

**T.I.M.E.**Triumphant Institute of  
Management Education Pvt. Ltd.**(Key and Solutions for AIMCAT1802)****Key****SECTION – I**

1. A	8. C	15. A	22. D	29. 3241
2. B	9. B	16. A	23. C	30. 2143
3. A	10. D	17. D	24. D	31. 4321
4. C	11. C	18. B	25. 3	32. 1234
5. B	12. D	19. A	26. 2	33. 4
6. D	13. C	20. 5	27. 4	34. 5
7. D	14. D	21. D	28. 4213	

**SECTION – II**

1. B	8. C	15. 5	22. B	29. A
2. D	9. 24	16. A	23. D	30. C
3. C	10. 40	17. B	24. C	31. C
4. A	11. 73	18. A	25. C	32. 60
5. C	12. B	19. 9	26. A	
6. B	13. C	20. B	27. A	
7. D	14. 9	21. B	28. B	

**SECTION – III**

1. A	8. C	15. C	22. 25	29. 36
2. B	9. A	16. 4	23. B	30. C
3. 138	10. 81	17. 34530	24. C	31. B
4. D	11. B	18. D	25. 4	32. A
5. C	12. B	19. B	26. B	33. C
6. B	13. 6	20. C	27. C	34. 2
7. A	14. B	21. A	28. D	

**Solutions****SECTION – I****Solutions for questions 1 to 6:****Number of words and Explanatory notes for RC:**

Number of words: 626

1. Option A: The bard is not concerned with originality. The poet's words would in no way have been anchored in visible signs, in text. Hence choice A is not correct and is the answer.  
Option B: The lines are packed with fixed epithets and clichés. The bard recites thousands of memorised lines in the course of an evening. Choice B is correct and is not the answer.  
Option C: The bard is not concerned with originality, but with intonation and delivery. So choice C is correct and is not the answer.  
Option D: The bard is perfectly attuned to the circumstances of the day, and to the mood and expectations of his or her listeners. Choice D is correct and is not the answer.  
Choice (A)
2. Option A: Choice A is true but is incomplete. There would be nowhere to 'look up a word', no authoritative source telling us the shape the word 'actually' takes.... In the absence of fixed, textual anchors for words.

Option B: There would be nowhere to 'look up a word', no authoritative source telling us the shape the word 'actually' takes. Say it over and over again, or it will slip away. Hence choice B is correct.

Option C: It is difficult now to imagine how differently language would have been experienced in a culture of 'primary orality'. Choice C is not the implication of the given sentence in the question. Choice C is not the answer.

Option D: In the absence of fixed, textual anchors for words, there would be a sharp sense that language is charged with power, almost magic: the idea that words, when spoken, can bring about new states of affairs in the world. 'prelogical to rational' has not been mentioned in the passage. Choice D is not specific to the question.

Choice (B)

3. Words were now anchored and, though spellings could change from one generation to another, or one region to another, there were now physical traces that endured, which could be transmitted, consulted and pointed to in settling questions about the use or authority of spoken language. In para 4, we are told: What had once been fundamentally temporal and singular was transformed into something eternal (as in, 'outside of time') and general. Even the simple act of making everyday lists of common objects – an act impossible in a primary oral culture – was already a triumph of abstraction and systematisation.

Again, in para 5: Much of what is said arises from metrical exigencies, the need to fill in a line with the right number of syllables, or from epithets whose function is largely mnemonic (and thus unnecessary when transferred into writing). Refer to para 8: This was dialectic: the structured, working-through of a question towards an end that has not been predetermined – even if this practice emerged indirectly from forms of reasoning only actualised with the advent of writing.

From these lines, we can infer that the given statement in the question is definitely true.

Choice (A)

4. Option A: Plato would express extreme concern about the role, if any, that poets should play in society. But he was not talking about poets as we think of them: he had in mind reciters and bards. But 'loathed' in choice A is incorrect. The viewpoint about Socrates as given in choice A cannot be inferred from the passage.

Option B: Socrates himself rejected writing but Plato would write down. Choice B is wrong.

Option C: Socrates himself rejected writing. Socrates would have preferred to merely say, and so would have preferred to have lost to the wind. So we can say that Socrates identified himself with a form of oral culture. Plato would also ensure the philosophical canonisation of his own mentor by writing his words down (recording them). Choice C is correct.

