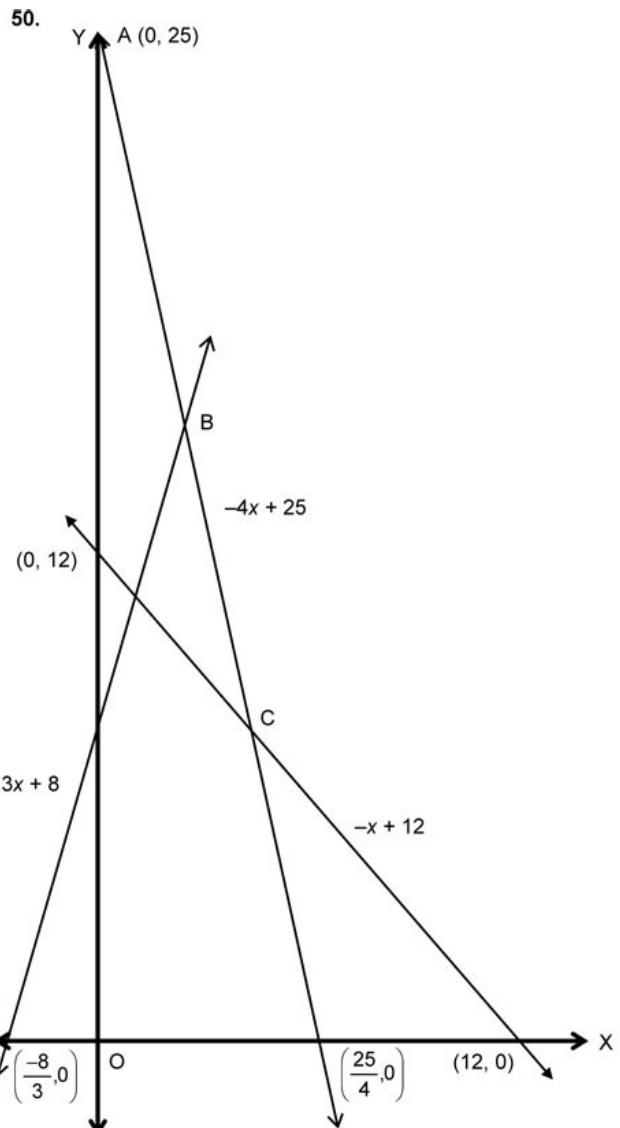
$$\log_a 75 = 2 \log_a 5 + \log_a 3 = y$$

$$\log_a 40 = \log_a 5 + \log_a 8 = z$$

$$\therefore \frac{y+2z}{4} \text{ gives coefficient of } \log_a 5 \text{ as 1.}$$

\therefore Only 1st choice satisfies.

Choice (1)



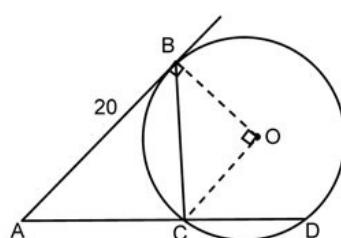
From the graph, we see that the minimum value of $f(x)$ corresponds to B.

Solving for B, $3x + 8 = -4x + 25$

$$\Rightarrow x = \frac{17}{7} \text{ and } f(x) = \frac{51}{7} + \frac{56}{7} = \frac{107}{7}$$

Choice (4)

- 51.



$\angle ABO = 90^\circ$, since AB is tangent.

\Rightarrow AB is parallel to CO

\therefore Area of trapezium ACOB is

$$\frac{1}{2} (OB)(AB + CO) = 48 \text{ (given)}$$

$$\Rightarrow \frac{1}{2} r [20 + r] = 48$$

$$\Rightarrow r[20 + r] = 96$$

$$\Rightarrow r = 4$$

\therefore The radius is 4 cm

Choice (2)

(Choices (3) and (4) can be eliminated as the area of ACOB (i.e., 48 sq.cm.) is definitely greater than r^2 , which implies that $r \neq 7.8$)

Solutions for questions 52 and 53:

Tap A can fill the tank in a minutes.

