

### (Key and Solutions for AIMCAT1805)

#### Key

#### SECTION – I

1. 5241	9. 5	17. D	25. C	33. A
2. 4352	10. 3	18. B	26. C	34. B
3. 2413	11. 4	19. B	27. D	35. B
4. 3142	12. 357	20. D	28. D	36. C
5. 5	13. 249	21. C	29. D	37. D
6. 2	14. 168	22. D	30. C	38. A
7. 4	15. 2	23. B	31. 5	39. D
8. 4	16. 5	24. B	32. B	40. B

#### SECTION – II

1. 3	7. D	13. 22.7	19. D	25. A
2. C	8. 588	14. B	20. A	26. B
3. A	9. C	15. 10.9	21. C	27. 7
4. 13	10. B	16. A	22. C	28. A
5. B	11. D	17. D	23. D	29. C
6. 50	12. C	18. C	24. C	30. B

#### SECTION – III

1. D	7. A	13. C	19. A	25. 35280
2. B	8. B	14. 0	20. C	26. C
3. C	9. D	15. C	21. D	27. A
4. -100	10. B	16. B	22. B	28. C
5. 4.8	11. 112	17. B	23. D	29. D
6. 58	12. C	18. C	24. 12	30. 768

#### Solutions

#### SECTION – I

##### Solutions for questions 1 to 4:

1. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that can begin the paragraph. It introduces the background: a (unique) gathering. Sentence 2 follows sentence 5 as it tells us where the gathering took place. "Justus Lipsius building in Brussels, his fellow leaders" in sentence 2 links with "European family" in sentence 5. Sentences 2 and 4 form a mandatory pair. "his fellow leaders commiserated with Britain's prime minister David Cameron over his failure to keep his country in the EU" in sentence 2 links with "Fractious as the marriage with Britain has sometimes been" in sentence 4. Sentence 4 is followed by sentence 1. "there was resigned sorrow and regret at the decision to end it" in sentence 4 links with "captured this feeling" in sentence 1. "I felt as if someone very close to me left our home" in sentence 1 points to "failure to keep his country in the EU" and "end it (the marriage with Britain)" given earlier in sentences 2 and 4 respectively. So, 5241. Sentence 3 is the odd sentence out. It needs a precedent and more substantiation. It is not clear who 'they' in sentence 3 refers to. So sentence 3 can be a part of another para, much later in the flow.  
Ans: (5241)

2. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that can begin the paragraph. It introduces the background: A dictionary is a database. Sentence 3 continues to tell us what a dictionary is and follows sentence 4. The pronoun 'its' in sentence 3 refers to the dictionary. Sentences 3 and 5 form a mandatory pair. "allows the reader to consult it in any way that makes sense" in sentence 3 links with "Look up a single word ..." in sentence 5. Sentence 5 is followed by sentence 2. "look up all the citations by a single author" in sentence 5 is followed by "Or (look up) those which share a root" in sentence 2. So, 4352. Sentence 1 is the odd sentence out "this way at all" in sentence 1 needs a precedent. Sentence 1 can be the introductory sentence of another paragraph. It needs more substantiation.  
Ans: (4352)

3. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that can begin the paragraph. It has some nouns: Hawaiian island of Oahu and humpback whale. So sentence 2 mentions the location "waters off the Hawaiian island of Oahu" and also introduces the topic of discussion: waters are visited each winter by migrating marine mammals. Sentence 2 is followed by sentence 4. "waters are visited each winter" in sentence 2 contrasts "All year round" in sentence 4. The pronoun 'they' in sentence 4 refers to "waters" in sentence

2. Sentences 4 and 1 form a mandatory pair. "vast reefs: corals" in sentence 4 links with "intricate pink structures stand out amid contortions of vegetable-green ones" in sentence 1. Sentences 1 and 3 form a mandatory pair. "Intricate pink structures stand out amid contortions of vegetable-green ones" in sentence 1 links with "these colours" in sentence 3. So, 2413. Sentence 5 is the odd sentence out. "this delicate balance" in sentence 5 needs a precedent. Sentence 5 is negative in tone. It can be a part of another para, much later in the thoughtflow.

Ans: (2413)

4. On a careful reading of the sentences, it can be observed that sentence 3 is the only general sentence that can begin the paragraph. The remaining sentences need a precedent. Sentence 3 introduces the background: .... the society as a whole will still be caught on a runaway treadmill. Sentence 3 is followed by sentence 1. "until we can capture control of the accelerated thrust itself" in sentence 3 links with "Till then, there will be a high velocity of change, of future shock," as given in sentence 1. Sentence 1 is followed by sentence 4. The contrast conjunction 'yet' separates the many factors of future shock mentioned in sentence 1 from the 'critical factor – technological advance' mentioned in sentence 4. "technological advance is clearly a critical node" in sentence 4 contrasts "traced to population growth, urbanization, the shifting proportions of young and old and other factors" in sentence 1. Sentences 4 and 2 form a mandatory pair. "technological advance..... may be the node that activates the entire net" in sentence 4 links with "preventing mass future shock, therefore, involves the conscious regulation of technological advance" given in sentence 2. So 3142. Sentence 5 is the odd sentence out as it does not refer to "future shock" or "technological advance" or any key element that the remaining sentences touch upon. Sentence 5 is a vague and redundant sentence.

Ans: (3142)

#### Solutions for questions 5 to 8:

5. On a reading of the paragraph, one can understand that the paragraph talks about cost and other factors related to American Education – overall, a para presenting a somewhat negative state of things. The highlighted sentence, on the other hand indicates a neutral (and potentially positive) state of affairs.

The highlighted sentence is too specific to be upstream of the given para. So (1) is not the answer.

The highlighted sentence does not belong to blank (2). The highlighted sentence would interfere with the thought flow if placed in blank (2). The sentence preceding blank (2) talks about "other American universities" trying to emulate the Ivy League (Harvard). Also "They erect sumptuous buildings, lure star professors with fat salaries and hire armies of administrators" as mentioned in the sentence following blank 2 points to "other American universities" as given in the sentence preceding blank 2.

The sentences preceding blank 3 talk negatively about American universities ( now the ratio is almost one to one ....). We can say that the sentence preceding blank 3 provides a reason for the sentence following blank 3: No wonder average annual fees at private universities have soared to \$31000 in 2017.... So if the highlighted sentence (which is positive in tone) is placed in blank 3, it would interfere with the thought flow.

The highlighted sentence cannot fit in blank (4) as it does not connect well with the previous sentence. "People who take costly arts degrees may end up poorer" as given in the sentence after blank 4 cannot link with "Digital technology can make college cheaper without making it worse." So choice 4 cannot be the answer.

The highlighted sentence can be best placed in a para succeeding the given para. "People who take costly arts degrees may end up poorer than if they had never been to college." is the last sentence of the para and brings the para to an end. Hence (5) is the location where the highlighted sentence could be inserted. That "digital

technology can make college cheaper without making it worse" is a totally new point of view that runs tangent to the discussion in the given para. But it can be placed later in the thoughtflow, in a new para. Hence (5) is the answer.

Ans: (5)

6. The paragraph begins by discussing the morning routine of a person as he wakes up. A person wakes up a slightly different (not significantly different) person but the dreams and the sleep-time rearrange the patterns inside his head. A person then takes a look in the mirror.

We need to place the highlighted sentence ahead of a sentence which speaks about concerns. The highlighted sentence can be placed only in blank (2). "**comfort** of routine to fit yourself back into total familiarity" in the sentence prior to blank 2 links with "even the **concerns** are **therapeutic**" as given in the highlighted sentence. So, the highlighted sentence forms a bridge between the sentence preceding blank (2) (It takes the comfort of routine to fit yourself back into total familiarity.) and the sentence succeeding blank (2) (Does that tooth feel a little bit hollow, the scalp like a lot of hair is coming out?). "Does that tooth feel ....", "Does the scalp feel like ....", "There's a little twinge in the shoulder ....", "Was the belly a little soft?" etc are all therapeutic concerns.

The highlighted sentence will disrupt the thought flow if it is placed in blank 3. The sentences after blank (2) need to run continuously.

The highlighted sentence will be redundant in blank (4). The general sentence "Even the concerns are therapeutic." cannot be placed after the specific examples, which, in this case, are mentioned before blank 4.

The highlighted sentence would need other specific information along with it to be placed upstream or downstream of the paragraph. Hence (1) and (5) are not the answers.

Ans: (2)

7. On a reading of the paragraph, one can understand that the paragraph talks about some research findings. The highlighted sentence mentions some suspicions of the researchers.

The highlighted sentence is too specific to be upstream of the given para. So (1) is not the answer.

On a careful reading of the paragraph, it can be inferred that the highlighted sentence does not belong to blank (2). The sentence is completely out of place in blank (2), as it interrupts the flow of thought. "meddling with day and night cycles has such a dire effect on the liver remains an enigma" in the sentence before blank (2) needs to be followed immediately by "sheds some light on the matter" as given in the sentence after blank (2). Also the pronoun 'them' given in the highlighted sentence needs a reference. The names of the researchers – Dr Fu and Dr Moore – are mentioned after blank 2.

The highlighted sentence is a misfit in blank (3). The sentence preceding blank (3) has some facts "disrupting the circadian rhythms of mice causes the rodents' livers to overproduce bile which is made by the liver." The highlighted sentence interferes with the thoughtflow if placed in blank (3). "**They also knew that** liver cancer commonly appears in mice engineered to lack certain genes required for the management of day-night cycles." needs to be placed immediately after the sentence "Dr Fu and Dr Moore knew from their previous research that ...." The first six sentences of the paragraph, as given, need to run continuously without any extraneous sentences being placed in locations (2) and (3).

The highlighted sentence can be a part of blank (4). If the highlighted sentence is placed in blank (4), then it continues the thoughtflow very well after the sentences: Dr Fu and Dr Moore knew from their previous research....., They also knew that liver cancer ..... We can say that the knowledge led them to suspect a link between liver cancer

and too much bile acid. " closer look" in the sentence after blank 4 links with "led them to suspect a link" given in the highlighted sentence. Hence 4 is the answer.

Ans: (4)

8. On a cursory reading of the paragraph, one can understand that the paragraph talks about the main players in the grocery market.

The highlighted sentence is a poor example of an introductory statement of the paragraph or even as an upstream statement. The paragraph best begins with the general sentence: In grocery, at least, globalisation has met its match. This sentence introduces the topic of discussion. So (1) and (2) cannot be the blanks where the highlighted sentence can be inserted.

The three sentences preceding blank 3 talk about how some illustrious names in the business have had to retreat from disastrous forays abroad. The examples given are those of Carrefour, Tesco and Walmart. So the highlighted sentence "So how far can they go?" if inserted in blank 3 would need further explanation. But the sentences after blank 3 do not provide any context that helps explain "So how far can they go?". Hence the highlighted sentence will disrupt the thoughtflow if inserted in blank 3.

The sentences after blank 3 and those just preceding blank (4) talk positively about "Aldi and Lidl", two German chains which are now the world's biggest "deep-discount" grocers. The sentence before blank 4 is: As mainstream supermarket groups contract, in Europe especially, the German duo continue to eat up market share. Hence the highlighted sentence can best conclude and complete this paragraph by being a part of blank 4. "So how far can they go?" links with "the German duo continue to eat up market share" and it leaves the reader with an important thought. The answer to this question can then be discussed in the following para. Hence choice 4 is the correct answer.

The highlighted sentence would need other specific information along with it to be placed downstream of the paragraph. Hence (5) is not the answer.