Option D: Plato and Aristotle, both, were willing to learn from Homer, once he had been written down. Choice D is incorrect as there is a difference between Plato and Socrates, as explained for choice C.

Choice (C)

5. Option A: Choice A is very broad in scope and is beyond the purview of the given passage.

Option B: The author of the passage talks about the journey from the oral tradition to the writing world. He explains the significance of writing: Writing rapidly turned customs into laws, agreements into contracts, genealogical lore into history. Even the simple act of making everyday lists of common objects – an act impossible in a primary oral culture – was already a triumph of abstraction and systematisation. This was dialectic: the structured, working-through of a question towards an end that has not been predetermined – even if this practice emerged indirectly from forms of reasoning only actualised with the advent of writing. Hence choice B is the answer. The methods used for reasoning and argumentation were developed along with the development of writing.

Option C: Choice C is limited to the latter half of the passage. From here it was just one small step to 'philosophy'. But choice C is not the main focus of the author.

Option D: Yet Homer would become an authority for early philosophers nonetheless: revealing truths about humanity not by argument or debate, but by declamation, now frozen into text. It is not orality that philosophy rejects, necessarily. Plato and Aristotle, both, were willing to learn from Homer, once he had been written down. From these lines, choice D gets negated.

Choice (B)

6. Option A: The passage says that writing first developed in the ancient Near East and then in Greece. We cannot say the same about philosophy.

Option B: There are no arguments in the Iliad: much of what is said arises from metrical exigencies, the need to fill in a line with the right number of syllables, or from epithets whose function is largely mnemonic (and thus unnecessary when transferred into writing). Yet Homer would become an authority for early philosophers nonetheless.

This could mean that (i) inspite of the limitation (metrical exigencies .... largely mnemonic), Homer would become an authority for early philosophers, or (even if we stretch the interpretation) (ii) the metrical exigencies, even in their limited function were the reason that early philosophers looked to Homer as an authority. While the second of these possibilities may draw attention, there's a lot of difference between 'forming the basis' and 'being considered an

authority', and there isn't enough in the context to go with the former. Hence choice B is incorrect.

Option C: Choice C is far-fetched and does not emerge from the passage.

Option D: Even the simple act of making everyday lists of common objects – an act impossible in a primary oral culture – was already a triumph of abstraction and systematisation. From here it was just one small step to what we now call 'philosophy'. Hence choice D is true and is the answer.

Choice (D)

#### Solutions for questions 7 to 12:

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

Number of words: 687

7. Statement (a): From booze to lipstick, consumer brands were the prizes which sparked some of the biggest takeover battles and grandest break-up schemes of the 1980s. Bidders and break-up artists thought they could sell well-known brands or exploit them better than existing managers. .... Many companies are beginning to stretch their brands for the same reason that they once scrambled to buy established brands at ever-higher prices ..... The steam has gone out of the takeover market, and few big brands still carry "for sale" signs. So statement (a) could be a reason for the managers in consumer goods industries to return to brand-stretching. Statement (a) is not the answer.

Statement (b): With many of the best brands snapped up, extending existing brands is becoming popular again. Many companies are beginning to stretch their brands for the same reason that they once scrambled to buy established brands at ever-higher prices: launching a new brand can be even riskier and more expensive. Hence statement (b) can be a reason for the managers in consumer goods industries to return to brand-stretching. Statement (b) is not the answer.

Statement (c): Brand stretching - using the recognition value and reputation of a brand-name in a new product area - is often a quick and cheap way for a company to invade a new market. Hence statement (c) is also true and is not the answer.

Statement (d): The initial part of statement (d) cannot be ascertained from the passage. The second part of statement (d) is not the reason for the managers in consumer goods industries to return to brand-stretching. Statement (d) is the negative aspect of brand-stretching. Stretching can also undermine the credibility of the original product. Consumers either may not believe that the new product shares any of the characteristics of the old, or they may simply forget what was attractive about the original item. Hence Statement (d) is the answer.

Choice (D)

8. Option A: Choice A is very general and can be true otherwise but it is not specific to the question. It does not relate to the main finding of Nielsen's research on brands.