Shiva thought that B could empty the tank in b minutes.

\therefore He calculates that A, B can fill the tank in $\frac{ab}{b-a}$ minutes i.e.,

$$m = \frac{ab}{b-a}$$

Actually, A and B can fill the tank in only $\frac{ab}{a+b}$ minutes. Shiva returns after n minutes when the fraction of the tank that is full is y , i.e., $y = \frac{n(a+b)}{ab}$.

52. $n = \frac{m}{2} \Rightarrow n = \frac{ab}{2(b-a)}$

$$\therefore y = \frac{ab}{2(b-a)} = \frac{a+b}{ab} = \frac{a+b}{2(b-a)}$$

$$y < 1 \Rightarrow a+b < 2b-2a$$

$$\Rightarrow 3a < b \Rightarrow \frac{b}{a} > 3$$

Among the choices $\frac{b}{a}$ can't be 3 : 1. Choice (1)

53. The fraction of the tank that is full when Shiva returns is 5/9

$$\text{i.e., } \frac{n(a+b)}{ab} = \frac{m}{3} \left(\frac{a+b}{ab} \right)$$

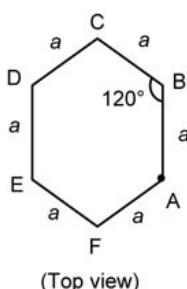
$$= \frac{1}{3} \frac{ab}{b-a} \left(\frac{a+b}{ab} \right) = \frac{a+b}{3(b-a)} = \frac{5}{9}$$

$$\Rightarrow 9a + 9b = 15b - 15a$$

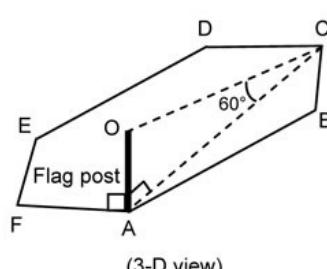
$$\Rightarrow 24a = 6b \Rightarrow \frac{b}{a} = \frac{4}{1}$$

Choice (2)

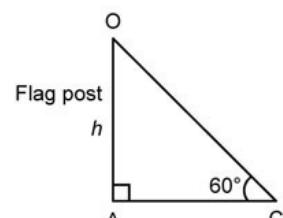
56. Let the side of the hexagon be a and height of flag post (AO) be h .



(Top view)



(3-D view)



(Side view)

In $\triangle ABC$

$$\cos 120^\circ = \frac{a^2 + a^2 - AC^2}{2a^2} = \frac{-1}{2}$$

$$a^2 + a^2 - AC^2 = -a^2$$

$$AC^2 = 3a^2 \Rightarrow AC = \sqrt{3}a$$

$$\text{Given } \tan 60^\circ = \frac{h}{\sqrt{3}a} = \sqrt{3}$$

$$\therefore \frac{h}{a} = \frac{3}{1}$$

Choice (1)

Solutions for questions 54 to 60:

54. Let the roots of $ax^2 + bx + c = 0$ be α and β .

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta}$$

$$= \frac{-b/a}{c/a} = \frac{-b}{c} = \frac{11}{28} \text{ (given)}$$

The product of the roots of $cx^2 + bx + a = 0$ is

$$\frac{a}{c} = \frac{1}{28} \text{ (given)}$$

\therefore The given equation is $bx^2 + ax + c = 0$

$$\text{The sum of its roots is } \frac{-a}{b} = \frac{a}{c} \times \frac{-c}{b} = \frac{1}{28} \times \frac{28}{11} = \frac{1}{11}$$

Alternative solution:

If sum of two reciprocals is $\frac{11}{28}$ the first combination to be

$$\text{tried must be 4 \& 7. Also, } \frac{-b}{a} = 11$$

$$\text{Product of roots in } ax^2 + bx + c = 0 \text{ is } \frac{c}{a} = \frac{1}{8}.$$

$$\therefore 7 \& 7 satisfy. \text{ In } bx^2 + ax + c, \text{ sum of roots} = \frac{-a}{b} = \frac{1}{11}$$