Ans: (4)

#### Solutions for questions 9 to 11:

9. In part (1), 'historical' needs to be replaced by 'historic'.

In part (2), the word 'probably' is misplaced. We need to say: "probably the most moving moment" ....

In part (3), we need the indefinite article 'a' before 'minute'. We need to say: for about a minute.....

Part (4) has an error of subject-verb agreement. The plural noun "sparks" needs a plural verb "are". So we need to say: are what China's president .....

Part (5) is error-free.

Ans: (5)

10. In part 1, "quiet" needs to be replaced by the comparative term "quite".

In part 2, "found" needs to be replaced with "founded". There has to be a comma after the word 'today'. The word 'chairman' needs to be preceded by the definite article 'the'. Part 3 is error-free.

In part 4, the correct usage is "living by their wits" and not "living on their wits".

In part 5, we need to say "could easily belong in a blockbuster" and not "to a blockbuster".

Ans: (3)

11. In part (1), we need the correlative conjunction "as ..... as".

We need to say: .... was as shocked as all his countrymen" Part (2) needs the superlative comparison: ..... most members (and not 'more' members).

Part (3) has an error of subject-verb agreement. The singular noun 'news' needs a singular verb 'affects'. So the plural verb 'affect' is incorrect.

Part (4) is error-free.

Part (5) needs the preposition 'like' in place of the conjunction 'as'.

Ans: (4)

#### Solutions for questions 12 to 14:

12. The first blank needs an adjective to describe the warnings of Bill McKibben. His warnings were depressingly accurate.

Protean refers to the tendency or the ability to change frequently or easily. Avuncular means kind and friendly towards a younger or less experienced person, reassuring, and trustworthy. Prescient means having or showing knowledge of events before they take place. From the question posed (Was his vision of the death of nature similarly **prophetic**, or greatly exaggerated?), we know that the first blank in the para can be filled up by the word 'prescient'. Hence choice 3 fills the first blank.

The second blank can only take the word 'consequences' as the remaining words 'farragoes' and 'inexorability' do not fit in. 'farragoes' means 'confused mixture'. Inexorability means impossible to stop, alter, or resist; inevitable. Choice 5 is the answer for the second blank.

The third blank needs a term to describe Hawaii. Three-quarters of all of America's bird and plant extinctions have occurred within Hawaii, and it now has more endangered species per square mile than any other place in the world. So we can say that Hawaii provides a globally important microcosm (a community, place, or situation regarded as encapsulating in miniature the characteristics of something much larger, a miniature representation of something, esp a unit, group, or place regarded as a copy of a larger one). Choice 7 is the answer for the third blank. Dotage is a deterioration of mental faculties associated with aging. Predilection (a special liking for something; a preference) does not fit the context.

Ans: (357)

13. Slave writers were urged to follow well-defined conventions and also add **their own** endorsements to the slaves' narrations. Authenticating means to show (something) to be true, genuine, or valid. The writers had the opportunity to tell their stories. Choice 2 is the answer for the first blank. Paralogical means relating to a form of reasoning which does not conform to the rules of logic. Factitious means artificially created or developed. Choices 1 and 3 do not fit in.

The second blank can be filled with 'working cautiously'. One does not say 'appraising within the genre'. 'Unencumbered' means not having any burden or impediment. Both choices E and F will make the last sentence of the para grammatically incorrect. The adverbs 'deferentially' and 'sophisticatedly' do not make any sense in the para. Choice 4 is correct for the second blank.

The clues 'speak in their own voices in a quest for selfhood', 'adding their own endorsements' and 'the opportunity to tell their stories constituted something more personal' in the para tell us that the last blank can be filled with the word 'individualize'. The word 'lionize' means to give a lot of public attention and approval to (someone); treat as a celebrity. The word 'whiffle' means make a soft sound, like that of breathing or a gentle wind. Choice 9 is correct for the second blank.

Ans: (249)

14. The first blank needs a synonym of 'continuous'. This word contrasts the description given later: But when readers hold the work of literature in their hands, it has at last cut free and begun a life **independent of the original**. Seamless means smooth and continuous, with no apparent gaps or spaces between one part and the next. 'Seamless' best fills the first blank. Unswerving means not changing or becoming weaker; steady or constant. The blank needs a synonym of continuous and not constant. Homogeneous does not fill the first blank correctly. Hence the answer for the first blank is choice 1.

The second blank in the para is preceded by "independent of the original – independent, that is, of the **simultaneous** internal states". Another word for 'simultaneous' is concurrent. The other words are unsuitable for the second blank. 'unflagging' means tireless; persistent. Collective means 'cooperative'. While these words can be used to describe 'acts', they are a misfit here. Choice 6 fills the second blank.

Language is external and needs metaphor to express the same internal states and acts of imagination. Something that contradicts this is Flaubert's melancholy observation.

We can say 'looming in' the background. Choice 8 is the answer. Choices 7 and 9 are incorrect and do not collocate with "the background ....".  
Ans: (168)

#### Solutions for questions 15 and 16:

15. The paragraph begins by saying: That our universe is approximately described by mathematics .... that it is mathematical means that all of its properties are mathematical. The main idea of the para is given in the last two sentences: All properties of our universe can in principle be understood if we are intelligent and creative enough. It also implies that our reality is vastly larger than we thought, containing a diverse collection of universes obeying all mathematically possible laws of physics. Choice 2 captures the essence of the para.

Choice 1 is not correct because the author is explaining how the mathematical laws of physics can be used to describe the universe. He does not mention the laws of the universe. The second part is besides the point. Physics is a separate science and the para only mentions certain laws of physics that can be mathematically proved.

Choice 3 is out of scope and is incomplete as a summary. The para does not discuss the fact that maths and physics both deal only in numerical properties ..... but it discusses the possibility of mathematical laws being able to describe all the properties of our universe. Choice 3 is not the answer.

The paragraph discusses the possibility (If ....) of mathematical laws being able to describe all the properties of our universe. But choice 4 states this as a fact. Hence choice 4 is not the answer.

Choice 5 brings in a new point of view (If I'm wrong) to complement what has been said earlier (If I'm right). Choice 5 does not capture the essence of the discussion at all. It runs tangent to the given text.

Hence the correct answer is choice 2. Ans: (2)

16. Option 1: Choice 1 refers to excessively interfering into the affairs of other nations, which is not given to be the intention of the founders. Choice 1 does not capture the main points of the para.

Option 2: Choice 2 (religion should be banished from public life) is an extreme measure. This makes choice 2 incorrect, though the second sentence in choice 2 appears to be correct from the last sentence of the para.

Option 3: People defending religious pluralism is a reflection of the liberality propounded by the Founders. But choice 3 is a fallout of what is mentioned in the paragraph. Choice 3 is not mentioned as such. It is also incomplete as a summary.

Option 4: Choice 4 does not go with the liberal ideas as advocated by the Founders of America. It is clear from the fourth sentence of the para that the Founders are open to accepting the fact that human beings are not above errors. So they won't support a discrimination that contradicts the notion.

Option 5: The passage highlights the liberal attitude of American society as envisioned by the Founders. The Founders uphold faith and religion but do not allow it to influence every sphere of the national life. They have tried to maintain a balance between religion and independence, and keep a check on extremism. Choice 5 is an apt summary of the para.  
Ans: (5)

#### Solutions for questions 17 to 22:

##### Number of words and Explanatory notes for RC:

Number of words: 790

17. Option A: Choice A has been mentioned as a fact in the passage. It is not the author's viewpoint. Refer to para 2: These government laboratories provide a bridge between the public and private sectors. Sometimes governments simply copy what private firms are doing. .... Refer to para 3: The units also provide a connection with academia. .... A new report published by Nesta, a British charity devoted to

promoting innovation, and Bloomberg Philanthropies shows how popular these government innovation labs have become. Hence choice A is not the answer.

Option B: Choice B is partly true as evident from the lines in the penultimate para of the passage: What difference can a few reformers in mayor's offices in Boston or New Orleans make? Bureaucracies are designed to kill innovation in the name of predictability. And a change in the political wind can reverse sensible changes. But choice B does not correctly capture the author's viewpoint in the passage. Hence choice B is a generalization that cannot be inferred from the passage. It is not the author's viewpoint.

Option C: Choice C may be true elsewhere but the word 'only' makes it narrow in scope. Hence choice C is not the answer.

Option D: Refer to the eight and ninth para. While showing some let downs of having innovation centres linked up with governments, the author is still happy that there is progress, however small it is. .... Still, something is better than nothing. And the various innovation centres have a growing number of somethings to their name. Reforming government is hard and often boring work. The innovation labs are making it a bit faster and a lot more interesting. Hence choice D is the answer.  
Choice (D)

18. Option A: A narrative passage tells a story, usually from one person's viewpoint. A narrative passage is a sequence of events and follows a story telling format. A narrative passage neither presents any analysis nor evokes any emotions. This passage is not narrative. Hence choice A is not the answer.

Option B: Analysis involves examining aspects of a situation in its pluses and minuses, and making an evaluation at the end of it. In this passage, the author analyzes a situation and weighs it up. The purpose of this passage is to offer an analysis: Still, something is better than nothing. And the various innovation centres have a growing number of somethings to their name. Hence choice B is the answer.

Option C: A descriptive passage makes a discussion vivid with detail. Here the author is not using a descriptive tone. Hence choice C is incorrect.

Option D: The passage is not argumentative. There is no debate i.e. the passage does not present arguments and counterarguments for any idea or concept. The author refrains from delivering an argument; neither does he try to convince people of an argument. Overall the style of the passage is analytical. Hence choice D is incorrect.  
Choice (B)

19. Refer to the penultimate para. Bureaucracies are designed to kill innovation in the name of predictability. And a change in the political wind can reverse sensible changes: New York's new mayor is undoing many of the reforms that Mr Bloomberg implemented. Politicians can also sometimes treat the existence of innovation centres as a justification for carrying on with business as usual everywhere. What is more, **such centres spend a lot of time putting sticking plasters on cancers**. Hence choice B is the most correct answer. The remaining choices do not apply.  
Choice (B)

20. Option D: Britain's Behavioural Insights Team, was the world's first government outfit dedicated to applying the insights of behavioural economics to public policy. Its mission was to point out the "small details" of policy that can have big consequences. It persuaded HM Revenue and Customs, Britain's tax collection agency, to **tweak** the words of a routine letter to say that most people in the recipient's local area had already paid their taxes. As a result, payment rates increased by 5 percentage points. .... Since this para talks about the **application of the insights of group behavioral economics to public policy**, we can infer that choice D is the correct answer.

Option A: Choice A is out of context.

Option C: While choice B may be relevant, it does not refer to the group behavioural aspect that the revised letter had included.

Option C: Choice C merely repeats an idea para from 3 but is not the reason for the question. The mission of Britain's Behavioural Insights Team was to point out the "small details" of policy that can have big consequences.

Choice (D)

21. Option A: The most popular idea is co-creation – getting one's customers to help invent and improve products and services. Hence choice A is true and is not the answer.

Option B: Whatever the connection, these units plug the public sector into a new world. They are full of people talking about "disruption" and "iteration". .... Whatever their location, the study suggests they go about things in similar ways, with a lot of emphasis on harnessing technology. The most popular idea is co-creation – getting one's customers to help invent and improve products and services. .... So choice B is correct and is not the answer.

Option C: The most striking thing about these institutions, however, is their willingness to experiment. **Policymakers** usually alternate between hostility to new ideas and determination to implement a new policy without bothering to try it out first. **Innovation centres tend to be both more daring and happy to test things.** Hence choice C is not true and is the answer.