Option B: Choice B is out of scope and cannot be gathered from the passage. We only know the following about the 1980s: In the 1980s companies often paid stratospheric prices to acquire established brands. .... sparked some of the biggest takeover battles and grandest break-up schemes of the 1980s. Bidders and break-up artists thought they could sell well-known brands or exploit them better than existing managers. Hence choice B is not the answer.

Option C: The research conducted by Nielsen mentions that out of all the brands that were leading many decades ago, a majority still continue to lead even today. From this we can infer that it is difficult to displace the brands that are well established. Hence choice C is the correct answer.

Option D: Brand-stretching is often a quick and cheap way for a company to invade a new market. But brands are not endlessly elastic. Launching a new brand can be even riskier and more expensive. We cannot say that the risks of brand-stretching are outweighed by its mentioned advantage. Choice D is not the finding of Nielsen's research on brands.

Choice (C)

9. Option A: In the 1980s companies often paid stratospheric prices to acquire established brands. With many of the best brands snapped up, extending existing brands is becoming popular **again**. Choice A is incorrect and is not the answer. Option B: Even well after a new product's launch, stretched brands have a higher survival rate. OC & C found that, of products launched by the same multinational six years ago, only about 30% of new brands exist today, while over 50% of stretched ones do. .... The advertising and promotion costs per consumer persuaded to try out each new product were 36% less for stretched brands than for completely new ones. Not only did stretched products need less advertising, but consumers were also more willing to give names they already knew an initial trial. So choice B is the correct answer.
- Option C: Stretching can also undermine the credibility of the original product. Consumers either may not believe that the new product shares any of the characteristics of the old, or they may simply forget what was attractive about the original item. But this does not imply that stretched brands **almost always** end up undermining the credibility of the original version. Hence choice C is not the answer.
- Option D: Choice D is out of scope of the given passage.  
Choice (B)
10. Option A: Montoya lists several strategies for creating a personal brand, from the obvious (send targeted press releases, maintain a Web site and pay personal attention to customers) to the unusual (create a personal brochure and use it instead of business cards, send out personal postcards instead of the usual direct mailers). Hence we can infer choice A.
- Option B: Choice B is also correct (since the question is about method and not attitude). The focus is also on the medium used. Montoya lists several strategies for creating a personal brand, from the obvious (send targeted press releases, maintain a Web site and pay personal attention to customers) ...
- Option C: Montoya lists several strategies for creating a personal brand, from the obvious to the unusual. Hence choice C is also correct.  
Choice (D)
11. And, before you ask, no, it's not the same as advertising and PR. The purpose of creating a personal brand is not to make you famous, emphasises Montoya. It's about enhancing your sphere of influence, because that's what generates wealth. Of course, you may become famous, but that's just a welcome extra, not the ultimate goal. A personal brand is about keeping you and your business top-of-mind, telling people you can create value and helping business come to you, rather than have you scout for work. From this we can infer choice C as the answer. The remaining choices are farfetched.
- Option A: The first part of choice A is true (a personal brand is 'a personal identity that stimulates precise, meaningful perceptions in its audience') but the second part cannot be ascertained from the passage.
- Option B: Choice B does not capture the exact difference between personal branding and advertising or PR. Choice B is not the answer.
- Option D: Personal branding is a reflection of reality. But that advertising and PR project larger than life images of the product does not serve to be a differentiating point between personal branding and advertising or PR. Choice D is not the answer.  
Choice (C)
12. Option A: The purpose of creating a personal brand is not to make you famous, emphasises Montoya. It's about enhancing your sphere of influence, because that's what generates wealth. Of course, you may become famous, but that's just a welcome extra, not the ultimate goal. Choice A is true and is not the answer.
- Option B: Personal branding is about enhancing your sphere of influence, because that's what generates wealth. Of course, you may become famous, but that's just a welcome extra, not the ultimate goal. A personal brand is about keeping you and your business top-of-mind, telling people you can create value and helping business come to

you, rather than have you scout for work. So choice B is true and is not the answer.

Option C: Your brand is a perception or emotion, maintained by somebody other than you, that describes the total experience of having a relationship with you. A personal identity that stimulates precise, meaningful perceptions in its audience about the values and qualities that person stands for, personally and professionally. Hence choice C is correct and is not the answer.