Choice (3)

55. Let the ages (in μs) of A and B at $t = -2\mu s$ be a and b respectively.

$$\therefore a = 3b + 18 \text{ (given)} \quad (1)$$

Let the age of A be thrice of B's age after $x \mu s$

$$\Rightarrow (a+x) = 3(b+x) \quad (2)$$

$$\Rightarrow 18 = 2x \text{ (from (1) and (2))} \Rightarrow x = 9\mu s$$

$$\Rightarrow \text{Required time} = -2\mu s + 9\mu s = 7\mu s$$

Alternative solution:

With each passing microsecond, A ages by $1 \mu s$, while 3 times B's age increases by $3 \mu s$.

\therefore The difference (A's age - 3 B's age) decreases by $2 \mu s$.

At $t = -2 \mu s$, this difference is $18 \mu s$.

\therefore At $t = (-2 + 9) \mu s$, this difference will be $0 \mu s$.

$\therefore t = 7 \mu s$ Choice (2)

57. Let the numbers of senior lecturers and junior lecturers be s and j respectively.

$$\text{Using alligation, } \frac{j}{s} = \frac{250 - 160}{160 - 100} = \frac{3}{2}$$

\therefore 60% of the lecturers were juniors.

Choice (2)

58. $(12)_N = N + 2$

$$(34)_N = 3N + 4$$

- - - - -

$$[(2M - 1)(2M)]_N = (2M - 1)N + 2M$$

$$\therefore X = NM^2 + M(M + 1)$$

$$= (2M + 1)M^2 + M^2 + M = 2M^3 + 2M^2 + M$$

$$\therefore X + M + 2 = 2M^3 + 2M^2 + 2M + 2 = (2222)_M$$

Alternative solution:

Since it is given that $M > 2$, without loss of generality, say

$$M = 3 \Rightarrow N = 7$$

$$\therefore X = (12)_7 + (34)_7 + (56)_7 = 7(1 + 3 + 5) + (2 + 4 + 6) = 75$$

$$\therefore X + M + 2 = 75 + 5 = 80$$

$$1^{\text{st}} \text{ choice is } (2222)_3 = (3^3 + 3^2 + 3 + 1)2 = 80$$

Choice (1)

59. $1^3 + 2^3 + \dots + (2m + 1)^3 = (2m + 1)^2(m + 1)^2$

Two of the cubes were left out. Since we have been asked to find the maximum value of m , for which the 'average' is less than 6750, we assume that 1^3 and $(2m)^3$ have been left out (The sum of the numbers has to be $2m + 1$. We assume that largest possible quantity has been left out).

$$\therefore \text{'Average'} = \frac{(2m+1)^2(m+1)^2 - (8m^3 + 1)}{2m+1}$$

$$= (2m + 1)(m + 1)^2 - (4m^2 - 2m + 1)$$

$$= 2m^3 + 5m^2 + 4m + 1 - 4m^2 + 2m - 1 = 2m^3 + m^2 + 6m = E$$

(say)

We can construct the following table

M	m^2	m^3	$2m^3$	$6m$	E
14	196	2744	5488	84	5768
15	225	3375	6750		6750+

We see that the greatest value of m for which $E < 6750$ is 14.

Choice (4)

60. Numbers satisfying second condition also satisfy the first condition. They are of the form

$$N = 33p + 29 \text{ and } N = 24q + 20$$

$$\Rightarrow N + 4 = k \text{ LCM of } (33, 24)$$

$$\Rightarrow N + 4 = 264k - 4$$

$$\Rightarrow N = 260 \text{ (when } k = 1)$$

$$524 \text{ (when } k = 2)$$

$$788 \text{ (when } k = 3)$$

Only 788 satisfies all the third condition. Choice (3)

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