Option D: Choice D is true from the last para. It is not the answer.

Choice (C)

22. Some of the "jargons" discussed in the passage are terms like "co-creation", "disruption", "harnessing technology" and "iteration".

Options A and B: Refer to the author's viewpoint in para 7: The most striking thing about these institutions, however, is their willingness to experiment. Policymakers usually alternate between hostility to new ideas and determination to implement a new policy without bothering to try it out first. In the quoted statement, the author is actually referring to paragraphs 6 and 7, in both of which he discusses attempts at innovation, and if one is looking at specific cases of innovation which may amount to "**jargon-spouting irrelevancies**", then we would have to include both Choice A (Development of computer games which are designed to teach pre-teenagers to make sensible choices about everything from nutrition to **gang membership**) and Choice B ("Generation sharing" matches elderly people who have a **spare room** with students who need a place to stay and are willing to help out with housework).

Option C: Choice C has been mentioned in para 7 as an example of innovation centres which tend to be more daring and happy to experiment and test new things. Choice C is also a case of innovation that may amount to a "**jargon-spouting irrelevancy**". So choices A, B and C apply. Hence choice D is the answer.

Choice (D)

#### Solutions for questions 23 to 28:

##### Number of words and Explanatory notes for RC:

Number of words: 718

23. Throughout the first paragraph, the author talks about the disastrous consequences of global warming. The last sentence of the first paragraph is "There's actually fairly convincing evidence that climate change is triggering more seismic activity, but there's no need to delve into it."

Option A: Despite the evidence, the scientists haven't concluded that climate change is what triggers seismic activity. This is not the answer.

Option B: The whole passage talks about how, due to global warming, different disasters occurred in different regions of the world. We don't really need to delve into how climate change triggers seismic activity because the effects of global warming are already disastrous. Hence, this is the answer

Option C: It's not the storms that are triggering the seismic activity. Hence, this is not the answer  
Option D: There is no need to delve into it because the repercussions of global warming are already catastrophic and there's no need to discuss earthquakes separately. It's

not because the scientists did not mention earthquakes as a consequence of global warming.  
Choice (B)

24. "Leaving aside the earthquake, every one of these events jibes with what scientists and environmentalists have spent 30 fruitless years telling us to expect from global warming." Option A: The storm in Houston was the greatest rainfall event ever measured in US history and it's not Irma. So this is not true. Hence, this is not the answer

Option B: "Leaving aside the earthquake,...to expect from global warming." From this, we can say that apart from the earthquakes, other events that have happened were warned in advance by the scientists who were referring to the consequences of global warming. This is true. Hence, this is the answer. {Note: 'Leaving aside' does not mean 'except for'. It's more in the nature of 'apart from'. 'Leaving aside' means to not consider something because you want to consider something else instead.)

Option C: Hurricane Harvey holds the record for being the most expensive catastrophe and not Hurricane Irma. So this is not true. Hence, this is not the answer. Option D: Katia did not trigger the strongest earthquake in 100 years. It crashed into the region where that earthquake occurred. This is not true. Hence, this is not the answer.

Choice (B)

25. In the second paragraph of the passage, the author talks about how the scientists' warning regarding global warming didn't have a significant impact just like how health warnings don't really have any impact.

Option A: Nowhere in the passage is the author talking about how people have overcome various odds and no relation can be established between health warning and global warming from this statement. Hence, this is not the answer.

Option B: Climate change affects our very existence and not just our health. Besides, this doesn't talk about the relationship between health warnings and global warming. Hence, this is not the answer.

Option C: People do not usually pay heed to the health warnings until it's too late. Just like they did not pay heed to the scientists' warning regarding global warming. Even though people know about it, they don't take any action until they're really in trouble. This is what the author is mainly talking about in the second paragraph of the passage. Hence, this is the answer.

Option D: We are past the stage where we can prevent global warming. We are in the stage where, if we don't do anything, we will end up dying. The author says that if we can do something about it, we can manage to save ourselves. He doesn't say that we cannot do anything about global warming. Hence this is not the answer.

Choice (C)

26. The passage is concerned about the issue of Global Warming and it talks about the impending threat.

Option A: Although the passage talks about global warming, it does not explain different aspects of it. The emphasis is more on the need to act quickly. Hence, this is not the answer.

Option B: The author isn't trying to criticize different human activities that led to global warming. He's emphasizing the importance of the issue. Hence, this is not the answer.

Option C: The passage alludes to the recent catastrophes to raise the issue of global warming and it mainly emphasizes on the need to act sooner because we do not have enough time left. Hence, this is the answer.

Option D: Although, a change in the climate in the right direction is the desired result, the passage is more about on the importance of acting quickly and not on bringing the change part. Hence, this is not the answer.

Choice (C)

27. The third paragraph of the passage talks about the rising temperature of the earth.

Option A: The author says, "...with the momentum built into the system, we're going to....considerably worse but maybe

it will be expensively endurable." This is a consequence of the rising temperature of the earth. Hence, this is not the answer.

Option B: The author says, "That is to say, we're going to build a planet so hot that we can't have civilizations," which implies that civilizations will cease to exist if the temperature of the earth keeps increasing. Hence, this is not the answer.

Option C: The author says that if the temperature of the earth will increase by 2°C, it may be considerably worse but still endurable, although expensive. So this is not the answer.

Option D: Nothing has been mentioned about how the rising temperatures will affect the prices of solar panels and windmills. It's only stated that their prices keep plummeting. Hence, this cannot be considered to be a consequence of the rising temperature of the earth. Hence, this is the answer.  
Choice (D)

28. The author says that global warming is the first crisis that comes with a limit – solve it soon or don't solve it. He implies that we are running out of time.

Option A: We might be able to tackle this issue but if we're late, it'd be pointless because the damage done by then will be irreversible and the earth may become entirely unendurable. So winning slowly would be pointless. Hence, this is not the answer.

Option B: The author is clearly stating that we are running out of time and if there's anything that we can do about it, now's the time to do it. Winning the war against global warming, thus, is not more important than how sooner it's done. Hence, this is not the answer.

Option C: The author has nowhere mentioned that shifting from fossil fuels to other alternatives is a slow process. Even if it were a slow process, we cannot afford to lose time. Therefore, this is not the answer.

Option D: The author says that we are running out of time and if there's anything that we can do about it, now's the time to do it. If we are to win, we have to win soon enough to matter. Hence, this is the answer.

Choice (D)

#### Solutions for questions 29 to 34:

##### Number of words and Explanatory notes for RC:

Number of words: 781

29. Refer to the last sentence of the passage and to the last para.

Option A: Good question, even without a question mark. The author does not imply that lack of punctuation renders it meaningless. It is the author who terms the question "I feel that if all the information is there why be concerned with general to specific and upside down triangles" a good question. Choice A is not the answer.

Option B: Good question, even without a question mark. "I feel that if all the information is there why be concerned with general to specific and upside down triangles", writes one freshman. Good question, even without a question mark. The author does not imply that it could have become a perfect question with a question mark.

Option C: Teachers should permit the greatest possible freedom in students' personal writing, with these understandings "that society at large will not accept ideas written in this form, that the speech and writing must be clear and comprehensible; that the student should develop his awareness of the uses of language as a result of his own writing." Students ought to be allowed to find their own voice without being buried underneath a melancholy heap of rhetorics, style-sheets, and how-to-write manifestos. This does not mean that rules of punctuation can be dispensed with. So choice C is not the answer.

Option D: The author wants to convey that the question asked is a reasonable one though it does not have a question mark. So the absence of a question mark does not belittle its merit. Choice D is the correct answer.

Choice (D)

30. Refer to para 2 where the example of the review of the Incredible Melting Man is cited.

Option A: The errors are of a serious nature. ... In the normal course of events, this student can expect to watch his prose disintegrate into a red porridge of corrections about tone, diction, punctuation, and the distinction between who's and whose, you're and your. Hence choice A is not correct.

Option B: This student can expect to watch his prose disintegrate into a red porridge of corrections about tone, diction, punctuation, and the distinction between who's and whose, you're and your. From repeated doses of correction he certainly will not learn to write. ... We cannot generalize and say that all students' English has degenerated. So choice B is not the answer.

Option C: Refer to the third and sixth paras. .... Yet none of the errors committed in this example or the earlier Melting man critique, is fatal to comprehension. ... "that society at large will not accept ideas written in this form, that the speech and writing must be clear and comprehensible. .... The review under question contains obvious mistakes. Still it does not make it incomprehensible. However, the mistakes are likely to be taken seriously by the teachers. The author then states a very important point in para 3. Is the role of the English teacher to exact mechanical adherence to an ..... to comprehend his own linguistic conventions? The answer, I think, is that the teacher must in justice do both. This makes choice C the correct answer.

Option D: Choice D is the idea delivered in the last para, not as a progression from the 2 examples presented, one of which is the example of the review of the Incredible Melting Man. The 2 examples demonstrate the idea that though the statements could be frowned upon from the language perspective, the teacher should enable a student to commit his best thought and vital interest to words, .... develop the consciousness of language to comprehend his own linguistic conventions. Choice D is a progression from that idea.

Choice (C)

31. Statement 1: What the educational system needs is not a change of curriculum but a change of attitude. Students ought to be allowed to find their own voice without being buried underneath a melancholy heap of rhetorics, style-sheets, and how-to-write manifestos. Hence statement 1 is true and is not the answer.

Statement 2: Formal English should be taught from an early age in much the same way Latin used to be taught. Students should not be made to feel inadequate because the language of their daily lives and feelings does not correspond with the formal language of our society, but they should be required to learn the rules and uses of this formal language for their own economic good. Hence statement 2 is correct and is not the answer.

Statement 3: Students should not be made to feel inadequate because the language of their daily lives and feelings does not correspond with the formal language of our society, but they should be required to learn the rules and uses of this formal language for their own economic good. Hence statement 3 is correct and is not the answer.

Statement 4: Standard English should be treated as a second language, not as the correct form of the language the student already speaks and writes. Students should not be made to feel inadequate because the language of their daily lives and feelings does not correspond with the formal language of our society, but they should be required to learn the rules and uses of this formal language for their own economic good. Hence statement 4 is correct and is not the answer.

Statement 5: The author has not suggested that we should discourage students from speaking vernacular English. He only says that standard English should be treated as a second language, not as the correct form of the language the student already speaks and writes. Hence statement 5 is true and is not the answer.

Ans: (5)

32. Option A: The first sentence ends with the view: Students who come to the classroom speaking and writing a variety

of dialects, jargons, and grammars are understandably repelled when informed that their native habits of language are wrong and unbeautiful. There is no process of alienation discussed here. A student is repelled and not alienated. Hence choice A is not the correct location where the quoted sentence in the question can be placed.

Option B: The second para has the following ending lines. "From repeated doses of correction he certainly will not learn to write. Instead he will lose all confidence in himself as a user of English. He will simply stop committing his best thought and vital interest to words, words framed; that is, in the approved fashion." This refers to an average age college freshman. We can infer that the quoted sentence can best fit at the end of para 2 as it connects well with the penultimate sentence of para 2 and extends the thoughtflow. The quoted sentence in the question also completes the second para very well.

Option C: The penultimate sentence of para 4 is: With the false logic, they wrongly reject the language they need to learn. The last sentence of para 4 is: We need an honest rationale for teaching standard English. These two sentences need to run continuously. The pronoun 'they' in the penultimate sentence of para 4 cannot refer to the "average age college freshman". Hence choice C is not the answer.