Option D: While previous self-help management techniques were about *self-improvement*, the personal-branding concept suggests instead that success comes from *self-packaging*. Hence choice D is false and is the answer.

Choice (D)

#### Solutions for questions 13 to 18:

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

Number of words: 682

13. Option A: Scientists do not work with unambiguous facts, they have to place facts in context, to interpret them within a particular framework or theory. In cosmology or atomic physics, this process is relatively uncontroversial. The first part of choice A is true. But when we are dealing with the question of human nature / origins, the creation of the framework within which one places the facts can be contentious, and open to political, philosophical and cultural influences. So, it's not that the facts are ambiguous, it's that we look at them through coloured lenses. So, the second part of choice A is distorted.

Option B: The converse of choice B is correct. In the former, scientists find it difficult to know which facts are important and which irrelevant, unless they already had a framework or theory into which they could fit the facts. So, choice B should have been read as: In the former, facts are twisted to suit theories.

Option C: Scientists do not work with unambiguous facts, they have to place facts in context, to interpret them within a particular framework or theory. Scientists find it difficult to know which facts are important and which irrelevant, unless they already have a framework or theory into which they could fit the facts. In cosmology or atomic physics, this process is rather uncontroversial. .... When we are dealing with the question of human nature (origins), the creation of the framework within which one places the facts can be contentious, and open to political, philosophical and cultural influences.

Hence choice C is correct and is the answer.

Option D: In the former, one theorizes before one has data. The second part of choice D has not been mentioned in the passage.  
Choice (C)

14. 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 mentions his viewpoint in the first para: When we are dealing with human nature or human origin, the framework is open to political, philosophical and cultural influences. He backs it up with the views of Jared Diamond and Robert Foley. While it does seem that the author is analysing the arguments that have been presented, he's actually laying the ground for an argument of his own (at the end). The author's style is not analytical but argumentative. Hence choice B is not 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 argumentative. An argumentative passage presents arguments and counterarguments. The author in the passage delivers an argument and he tries to

convince us of his argument. Refer to para 3: In adopting the second argument ... what it means to be human onto the data. Refer to para 4: Today's insistence that humans are nothing .... disillusionment with such opinion. The purpose of the last para is to offer the author's argument: We have to understand ..... Putting the two together will tell us about humanness and the present state of humanity. Overall the style of the passage is argumentative. Hence choice D is correct.

Choice (D)

**15. Refer to para 2.**

Option A: Choice A is Diamond's opinion. Diamond's argument is that 'what we really are', the essence of humanity, has little to do with conventional indices of humanness: language, culture, technology, and so on. Rather it is expressed principally through our animal heritage (inherent traits correspond to animal heritage).

Option B: Choice B is only an intermediate step to the author's opinion of what Diamond means. If we take away our clothes, possessions and language, says Diamond, then we begin to look like an ape. If we remove our marks of humanity, we no longer appear to be human: not a very profound claim. But Diamond doesn't leave it there. ... the essence of humanity, has little to do with conventional indices of humanness: language, culture, technology, and so on. Rather it is expressed principally through our animal heritage. This makes choice B wrong and choice A the correct answer.

Option C: The genetic proximity of Man and ape is without question. But choice C is not the author's opinion.

Option D: Choice D is neither stated nor implied.

Choice (A)

**16. Option A:** The key issue for many Darwinists is the similarity of humans and apes. Darwinian explanations also draw on philosophical and cultural assumptions about what constitutes humanity, how humans relate to the non-human animal world and so on. The roots of our behaviour must lie in our animal, and in particular ape, ancestry. Hence choice A is the correct answer.

Option B: Choice B is not the story that Darwinists would tell. Choice B does not discuss the view of Darwinists at all. It only explains that the original Victorian image of man is reversed today: Today there is a 'loss of confidence in the extent to which humans could be said to be on a pedestal above the swamp of animal brutishness.' The almost boundless capacity of humans to do damage to each other have, in the twentieth century, rather dented human self-esteem. .... Apes have become more angelic during the course of the twentieth century, the angels, or at least their human representatives, more apish. .... Originally humans were thought to be the advanced form of life (the angels), and other animals the more primitive. Hence choice B is incorrect.

Option C: The animal within us is our noble side, and humanity or civilization the darker side – a complete reversal of the original Victorian image. Choice C again does not give us the viewpoint of Darwinists.