Option D: Para 5 has the following sentence at the end: The goal of teaching formal English as a second language should be to provide all citizens with the ability to read and write all those public documents by which society organises itself. The quoted sentence in the question will be redundant if placed after this sentence. It will interrupt with the thoughtflow. It also cannot conclude the said para. Hence choice D is not the answer. Choice (B)

33. "I avoid English classes as though it were some contagious disease, this is probably do in part to my fear of failure", writes a freshman. "Lack of agreement, comma splice, spelling error", comes the professorial reply to this intelligent self-diagnosis.

Option A: In para 3, it is given: "I avoid English classes as though it were some contagious disease, this is probably do in part to my fear of failure", writes a freshman. "Lack of agreement, comma splice, spelling error", comes the professorial reply to **this intelligent self-diagnosis**. The level of intelligence in this quotation is respectable. This makes choice A the correct answer.

Option B: Choice B is besides the point. Though the reason for the student to avoid English classes is mentioned, choice B refrains from providing us with the author's view. Hence choice B is not the answer.

Option C: Yet none of the errors committed in this example or the earlier Melting man critique, is fatal to comprehension, and the level of intelligence in both quotations is respectable. So choice A is better than choice C. Choice C is evident from the lines given later on but it is not the answer to the question. .... Is the role of the English teacher to **exact mechanical adherence** to an established set of linguistic standards or to **develop the consciousness of language** necessary for the student to comprehend his own linguistic conventions? The answer, I think, is that the teacher must in justice do both. So choice C is not specific to the question.

Option D: There is no meaning alteration in the sentence here. Choice D is not the answer. Choice (A)

34. Refer to the first para.

Option A: What the educational system needs is not a change of curriculum but a change of attitude. The author does not view the standard and grammatical use of English language as an unnecessary obsession. Students who want to get ahead in American civilization must continue to learn standard English.... Hence choice A is not the answer. Option B: Students who want to get ahead in American civilization must continue to learn standard English for its social utility and not, as its champions would have them believe, its moral necessity. In the fourth para, the author says: Standard English should be taught as a practical tool of social advantage, never as a moral or aesthetic norm.

Hence choice B is true and is the answer.

Option C: Choice C sounds too positive and is not the answer.

Option D: Should they learn to read and write without rules? Not if they hope to succeed in the American economy. The norms of correct usage may be false, pretentious and outdated, but they are standards of literate behaviour demanded in government, business and the professions. So choice D is not the author's viewpoint.

Choice (B)

#### Solutions for questions 35 to 40:

##### Number of words and Explanatory notes for RC:

Number of words: 909

35. Option A: The last para begins with: But the IMF's reasoning was even more flawed. The para also goes on to tell us Ethiopia's logic (a built-in flexibility). The penultimate sentence of the para is: What couldn't be understood is why the IMF couldn't see the logic of their position? So choice A would be redundant if placed after the penultimate sentence of the para. Choice A which refers to the action point of IMF would need to come prior to the penultimate sentence or reference. Choice A is not the answer.

Option B: Ethiopia's government officials understood what was at issue, they understood the concern about what might happen if either tax revenues or foreign assistance should fall, and they had designed policies to deal with these contingencies (eg. there is a built-in flexibility; if the country does not receive money to build an additional school, it simply does not build the school.) So choice B can be the last sentence of the last para as it is a consequence of the IMF not seeing the logic of Ethiopia's position. Hence choice B is the correct answer.

Option C: Choice C sounds like the introductory sentence of another para. It talks positively of the IMF whereas the last para has a negative tone wrt the IMF (What couldn't be understood is why the IMF couldn't see the logic of their position?). Hence choice C cannot complete the last sentence of the last para of the passage.

Option D: Choice D refers to a lack of detailed knowledge. It is out of scope of the given topic. It's not knowledge the IMF lacks. The IMF lacks a realistic outlook.

Choice (B)

36. If the macro-economic indicators – inflation and growth – are solid, as they were in Ethiopia, surely the underlying macro-economic framework must be good. The World Bank also had direct evidence of the competence of the Ethiopian government and its commitment to the poor. Ethiopia had formulated a rural development strategy, focussing its attention on the poor, and especially the 85 percent of the population living in the rural sector. It had dramatically cut back on military expenditures – remarkable for a government which had come to power through military means – because it knew that funds spent on weapons were funds that could not be spent on fighting poverty. Hence choice C is the answer. The remaining choices do not apply.

Option A: Competence of the government is not a sufficient reason for IMF to support Ethiopia's macro-economic framework. Hence choice A is not the answer.

Option B: The passage does not say that Ethiopia's micro-economic condition predicted better macro-economic future. Hence choice B is incorrect.

Option D: Just because Ethiopia received aid from European countries, its macro-economic framework need not be supported by the IMF. So choice D is not true.

Choice (C)

37. The IMF had suspended its program with Ethiopia, in spite of the good macro-economic performance.

Statement (a): A government's budget is in balance so long as its revenue sources equal its expenditures. The IMF worried that if this (foreign) aid dried up, Ethiopia's budgetary position could be judged solid only if expenditures were limited to the taxes it collected. Hence

statement (a) is true and is the answer.

Statement (b): Ethiopia, like many developing countries, derived much of its revenue from foreign assistance. If Sweden say, gives money to Ethiopia to build schools, this logic dictates that Ethiopia should instead put the money into its reserves. Statement b is true and is the answer.

Statement (c): The IMF's view on the amount of donor-aid available, or the number of donors, has not been discussed. So, this is not one of the reasons why IMF aid to Ethiopia was denied.

So a and b are correct. Hence choice D is the answer.  
Choice (D)

38. Option A: Refer to para 5. Choice A is correct. When the aid money ran out, there was no money to maintain these facilities. The donors had recognized this problem and built it into their assistance programs in Ethiopia and elsewhere. But what the IMF alleged in the case of Ethiopia went beyond **that concern**. So "that concern" refers to the ability of Ethiopia to ensure that donated facilities would be kept effective.

Option B & C: Choices B and C sound positive and do not refer to "that concern".

Option D: Statistics, when checked, confirmed that international assistance was more stable than tax revenues. Using the IMF reasoning about stable sources of revenue, Ethiopia, and other developing countries, should have counted foreign aid but not included tax revenues in their budgets. And if neither taxes nor foreign assistance were to be included in the revenue side of budgets, every country would be considered to be in bad shape. So choice D is negated and is not the answer.  
Choice (A)

39. Option A: Choice A is the general view of para 2. Surely, this was precisely the kind of government to which the international community should have been giving assistance? But the IMF had suspended its program with Ethiopia, in spite of the good macro-economic performance, saying it was worried about Ethiopia's budgetary position. So choice A is true but it is not the answer.

Option B: Choice B is expressed in the last part of para 2, especially through the rhetorical question. Surely, this was precisely the kind of government to which the international community should have been giving assistance? But the IMF had suspended its program with Ethiopia, in spite of the good macro-economic performance, saying it was worried about Ethiopia's budgetary position. Also refer to the viewpoint in the last para: What couldn't be understood is why the IMF couldn't see the logic of their position?  
Choice B is correct but it is not the answer.

Option C: Choice C is expressed in para 1. It is supposed to review each recipient's macro economic situation and make sure that the country is living within its means. If it is not, there is inevitably trouble down the road. In the short run, a country can live beyond its means by borrowing but eventually a day of reckoning comes, and there is a crisis.  
..... **If a country does not come up to certain minimum standards, the IMF suspends assistance; and typically, when it does, so do other donors.** Choice C is correct.

Option D: Choice D is not the view expressed through the passage. It is negated by para 5. The IMF view was not rooted in a long-held concern about project sustainability  
..... Choice D is the correct answer.  
Choice (D)

40. Inflation is the means and soundness of the economy is the end. By assuming that control of inflation is synonymous with the strength of the economy, the IMF penalises countries which actually have a sound economy, fulfill developmental obligations and hence deserve assistance. Choice B reflects this.

Option A: A country like Argentina can get an "A" grade even if it has double-digit unemployment for years, so long as its budget seems in balance and its inflation seems in control! Choice A might provide an example of how the IMF confuses means with ends. But choice A does not answer the question.

Option C: Choice C is wrong because the IMF has drawn an inverse relationship between inflation and economic health, not a direct one.

Option D: A country can have low inflation but no growth and high unemployment. Choice D is not specific to the question.  
Choice (B)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	33
Easy	25, 27, 28, 29, 31, 34
Medium	17, 21, 23, 24, 26, 36, 37, 38
Difficult	1, 5, 6, 7, 8, 9, 11, 12, 13, 18, 19, 20, 22, 30, 32, 35, 39, 40
Very Difficult	2, 3, 4, 10, 14, 15, 16

## SECTION – II

### Solutions for questions 1 to 5:

B has 3 blue cards. The only person who can give 3 blue cards to B is D. Similarly, the only person who can give the 4 red cards to B is A. The only person who could have given the Yellow card to B is C.

Similarly, C received 2 Blue cards from A and 4 Yellow cards from D.

Let the  $p, q, r$  and  $s$  represent the blank cells as shown below:

Person	Blue	Red	Yellow
A	$p$	$q$	3
B	3	4	1
C	2	0	4
D	$r$	2	$s$

A received  $p$  blue cards from C,  $q$  red cards from D and 3 Yellow cards from B.

D received  $r$  Blue cards from B, 2 Red cards from C and  $s$  Yellow cards from A.

Since A was the first person to play, the number of cards that he passed will be one more than the number of cards he received. That is, except for the first card that he passed, for each card that A received, he passed exactly one card to someone else. Similarly, since D was the last person to have received a card, the number of cards that he passed will be one less than the number of cards he received. This is because except for the last card that he received, for each card that D received, he passed exactly one card to someone else.

For B and C, the number of cards that they passed will be the same as the number of cards that they received.

A passed 4 red cards (to B), 2 Blue cards (to C) and  $s$  Yellow cards (to D).

A received  $p$  blue cards,  $q$  red cards and 3 yellow cards.

Hence,  $4 + 2 + s = p + q + 3 + 1 \Rightarrow p + q - s = 2$

D passed 3 blue cards (to B), 4 yellow cards (to C), and  $q$  red cards (to A).

D received  $r$  blue cards, 2 red cards and  $s$  yellow cards.

Hence,  $3 + 4 + q + 1 = s + r + 2 \Rightarrow s + r - q = 6$

Since the number of cards that B passed and B received are equal,  $3 + 4 + 1 = 3 + r \Rightarrow r = 5$

Since the number of cards that C passed and received are equal,  $2 + 4 = 1 + p + 2 \Rightarrow p = 3$

Also, there are a total of 30 cards, hence,  $p + q + r + s = 11$

Hence,  $s + q = 3$  and  $s - q = 1$ . Hence,  $s = 2$  and  $q = 1$ .

The following table provides the number of cards with each person:

Person	Blue	Red	Yellow
A	3	1	3
B	3	4	1
C	2	0	4
D	5	2	2

1. A had 3 Blue cards at the end of the game.

Ans: (3)

2. Since D has 5 Blue cards, B passed a card to D five times.  
Choice (C)
3. D has the maximum number of cards at the end of the game.  
Choice (A)
4. There were  $3 + 3 + 2 + 5 = 13$  blue cards in the pile.  
Ans: (13)
5. Since A has 1 Red card, D passed to A exactly once.  
Choice (B)

**Solutions for questions 6 to 10:**

After the first redistribution, there will be two plots. The elder child will get the plot to the left and the younger one will get the plot to the right.

Among their children, the two children of the elder one will be older than both the children of the younger one.

After the second redistribution, there will be 4 square plots. If the children of this generation are ranked according to their age from 1 to 4 (with 1 being the eldest), then the four children will be allotted the plots as shown in the figure below:

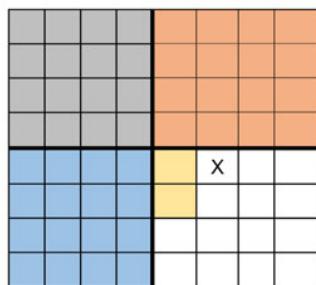
1	3
2	4

Similarly, after the fourth redistribution, the plots will be allotted to the 16 children in the following manner (1 to 16 represent the ranks of their ages):

1	3	9	11
2	4	10	12
5	7	13	15
6	8	14	16

We can divide the entire land into four quadrants and see that the eldest one-fourth are allotted the plots in the top left quadrant; the next one fourth are allotted the plots in the bottom left quadrant; the next one fourth are allotted the plots in the top right quadrant and the last one fourth are allotted the plots in the bottom right quadrant.

6.



After the sixth redistribution, there will be 64 plots.

Hence, the plot (5, 3) will be in the bottom right quadrant (represented by X in the given figure). All the persons with plots in the top left (shaded grey), bottom left (shaded blue) and top right (shaded orange) quadrant will be older than

this person. Also, the two persons with plots in the same quadrant as X (shaded in yellow) will also be older than him. Hence, there will be  $16 + 16 + 16 + 2 = 50$  persons older than him.

In the bottom right quadrant, (5, 3) represents the oldest person of his generation. Hence, there will be 50 persons older than him.

Ans: (50)

7. After the eighth redistribution, there will be 256 plots. We need to find the location of the plot of the 100<sup>th</sup> eldest person. For visualizing, we can divide each of the above 16 plots (in the 4x4 square provided above) into 16 plots each. Hence, the first 64 will be allotted plots from the top left quadrant. The next 64 will be allotted the plots which from the bottom left quadrant. Of these 64, 32 will be allotted plots from the left part of the bottom left quadrant. This will account for the first 96 persons.

The 100<sup>th</sup> person will have his plot in the square represented by 7 in the above figure. If we divide that square into 16 parts, we can take the above diagram (with 16 parts) to represent the plot that we have considered. The plot of the 100<sup>th</sup> person will be in the location represented by 4 (in the plot represented by 7).

Hence, there will be 5 plots to the left of the plot of the 100<sup>th</sup> person and there will be 6 plots to the bottom. Therefore, the plot (5, 6) represents the plot of the person.

Choice (D)

8. After the tenth redistribution, there will be 1024 plots. Let us refer to the person who owns the plot (18, 21) as X. (18, 21) falls in the third quadrant. Hence, all the persons who own the plots in the two quadrants to the left of the land will be older than X. Therefore, all these 512 persons are older than X.

If we divide the 256 plots in the third quadrant into four more quadrants, (18, 21) translates into (2, 5). Hence, (2, 5) falls into the bottom left quadrant in this 256 plots. Hence, there will be 64 persons older than him. In this 64 squares, (2, 5) when translated to this plot, remains the same. (2, 5) falls in the top left quadrant (with 16 squares). In these 16 squares, (2, 5) translates to (2, 1). This falls in the bottom right corner and falls in position 13 represented in the diagram above. Hence, there will be 12 more persons older than him.

The total number of persons older than him =  $512 + 64 + 12$   
Ans: (588)

9. After the 7<sup>th</sup> redistribution, there will be 128 plots. The eldest 64 will have plots to the left and the youngest 64 will have plots to the right.
- Since we are interested in the 77<sup>th</sup> oldest person, he will have a plot on the right side. Also, he will have a plot on the top right quadrant. If we divide the 32 plots in the top right quadrant into four more quadrants, he will have a plot in the bottom left quadrant of these 32 plots. Among the eight plots in that quadrant, his plot will be in the position as shown in the figure below:

73	74	77	78
75	76	79	80

Hence, there will be  $8 + 2 = 10$  plots to the left of this plot. There will be 5 plots below this plot. Therefore, the plot (10, 5) belongs to the 77<sup>th</sup> oldest person.

Choice (C)

10. The number of persons younger than the person who owns the plot at the top right corner, say person X, will be the persons who own a plot in the same quadrant as X and are younger than X plus the number of persons who own a plot

in the bottom right quadrant, which will be  $\frac{2^n}{4} = 2^{n-2}$ .

The top right quadrant can again be divided into four quadrants, and applying the same principle as above. In

this quadrant, we will find another  $\frac{2^{n-2}}{4} = 2^{n-4}$  persons younger than X.

Proceeding in this manner, the total number of persons younger than X will be

$2^{n-2} + 2^{n-4} + 2^{n-6} + \dots$  upto  $2^0$  or  $2^1$  (depending on whether n is even or odd)

For  $n = 6$ , we get  $2^4 + 2^2 + 2^0 = 21$  persons younger than him.

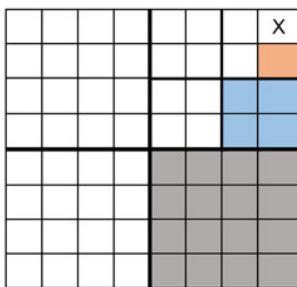
Similarly, for  $n = 7, 8, 9, \dots$  we get the number of persons younger than him as 42, 85, 170... respectively.

Hence, the minimum value of n to have at least 50 persons younger than him is  $n = 8$  (corresponding to 85 persons younger than him), i.e., after eight redistributions.

#### Alternative Solution:

The solution that follows is a direct numerical approach, without using the general expression arrived in the earlier solution.

The number of persons younger than the person who owns the plot at the top right corner, say person X, will be the persons who own a plot in the same quadrant as X and are younger than X plus the number of persons who own a plot in the bottom right quadrant.



We can start with 64 persons.

If there are 64 persons, the number of persons who own a plot in the same quadrant as X and are younger than X = 1 + 4 = 5 (coloured blue and orange in the figure given)

Number of persons who own a plot in the bottom right quadrant = 16 (coloured grey in the given figure)

Total number of persons younger than X = 16 + 5 = 21

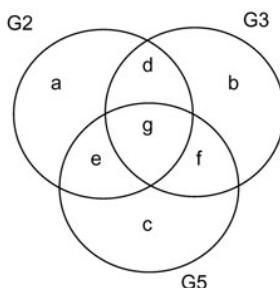
If there are 128 persons, number of persons younger than him = 32 + 2 + 8 = 42

If there are 256 persons, number of persons younger than him = 64 + 16 + 5 = 85

Hence, when there are 256 persons, there will be 50 persons older than him. Therefore, the minimum number of redistributions = 8  
Choice (B)

#### Solutions for questions 11 to 15:

Let the adjacent Venn diagram represent the number of students in the three groups.



From (i),  $a = 2(g + f) \dots (1)$

From (ii),  $g = 4$

From (iii),  $b + d + g + f = c + f + g + e \dots (2)$

$\Rightarrow b + d = c + e \dots (2)$

From (iv),  $d + g = 4 + e + g \dots (3)$

$\Rightarrow d = 4 + e \dots (3)$

From (v),  $e = 4 + a$  and  $e = b - 8$

$\Rightarrow b = a + 12$

From (2) and (3),  $b + 4 = c$ . Therefore,  $c = a + 16$

From (3),  $d = a + 8$

Since total number of students is 150,  $a + b + c + d + e + f + g = 150$

$\Rightarrow a + a + 12 + a + 16 + a + 8 + a + 4 + a/2 = 150$

$\Rightarrow a = 20; b = 32; c = 36; d = 28; e = 24; f = 6; g = 4$

Also, a represents the students who were offered salaries (in Rs. lakhs) of 2, 4, 8, 14, 16, 22, 26 or 28.

b represents the students who were offered salaries of 3, 9, 21 or 27.

c represents the students who were offered salaries of 5 or 25.

d represents the students who were offered salaries of 6, 12, 18 or 24.

e represents the students who were offered salaries of 10 or 20.

f represents the students who were offered salaries of 15.

g represents the students who were offered salaries of 30.

$$11. b + d = 32 + 28 = 60 \quad \text{Choice (D)}$$

$$12. 6 \text{ students (represented by } f\text{) were offered a salary of Rs. 15 lakhs.} \quad \text{Choice (C)}$$

$$13. \text{Students represented by } f, g, e \text{ and } c \text{ cannot take values of 5 or 10.}$$

Hence, 36 students (c) were offered a salary of Rs. 25 lakhs.

24 students (e) were offered a salary of Rs. 20 lakhs.

6 students (f) were offered a salary of Rs. 15 lakhs.

4 students (g) were offered a salary of Rs. 30 lakhs.

Average salary =

$$\frac{36 \times 25 + 24 \times 20 + 6 \times 15 + 4 \times 30}{70} = 22.7 \quad \text{Ans: (22.7)}$$

$$14. \text{Except for the students represented by } e, f \text{ and } g, \text{ all the others could have been offered a salary of less than Rs. 10 lakhs.}$$

Required number of students =  $150 - 34 = 116$ .

Choice (B)

$$15. \text{Since none of them were offered a salary between Rs. 16 lakh and Rs. 26 lakh, } c \text{ can represent only those students who were offered a salary of Rs. 5 lakh. Hence, the number of students who were offered a salary of Rs. 5 lakh = 36. From the given information, the number of students who were offered a salary of Rs. 6 lakhs = 18.}$$

Also, d cannot represent the students who were offered a salary of Rs. 18 lakh or Rs. 24 lakh.

Hence, the number of students who were offered a salary of Rs. 12 lakh =  $28 - 18 = 10$

Further, e represents the students who were offered Rs. 10 lakh.

Average salary of all the persons who belong to more than one group

$$= \frac{6 \times 18 + 12 \times 10 + 24 \times 10 + 6 \times 15 + 4 \times 30}{62} = 10.935$$

Ans: (10.9)

#### Solutions for questions 16 to 20:

From (vi), the person sitting in the 2<sup>nd</sup> position and the person sitting in the 1<sup>st</sup> position marked the answer to Q3 as option B. From (i), Hugh cannot be in the 1<sup>st</sup> or 2<sup>nd</sup> positions because he did not mark the answer to Q3 as option B.

According to (iii), Bob is sitting immediately in front of Daniel.

From (vi), Daniel is not in the second position. From (i), Daniel was not in the last position. Hence, Bob and Daniel can be 2<sup>nd</sup> and 3<sup>rd</sup> OR 3<sup>rd</sup> and 4<sup>th</sup>.

However, if Bob and Daniel are 3<sup>rd</sup> and 4<sup>th</sup>, Hugh cannot be in 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> position. From (i), Hugh cannot be in the last position as well. Hence, this case is not possible.

Therefore, Bob and Daniel are 2<sup>nd</sup> and 3<sup>rd</sup>. Hugh cannot be 1<sup>st</sup> or 5<sup>th</sup>. Hence, Hugh has to be 4<sup>th</sup>.