Option D: Today's insistence that humans are nothing more than another kind of ape is the consequence of a century's worth of disillusionment with such optimism. But choice D is far-fetched and is not the answer as it does not pertain to the view of Darwinists as discussed in the passage. Had the statement been 'The story of the divergence of the human and ape evolutionary tree lines' it would have been worthy of consideration.

Choice (A)

**17. Option A:** Choice A is true from the quote from Foley (fourth para). The history of the twentieth century has transformed our vision of humanity, leading to a 'loss of confidence in the extent to which humans could be said to be on a pedestal above the swamp of animal brutishness.' Hence choice A is not the answer.

Option B: Choice B is true as per para 4 which gives Foley's opinion. Robert Foley's protested that evolutionary questions are merely technical ones. So choice B is not the answer.

Option C: Choice C is true as per para 3. We are little more than another ape, and that the roots of our behaviour must lie in our animal, and in particular ape, ancestry. The essence of humanity is expressed principally through our animal heritage. So choice C is not the answer.

Option D: Choice D is negated by the last para, first sentence. The fact that scientific explanations of humanness are shaped by wider influences does not necessarily mean that they are wrong. Hence choice D is the correct answer.

Choice (D)

**18. Option A:** Choice A is negated from the last para. What does science tell us about being human, and what do scientific theories about human origins tell us about the non-scientific influences upon their stories? Putting the two together will tell us much, both about humanness and about the present state of humanity. So choice A is incorrect.

Option B: The primary purpose of the passage is given in choice B. Refer to para 1. Scientists in the field of cosmology or atomic physics frame theories and fit facts into it. In the second half of the para, he says that when we are dealing with human nature or human origin, the framework is open to political, philosophical and cultural influences. The author continues on the same line of thought in the last para: we have to understand arguments about human nature as simultaneously scientific and cultural claims. First, what data have scientists produced about human origins, human behaviour, the human mind? And second, what is it about humanness that is being said through particular interpretations of this data? i.e. What does science tell us about being human, and what do scientific theories about human origins tell us about the non-scientific influences upon their stories? Hence choice B is the answer.

Option C: Virtually all our theories about human origins are relatively unconstrained by fossil data. They 'have often said far more about the theorists than about what actually happened'. But choice C is not the primary objective of the passage.

Option D: Choice D though true is not the author's objective. In cosmology or atomic physics, this process of interpreting facts within a particular framework or theory is relatively uncontroversial. But when we are dealing with the question of human nature (origins), the creation of the framework within which one places the facts can be particularly contentious, and particularly open to political, philosophical and cultural influences.

Choice (B)

**Solutions for questions 19 to 21:**

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

Number of words: 459

**19. Option A:** Though the author begins the passage with the questions "How good are graphic novels, really? Are these truly what our great-grandchildren will be reading, instead of books without pictures?", he does not hazard an answer to these questions. He analyzes the pros and cons of the graphic novel in the passage. We can say that the author's attitude towards graphic novels is one of qualified appreciation. The author is positive about certain features of the graphic novel and explains where and how the novel works fine. (Refer to para 1, 2 and 3: "And the form is better-suited to certain themes and kinds of expression than others. One thing the graphic novel can do particularly well ..... the graphic novel can be very funny"). The author also explains how the graphic novel concept does not work well in certain areas. Refer to the criticism in his view "This is a medium probably not well suited to lyricism or strong emotion, and the very best graphic novels don't take themselves entirely seriously. They appeal to that childish part of ourselves ..." Hence choice A is the correct answer. {Note: The neutral view of the author can be ascertained from the lines "Some of the graphic novels are much better than others, obviously, but this is true of books of any kind." and "In fact, the genre's greatest strength and greatest weakness is that no matter how far the graphic novel

verges toward realism, its basic idiom is always a little, well, cartoonish."}

Option B: The author lists the merits as well as some limitations of graphic novels. There is no hint of patronization, however. So choice B is incorrect.

Option C: We cannot infer from the passage that the author favours the graphic novel. "They are beginning to be taken seriously by the critical establishment" is a report of the views of critics. This is a medium probably not well suited to lyricism or strong emotion, and the very best graphic novels don't take themselves entirely seriously. They appeal to that childish part of ourselves ... So choice C is quite definite and as explained for choice A, we cannot pinpoint choice C as the correct attitude of the author. We can only say that the author's attitude towards graphic novels is one of qualified appreciation.