Bob would have marked the answer to Q3 as option B. From (v), Daniel would have marked the answer to Q2 as option C. From (iv), since Bob copied the answer to Q3, none of the others could have copied the answer to the same question. Since Daniel did not copy the answer to Q3 from Bob, his answer for Q3 must be option A/C. From (v), Daniel did not copy the answer to Q2. Hence, Bob would have marked option A/B for Q2. From (iii), Bob would have marked option C for Q1 and Q4. Since each student marked each option for at least one question (from iv), Bob must have marked the answer as option A for Q2. From (ii), two students marked the answer as option B for Q1. These two students are not at extreme ends. Since Bob (in 2<sup>nd</sup> position) marked the answer as option C for Q1, Daniel and Hugh (in 4<sup>th</sup> position) would have marked the answer to Q1 as option B.

From (i), Gary marked the answer to Q1 as option C. If Gary is in 1<sup>st</sup> position, his answer will be the same as Bob's answer for this question which is not possible (since Bob has copied Q3 from the person in the 1<sup>st</sup> position). Hence, Gary cannot be 1<sup>st</sup> and he will be 5<sup>th</sup>. The person in the 1<sup>st</sup> position will be Carl.

Carl must have marked the answer to Q1 as option A (he cannot mark option B since only two people marked that option for Q1; he cannot mark the answer as option C since Bob marked it). Carl can mark the answer as option C only for Q2. For Q4, he could have marked A/B.

Daniel did not copy Q2 from Bob. Hence, he must have copied Q4. Therefore, Daniel will have marked the answer to Q4 as option C. From (iv), Daniel must mark option A as the answer for Q3 (since he did not mark option A for any other question).

Since Hugh, Bob and Daniel copied Q1, Q3 and Q4 respectively, Gary must have copied Q2. From (i), Gary marked option B for Q2. Hence, both Gary and Hugh would have marked option B for Q2.

Since Hugh has marked option B for Q1 and Q2, he must mark option C for Q3 and option A for Q4 (since Daniel marked A and C for Q3 and Q4 respectively). Since Gary marked option C only for Q1, he must have marked option B for Q4. For Q3, he must have marked option A (from iv)).

The following table presents the options marked by the four students, with the copied answers in grey background:

Order	1	2	3	4	5
Persons	Carl	Bob	Daniel	Hugh	Gary
Q1	A	C	B	B	C
Q2	C	A	C	B	B
Q3	B	B	A	C	A
Q4	A/B	C	C	A	B

16. Gary, who was in the last position, marked the answer as option B for Q4.  
Choice (A)
17. None of the students satisfy the given condition.  
Choice (D)
18. Both Daniel and the person in the first position, Carl, marked option C as their answer for Q2.  
Choice (C)
19. Option C was marked by two persons and one of option A or option B would be marked by two persons. Hence, more than one of the given options would have been marked by the maximum number of persons.  
Choice (D)
20. Carl marked his answer as option A for Q1.  
Choice (A)

#### Solutions for questions 21 to 25:

On Day 1, he sold 142 pens. The cost of the first 54 pens (which belonged to Carton 1) is Rs. 405. The cost of the next 88 pens (from Carton 2) =  $\frac{1000}{125} \times 88 = 704$

On Day 2, he sold 124 pens, of which 34 pens are from Carton 2 and, 88 pens are from Carton 3 and 2 pens are from Carton 4. The total cost of the first 34 pens is Rs. 272, the cost of the next 88 pens is Rs. 594 and the cost of the next 2 pens is

$$\frac{481}{74} \times 2 = \text{Rs. } 13$$

Similarly, we can calculate the cost of the pens for each Day and Carton combination. The table below presents the number of pens, along with the carton the pen is from, the price, cost and profits of the pens.

Day	Number of Pens	Revenue	Cost	Profit
Day 1	54 (C1)	1349	1109	240
	88 (C2)			
Day 2	34 (C2)	1271	879	392
	88 (C3)			
Day 3	2 (C4)	999	747	252
	72 (C4)			
Day 4	36 (C5)	969	831	138
	84 (C5)			
Day 5	30 (C6)	945	742.5	202.5
	66 (C6)			
Day 6	42 (C7)	1040	878.5	161.5
	22 (C7)			
	82 (C8)			

21. Profit made by Raghu on Day 4 = 63 + 75 = Rs. 138  
Choice (C)
22. On Day 1, the first 54 pens have profit percentage of more than 20%. All the pens sold on Day 2 have more than 20% profit percentage. On Day 3, the first 72 pens have profit percentage more than 20%. On Day 4, the 30 pens sold have a profit percentage more than 20%. On Day 5, the first 66 pens, and on Day 6, the first 22 pens have profit percentage more than 20%. Therefore, the total number of pens = 54 + 34 + 88 + 2 + 72 + 30 + 66 + 22 = 368  
Choice (C)
23. Raghu made the lowest profit on Day 4.  
Choice (D)
24. The average profit made by Raghu per day from Day 3 to Day 6 =  $\frac{252 + 138 + 202.5 + 161.5}{4} = 188.5$   
Choice (C)
25. Profit was made by selling the pens in Carton 6  
 $= 30 \times 8.5 + 66 \times 8.75 - 576 = \text{Rs. } 256.50$ . Choice (A)

#### Solutions for questions 26 to 30:

The given numbers are 98551, 75311 98765 and 76544. From (i), B picked consecutive digits. We can see that no one picked 2. Hence, B could have picked any set of consecutive digits starting from 3. However, from (ii), B could not have picked 4. This is because if B picked 4, he must have picked it for the number 76544. However, in this number, D cannot choose a lesser digit than B. Hence, B could not have chosen 4. B could have chosen (5, 6, 7, 8) OR (6, 7, 8, 9). Since B did not pick the leftmost digit in any round, B could not have chosen 9. Hence, B must have chosen (5, 6, 7, 8) in the four rounds. B could not have picked 7 in the Numbers 75311 and 76544 because 7 is the leftmost digit in these rounds. Hence, B must have chosen 7 in 98765. B could have picked 5 in 98551 or 76544. But B could have picked 6 only in 76544 (since he already picked 7 in 98765). Hence, B picked 6 in 76544 and 5 in 98551. B must have picked 8 in 98551.

From (iii), the winner picked the rightmost digit in the third round. Hence, 98765 cannot be the Ceiling Number of the third round. From (iv), only one child picked 9 and 1 in two rounds. This person picked 1 in the first round. Hence, this person is not the winner because the winner could not have picked the least digit in first round and third round. Hence, the child who picked 9 and 1 must have picked 9 in the round with the Ceiling Number as 98551 (because the other 9 would have been picked by the winner). Since this child cannot pick 1 in the same round, he must have picked 1 in the round with the Ceiling Number 75311. Therefore, 75311 is the Ceiling Number of the first round. Also, only one child picked 9 and 1. Hence, the winner, who picked 9, must not have picked 1. Since the winner picked the least digit in one round, the winner must have picked 4 in 76544. Therefore, 76544 must be the Ceiling Number of the third round. From (ii), C and E picked the same digit in the second round. The only Ceiling Number of second round can be 98551. Hence, C and E must have picked 5 in this round. The fourth round must have Ceiling Number as 98765.

In the second round, with number 98551, B picked 8, C and E picked 5. D must have picked 1 (as D picked lower number than B) and A must have picked 9.

In the first round, with number 75311, B picked 5. D cannot pick 1 as he picked 1 in second round. Hence, D must have picked 3. A must have picked 1 in the first round (as he picked 9 in the second round).

In the third round with number 76544, D cannot pick 4 (as no one picked the same digit as D). Hence, D picked 5 in third round. Since D picked 5 in third round, in the fourth round, with number 98765, D cannot pick 5. Hence, D picked 6 in fourth round. E cannot pick 4 in third round, with number 76544, as E and D did not pick consecutive numbers. Hence, E picked 7 in third round. C and A picked 4 in the third round. But we know that the person who picked 4 in the third round was the winner. But A cannot be the winner as he picked 9 in the second round, with number 98551. Hence, the winner must be C. C must have picked 9 in the fourth round, with number 98765.

Since E picked 7 in the third round, E cannot pick 7 in the first round. Hence, E picked 1 in the first round. C must have picked 7 in the first round.

In the fourth round, E cannot pick 5 (as D picked 6). Hence, E picked 8 and A picked 5 in the fourth round.

The following table provides the digit that each person picked in each round:

	7	5	3	1	1
Round 1	C	B	D	E/A	A/E
Round 2	9	8	5	5	1
Round 3	A	B	C/E	E/C	D
Round 4	7	6	5	4	4
	E	B	D	A/C	C/A
Round 1	9	8	7	6	5
Round 2	C	E	B	D	A

26. The winner of the game is C. Choice (B)  
 27. C picked 7 in the first round. Ans: (7)  
 28. A picked the least digit in the fourth round. Choice (A)  
 29. C picked the highest digit in two rounds. Choice (C)  
 30. The sum of the digits across the four rounds was the highest for B (A – 19; B – 26; C – 25; D – 15; E – 21). Choice (B)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	
Medium	11, 14, 21, 23, 24, 25
Difficult	1, 2, 3, 4, 5, 6, 12, 13, 15, 22, 26, 27, 28, 29, 30
Very Difficult	7, 8, 9, 10, 16, 17, 18, 19, 20

## SECTION – III

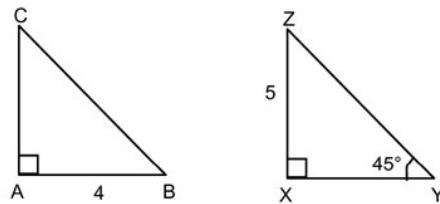
## Solutions for question 1:

1. Given  $a^m = a^n$   
 $a = 1$  or  $0$  or  $-1$  or  $m = n$   
 Hence, none of choices (A), (B) or (C) is necessarily true  
 Choice (D)

## Solutions for questions 2 and 3:

2. From statement I  
 $F - 8 = 3(S - 8) - 6$   
 $F = 3S - 22$   
 Statement I alone is not sufficient.  
 From statement II,  $F + 6 = 2(S + 6) - 4$   
 $F = 2S + 2$   
 Adding 2 on both sides  
 $F + 2 = 2S + 4 = 2(5 + 2)$ . So in 2 years time, Ajit will be twice as old as his son.  
 Statement II alone is sufficient  
 Choice (B)

3. Each statement alone is not sufficient.  
 Combining both statements



$$XY = XZ = 5 \text{ (Since } \angle ZYX = 45^\circ\text{)}$$

$$\therefore ZY = 5\sqrt{2}$$

$$\text{Since } \frac{AC}{BC} = \frac{XY}{ZY} \Rightarrow BC = AC\sqrt{2} \left( \text{Since } \frac{XY}{ZY} = \frac{1}{\sqrt{2}} \right)$$

$\therefore \triangle ABC$  will also be isosceles right triangle.

Sides of ABC are 4, 4,  $4\sqrt{2}$

Sides of XYZ are 5, 5,  $5\sqrt{2}$

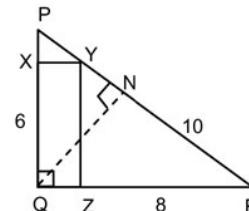
$\triangle XYZ$  has a larger area.  
 Choice (C)

## Solutions for questions 4 to 6:

4. Given,  $t_n = (-1)^{n+1} (t_{n-1} + 1)$  and  $t_0 = 1$   
 $t_1 = (-1)^2 (t_0 + 1) = 1(1 + 1) = 2$   
 $t_2 = (-1)^3 (2 + 1) = -3$   
 $t_3 = (-1)^4 (-3 + 1) = -2$   
 $t_4 = (-1)^5 (-2 + 1) = 1$   
 $t_5 = (-1)^6 (1 + 1) = 2$   
 $t_6 = (-1)^7 (2 + 1) = -3$   
 $t_7 = (-1)^8 (-3 + 1) = -2$   
 $t_8 = (-1)^9 (-2 + 1) = 1$   
 So, we can observe that the series repeats with a period of 4 starting from  $t_0$ .  
 $S_{199}$  is the sum of 50 such complete cycles, from 0 to 199.  
 i.e.,  $S_{199} = 50(t_0 + t_1 + t_2 + t_3) = 50(1 + 2 - 3 - 2) = 50(-2) = -100$ .  
 Ans: (-100)

5. The given situation is represented in the following figure:

$$PR = \sqrt{6^2 + 8^2} = 10$$



Further, it can be observed that  $XYZQ$  is a rectangle.  
 $\Rightarrow XZ = QY$ .

The least value of  $XZ$  is equal to the least value of  $QY$ , which occurs when  $QY$  is perpendicular to  $PR$ . Let the foot of the perpendicular from  $Q$  to  $PR$  be denoted as  $N$ . We need to find  $QN$ .

$$\text{Now, area of } \triangle PQR = \frac{1}{2} PQ \times QR = \frac{1}{2} PR \times QN$$

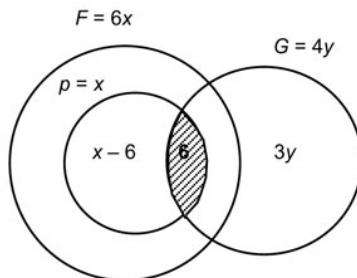
$$\Rightarrow PQ \times QR = PR \times QN$$

$$\Rightarrow 6 \times 8 = 10 \times QN \Rightarrow QN = 4.8$$

That is,  $XZ$  is a minimum of 4.8 cm

Ans: (4.8)

6.



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

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

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

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

$$\text{and } 3y = 39 \Rightarrow y = 13$$

$$\text{also } 6x = 78 \Rightarrow x = 13$$

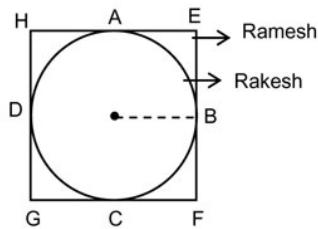
$$\Rightarrow x - 6 = 7 \text{ and } y - 6 = 7$$

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

Ans: (58)

#### Solutions for questions 7 and 8:

7. The path traced by Rakesh and Ramesh is shown below



Let the side of the square be  $a$ .

$$\therefore \text{The radius of the circular track} = \frac{a}{2}$$

The circumference of the track =  $\pi a$

The perimeter of the square =  $4a$

$\therefore$  Ratio of the track lengths =  $\pi : 4 = 22 : 28 = 11 : 14$

Ratio of the speeds =  $11 : 14$

$\therefore$  Ratio of the times =  $1 : 1$

The time in which Rakesh covers quarter of a circle.

Both again meet at point B, C, D, A etc. (when both run in same direction).

The distance them will be maximum, when Ramesh is at E (or F, G, H). This distance is

$$\frac{a}{2}(\sqrt{2} - 1) = 2\sqrt{2}(\sqrt{2} - 1)m = 4 - 2\sqrt{2}m = 1.172m$$

Choice (A)

8. When they start in opposite directions the maximum distance will be when Ramesh is at D and Rakesh is at B.

$$\therefore \text{The maximum distance is } 4\sqrt{2} m \approx 5.656 m$$

Choice (B)

#### Solutions for questions 9 and 10:

9. X can make 4 litres of black dye/hr and 3 litres of brown dye/hr.

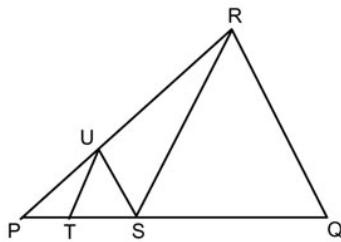
Y can make 3 litres of black dye/hr and 4 litres of brown dye/hr.

If X and Y work simultaneously to make black and brown dyes respectively, they can make a total of 360 litres of each colour in 90 hours.

Another 40 litres of black dye would remain. Both X and Y, working together, can finish making this 40 litres in  $\frac{40}{7} \text{ hours} = 5\frac{5}{7} \text{ hours}$

$\therefore$  The company's delivery would be delayed by at least  $\left[ \left( 90 + 5\frac{5}{7} \right) - 93 \right] = 2\frac{5}{7} \text{ hours.}$  Choice (D)

10.



In  $\triangle PSR$ ,  $UT$  and  $RS$  are parallel.  $\therefore PT/PS = PU/PR$ .

In  $\triangle PQR$ ,  $US$  and  $RQ$  are parallel.

$$\therefore PS/PQ = PU/PR = 2/3 \text{ (given)}$$

$$\therefore (PT + TS) : SQ = 2 : 3 = 10 : 15$$

and  $PT : TS = 2 : 3 = 4 : 6$

$$\therefore (PT : TS) : SQ = 4 : 6 : 15 \text{ and } TS : SQ = 2 : 5$$

Choice (B)

#### Solutions for question 11:

11. Since the students get 15 marks, they answered 5 questions. We can select any 5 questions out.

Out of 8 questions, this can be done in  ${}^8C_5$  ways. Each of the remaining three countries are incorrectly matched.

This can happen in 2 ways.

$\therefore$  The total number of ways in which students can get 15 marks is  ${}^8C_5 (2) = 112$  Ans: (112)

#### Solutions for questions 12 and 13:

12. Given that  $(A)_{20} = (10)_{10}$ ,  $(B)_{20} = (11)_{10}$ ,  $(C)_{20} = (12)_{10} \dots$   $(J)_{20} = (19)_{10}$

$$\begin{array}{r} (H \ E \ A \ D)_{20} \\ - (D \ E \ A \ D)_{20} \\ \hline (4 \ 0 \ 0 \ 0)_{20} \end{array} \quad \left. \begin{array}{l} \text{By the application of laws} \\ \text{of addition when base is} \\ \text{other than 10.} \end{array} \right\}$$

$$= 4 \times 20^3 + 0 \times 20^2 + 0 \times 20 + 0 = (32000)_{10} \text{ Choice (C)}$$

13. Let  $E = x + \frac{1}{x-1}$

As  $x > 1$ ,  $(x-1) > 0$

$$E = (x-1) + \frac{1}{(x-1)} + 1 = F \text{ (say)} + 1$$

As  $(x-1) > 0$ , the minimum value of  $F$  is 2.

$\therefore$  The minimum value of  $E$  is 3.

This would be the case, provided  $(x-1)$  can take all possible positive values.

But  $4x^2 - 21x + 20 \geq 0$

$$\Rightarrow (4x-5)(x-4) \geq 0$$

$$\Rightarrow x \leq \frac{5}{4} \text{ or } x \geq 4 \Rightarrow x-1 < \frac{1}{4} \text{ or } x-1 > 3$$

$$\text{When } (x-1) = \frac{1}{4}, F = 4\frac{1}{4}$$

When  $(x - 1) = 3$ ,  $F = 3\frac{1}{3}$

When  $0 < (x - 1) \leq \frac{1}{4}$ ,  $F \geq 4\frac{1}{4}$

When  $(x - 1) \geq 3$ ,  $F \geq 3\frac{1}{3}$

Thus the minimum value of  $F$  is  $3\frac{1}{3}$

$\therefore$  The minimum value of  $E = F + 1 = 4\frac{1}{3}$ .

#### Alternative solution:

Once we conclude that the minimum value of  $E$  (i.e.,  $x + \frac{1}{x-1}$ ) is 3, which is for  $x = 2$ , we can observe

that the minimum value of  $E$  in this case will definitely be greater than 3. This is because  $E = 3$  for  $x = 2$ , but  $x \in R - [5/4, 4]$ , i.e.,  $x = 2$  is not possible as per the given conditions. Now, observing among the answer choices only choice (C) is possible as all the other choices are less than or equal to 3.

Choice (C)

#### Solutions for question 14:

14.  $(5)^{505}$  ends in a 5, and there is at least one even number in the product. Hence the last digit of the entire product will be zero.  
Ans: (0)

#### Solutions for questions 15 to 23:

$$15. \frac{1}{x+1} = \frac{ax}{ax^2 + ax}$$

(Multiplying by  $ax$  in both numerator and denominator)

$$\frac{1}{y+1} = \frac{by}{by^2 + by}$$

(Multiplying by  $by$  in both numerator and denominator)

$$\frac{1}{z+1} = \frac{cz}{cz^2 + cz}$$

(Multiplying by  $cz$  in both numerator and denominator). Substituting the given values for  $ax^2$ ,  $by^2$  and  $cz^2$ .

$$\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = \frac{ax + by + cz}{ax + by + cz} = 1$$

#### Alternative solution:

Assume  $a = b = c = 1$ . Then we get the following relations:

$$x^2 = y + z$$

$$y^2 = x + z$$

$$z^2 = x + y$$

By observation,  $x = y = z = 2$  is a valid solution (but not necessarily the only solution).

$$\text{Hence } \frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = 1.$$

However, given the choice "cannot be determined", option (3) needs to be marked with caution.  
Choice (C)

16. Let the number of oranges bought be  $x$ .

$\therefore$  The number of oranges which are not rotten = 0.6x.  
The selling price per orange to gain an overall profit of 20%

$$= \frac{60 \times 1.2}{0.6x} = \frac{120}{x}$$

$$\text{Cost per orange} = \frac{60}{x}.$$

$$\therefore \text{The selling price per orange is } \frac{\left(\frac{120}{x}\right)}{\left(\frac{60}{x}\right)} \times 100\%$$

200% of the cost price per orange.

Choice (B)

17. The 3 successive discounts are  $a\%$ ,  $b\%$  and  $c\%$ , where  $a + b + c = 50\%$ .  
The maximum discount ( $x\%$ ), would occur when  $a = 50\%$ ,  $b = c = 0\%$ .  
In this case, selling price = 1080. Profit % = 8%

The minimum discount would result when  $a = b = c = \frac{50}{3}\%$

$$\therefore \text{Selling price} = \left(\frac{5}{6}\right) \left(\frac{5}{6}\right) \left(\frac{5}{6}\right) 2160 = 1250$$

$\Rightarrow$  Profit % = 25%

There two cases are represented below.

Minimum Selling Price 1080	Maximum Selling Price 1250
Minimum Profit Percentage 8%	Maximum Profit Percentage 25%

Consider the ranges given in the choices:

- (i)  $6 < x < 10$  contains values which are not possible for  $x$ .
  - (ii)  $14 < x < 20$  contains only those values which are possible.
  - (iii)  $20 < x < 24$  contains only those values which are possible.
  - (iv)  $24 < x < 26$  contains values which are not possible for  $x$ .
- $\therefore$  2 of the ranges contain values which are not possible for  $x$ .  
Choice (B)

18. Let the ages of A and B, 12 years ago, be  $2k$  and  $3k$  respectively.

Let the present age of C be  $x$  years.

$$\text{Given, } \frac{3k + 24}{x + 12} = \frac{2}{3}$$

$$\Rightarrow 2x = 9k + 48$$

$$\Rightarrow x = 4.5k + 24.$$

$$\text{Given, } \frac{(2k + 12) + (4.5k + 24)}{2} = 57$$

$$\Rightarrow 6.5k = 78 \Rightarrow k = 12$$

$\Rightarrow$  B's age 12 years ago was 36 years.

Let the age of C be twice the age of B,  $p$  years ago.

Hence,  $[4.5(12) + 24] - p = 2(48 - p)$

$$\Rightarrow p = 18$$

Choice (C)

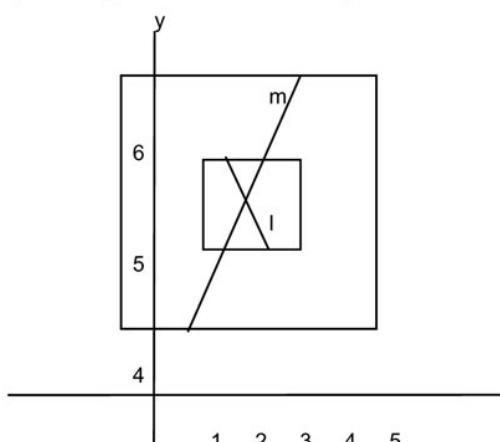
19. There are eight comrades in the get-together. Every pair of comrades has a unique signal and they send out this signal whenever they meet. Since, the signal sent out by each pair is distinct, the number of distinct signals used =  ${}^8C_2 = 28$ .

Consider the statement in choice (A)

If there are '85' signals, then at a minimum we need one person meeting a particular person more than thrice. (since  $28 \times 3 = 84$ )

And 85<sup>th</sup> meeting must be a 4<sup>th</sup> meeting for the two of them.  
So, choice (A) is false.  
Choice (A)

20. The given co-ordinates can be plotted on a co-ordinate plane. By observation, the two quadrilaterals are rectangles.  
Any line that divides a rectangle into two equal halves must pass through the centre of the rectangle.



The centre of  $\alpha$  is  $\left(\frac{1+3}{2}, \frac{3+5}{2}\right)$  i.e., (2, 4)

The centre of  $\beta$  is  $\left(\frac{-0.5+4.5}{2}, \frac{1.5+6.5}{2}\right)$  i.e., (2, 4)

$l$  divides  $\alpha$  into two equal parts.

$\therefore$  It passes through (2, 4)

$m$  divides  $\beta$  into two equal parts.

$\therefore$  It passes through (2, 4)

i.e.,  $l$  intersects  $m$  at (2, 4)

#### Alternative Solution:

Note: From the figure, it can be directly observed that the rectangles are concentric (with sides of the rectangles being along the  $x$  and  $y$  axes). Therefore, the common centre of the rectangles can easily be found to be (2, 4) by observation.

Choice (C)

21. Let  $\frac{1}{10} = x$ , then

$$\begin{aligned} S &= 2x + 6x^2 + 12x^3 + 20x^4 + 30x^5 + \dots \\ \Rightarrow Sx &= 2x^2 + 6x^3 + 12x^4 + 20x^5 + \dots \\ \Rightarrow S(1-x) &= 2x + 4x^2 + 6x^3 + 8x^4 + \dots \\ \Rightarrow S(1-x)x &= 2x^2 + 4x^3 + 6x^4 + 8x^5 + \dots \\ \Rightarrow S(1-x)(1-x) &= 2x + 2x^2 + 2x^3 + 2x^4 + 2x^5 + \dots \end{aligned}$$

$$\begin{aligned} \Rightarrow S(1-x)^2 &= 2\left(\frac{x}{(1-x)}\right) \Rightarrow S = \frac{2x}{(1-x)^3} = \frac{2\left(\frac{1}{10}\right)}{\left(1-\frac{1}{10}\right)^3} \\ \Rightarrow S &= \frac{2}{10} \times \frac{1000}{729} = \frac{200}{729} \end{aligned}$$

#### Alternative solution:

$$\begin{aligned} S &= 0.2 + 0.06 + 0.012 + 0.0020 + 0.00030 + 0.000042 + \dots \\ \Rightarrow S &= 0.274342 + \dots \end{aligned}$$

Going from answer choices, choice (A) = 0.2666.....;  
Choice (B) = 0.268888.....; choice (C) = 0.27222.....;  
Choice (D) = 0.27434.....; choice (E) = 0.28943  
Hence choice (D). Choice (D)

22. The merchant adulterated 8 litres of petrol with 40% (8) or 3.2 litres of kerosene i.e., he sold a total of  $12 + 8 + 3.2 = 23.2$  litres of petrol.

Total cost price of petrol and kerosene

$$= ₹(20 \times 50 + 3.2 \times 20) = ₹1064$$

Total selling price (in ₹) =  $55 \times 23.2 = 1276$

Profit obtained (in ₹) =  $1276 - 1064 = 212$

Choice (B)

23. There are three possible cases here :-

case (i)  $\underline{\quad}$   $\underline{\quad}$   $\underline{5}$   $\underline{6}$

case (ii)  $\underline{\quad}$   $\underline{5}$   $\underline{6}$   $\underline{\quad}$

case (iii)  $\underline{5}$   $\underline{6}$   $\underline{\quad}$

case (i) The digits to the left of 56 have to form a number that is less than 56. So the numbers will range from 10 to 55. So, number of ways this can be done  $\rightarrow 46$ .

Case (ii) The thousands place can be filled up in 9 ways i.e., numbers from 1 to 9. The units place can be filled up with numbers from 0 to 9 i.e., in 10 ways.

So number of ways =  $9 \times 10 = 90$ .

Case (iii) The numbers in the last two places can be filled with any number ranging from 0 to 99. This can be done in 100 ways. But the number 5656 must not be included.

$\therefore$  Possibilities in case (iii) are  $100 - 1 = 99$

Hence the total number of ways =  $46 + 90 + 99$

= 235

Choice (D)

#### Solutions for questions 24 and 25:

24.  $\text{Rem}\left(\frac{5}{13}\right) = 5 \text{Rem}\left(\frac{5^2}{13}\right) = 12 \text{ or } -1$

$$\therefore \text{Rem}\left(\frac{5^4}{13}\right) = (-1)^2 = 1$$

$\therefore$  It can be seen that

$$\text{Rem}\left(\frac{5^2}{13}\right)^{\text{odd no}} = -1 \text{ and } \text{Rem}\left(\frac{5^2}{13}\right)^{\text{even no}} = 1$$

$$\text{Now, Rem}\left[\frac{5+5^2+5^3+\dots+5^{55}}{13}\right]$$

$$= \text{Rem}\left[\frac{5+5^3+5^5+\dots+5^{55}}{13}\right] +$$

$$\text{Rem}\left[\frac{5^2+5^4+5^6+\dots+5^{54}}{13}\right]$$

$$\text{Consider the 2<sup>nd</sup> part, i.e., Rem}\left[\frac{5^2+5^4+5^6+\dots+5^{54}}{13}\right]$$

$$= \underbrace{-1+1-1+\dots+(-1)}_{27 \text{ terms}} = -1$$

27 terms

Consider the 1<sup>st</sup> part, i.e.,

$$\text{Rem}\left[\frac{5+5^3+5^5+\dots+5^{55}}{13}\right]$$

$$= \text{Rem}\left[\frac{5(1+5^2+5^4+5^6+\dots+5^{54})}{13}\right]$$

$$= 5\left(\text{Rem}\left[\frac{1}{13}\right] + \text{Rem}\left[\frac{5^2+5^4+5^6+\dots+5^{54}}{13}\right]\right)$$

$$= 5(1 + (-1)) = 0$$

$\therefore$  Final remainder =  $0 + -1 = -1 \equiv 12$

Alternately, one could observe that for successive values of  $n$ , starting with 1, the remainders of  $5^n$  divided by 13 are, 5, 12, 8 and 1, repeating the sequence, as  $n$  increases. Any set of four consecutive terms, starting from the first term will therefore yield a net remainder of zero. Hence, the first 52 terms will yield a remainder of zero and the last three terms will together yield a remainder of  $(5 + 12 + 8)/12$ , i.e., 12. Ans: (12)

25. The number of ways of choosing the three non-zero and non-unity digits out of 8 digits =  ${}^8C_3 = 56$ . These can be arranged in  $\frac{6!}{2! \times 2! \times 2!} = 90$  ways and the digit 1 can be

placed in any of the seven possible locations with respect to the six digits ( $7 \times 56 \times 90$  as 35280)

$\therefore$  There are 35280 trials that are needed. Ans: (35280)

#### Solutions for question 26:

26. For  $0 < |\sin x| < 1$ , we can use the formula for sum to infinite terms of a G.P

In this case  $1 + |\sin x| + \sin^2 x + |\sin^3 x| + \dots = \infty$

$$= \frac{1}{1-|\sin x|} \text{ since in 1<sup>st</sup> quadrant; } \sin x \geq 0 \text{ and } |\sin x| = \sin x$$

$$\Rightarrow 8\left[\frac{1}{1-(\sin x)}\right] = (2^3)^3 \Rightarrow (2^3)\left(\frac{1}{1-\sin x}\right) = 2^6$$

$$\text{Comparing powers of '2' on both sides } \frac{3}{1-\sin x} = 6$$

$$\Rightarrow 1 - \sin x = \frac{1}{2} \Rightarrow \sin x = \frac{1}{2} \Rightarrow x = 30^\circ = \frac{\pi}{6} \text{ (radians).}$$

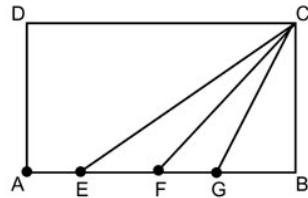
Choice (C)

**Solutions for questions 27 and 28:**

27. The second piece of work takes  $6 \text{ man days} \times 3 \times 3 = 54$  women days.  
 Now, since  $10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 = 54$ , the work takes 9 days to complete.  
 The first piece of work = 6 man days =  $1 + 2 + 3 = 6$   
 $\therefore 3 \text{ days.}$  Choice (A)
28. In  $\triangle ABC$ ,  $180^\circ - \angle b = \angle a + \angle f + \angle e \quad \text{--- (1)}$   
 However, in  $\triangle CBD$ ,  $180^\circ - \angle b = \angle g + \angle c \quad \text{--- (2)}$   
 From (1) and (2),  $\angle a + \angle f + \angle e = \angle g + \angle c$   
 $\Rightarrow \angle g + \angle c - \angle e = \angle a + \angle f$   
 Hence I = II. Choice (C)

**Solutions for question 29:**

29.



$$AE = EF = FG = GB$$

Area of  $\triangle CEF$

$$= \frac{1}{2}(EF)(CB)$$

$$= \frac{1}{2} \left( \frac{AB}{4} \right) (CB) \quad \text{--- (1)}$$

$$\text{Area of rectangle } ABCD = AB \times CB \quad \text{--- (2)}$$

Ratios of the areas = 1 : 8

Choice (D)

**Solutions for question 30:**

30. Let  $\ell$ ,  $b$  and  $h$  be the length, breadth and height of the Cubical box.  
 Given that  
 $\text{Body diagonal} = \sqrt{\ell^2 + b^2 + h^2} = 26$   
 $\Rightarrow \ell^2 + b^2 + h^2 = 676 \quad \text{--- (1)}$   
 $\text{Sum of all its edges} = 4(\ell + b + h) = 152$   
 $\Rightarrow \ell + b + h = 38 \quad \text{--- (2)}$   
 $\text{Its total surface area} = 2(\ell b + bh + \ell h)$   
 $= (\ell + b + h)^2 - (\ell^2 + b^2 + h^2) = 38^2 - 676$   
 $= 1444 - 676 = 768$  Ans: (768)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
Very Easy	-
Easy	12, 15, 16, 22, 29
Medium	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 14, 18, 19, 23, 25, 26, 27, 28, 30
Difficult	5, 13, 17, 20, 21, 24
Very Difficult	-