Option D: Choice D is distorted. 'unappealing' is not the correct term to describe the author's attitude towards graphic novels. Also 'resigned to the fact ....' sounds like as if the author half-heartedly makes an attempt at appreciating graphic novels. This is not correct.

Choice (A)

20. The word 'anomie' in the passage means the lack of the usual social or ethical standards in an individual or group. Choice 5 is the answer. The remaining choices are far from correct.

Ans: (5)

21. Statement (a): One thing the graphic novel can do particularly well, for example, is depict the passage of time, slow or fast or both at once -- something the traditional novel can approximate only with empty space. So statement (a) is true and is not the answer.

Statement (b): And of course, drawing as it does on the long tradition of comic and satiric art, the graphic novel can be very funny. So statement (b) is true and is not the answer.

Statement (c): The very best graphic novels don't take themselves entirely seriously. Hence statement (c) is false and is the answer.

Statement (d): The graphic novel is also good at depicting blankness and anomie. The graphic novel is great for stories of spookiness and paranoia. They appeal to that childish part of ourselves that delights in caricature. Hence statement (d) is true and is not the answer.

Statement (e): The graphic novel can make the familiar look new. They rely on the magic, familiar but always a little startling, that reliably turns some lines, dots and squiggles into a face or a figure. Hence statement (e) is true and is not the answer.

Choice (D)

#### Solutions for questions 22 to 24:

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

Number of words: 395

22. Self-perception theory thus anticipated the revolution in psychology in the study of human consciousness, a revolution that revealed the limits of introspection. But it turns out that we don't just use our behaviour to reveal our dispositions – we infer dispositions that weren't there before. Often, our behaviour is shaped by subtle pressures around us, but we fail to recognize those pressures. As a result, we mistakenly believe that our behaviour emanated from some **inner disposition**.

Option A: "disposition" as used in the second paragraph does not refer to strongest tendencies. The context is one of an "inherent character" and not one of strength. Hence choice A is incorrect.

Option B: "characteristic tendencies" as given in choice B is not sufficient to describe "inner disposition". Tendencies can originate naturally or can be modulated by the environment. So choice B is not the answer.

Option C: "disposition" as used in the second paragraph does not refer to inherent strengths (an attribute or quality of particular worth or utility; an asset). So choice C is not the answer.

Option D: The word 'disposition' in the given context means

"a person's inclination or outlook towards things". This corresponds to 'tendencies'. 'Immanent' means 'inherent'. Hence choice D is the correct answer.

Choice (D)

23. Option A: In the second para, the author says that we are strangers to ourselves. If we knew our own minds ..... If our minds were an open book, we would know exactly how honest we are. So choice A is not true.

Option B: Often, our behaviour is shaped by subtle pressures around us, but we fail to recognize those pressures. So choice B is not true.

Option C: But it turns out that we don't just use our behaviour to reveal our dispositions – we infer dispositions that weren't there before. The passage goes on to say: "We mistakenly believe that our behavior emanated from some pre-existing inner disposition." This means we not only apply logic in reverse, identifying our inclinations from our actions, we go wrong with it, identifying as inclination something that didn't really prompt our actions.

So choice C is true and is the answer.

Option D: Self-perception theory states that people become what they do. Common wisdom suggests that people act the way they do because of their personality traits and attitudes. We mistakenly believe that our behaviour emanated from some inner disposition. Self-perception theory turns common wisdom on its head. Choice D is not the answer.

Choice (C)

24. The idea that people become what they do is my favourite idea. This explanation of how people acquire attitudes and traits was formalized by the social psychologist Daryl Bem in his self-perception theory. People draw inferences about who they are, Bem suggested, by observing their own behaviour. .... Self-perception theory thus anticipated the revolution in psychology in the study of human consciousness, a revolution that revealed the limits of introspection.

Option A: The statement does not reveal a new side to the self-perception theory. "change their behaviour first, with the assumption that changes in their inner dispositions will follow" as given in choice A is the same as "while it is true that behaviour emanates from people's inner dispositions, Bem's insight was to suggest that the reverse also holds." as given in the passage. {People act the way they do because of their personality traits and attitudes, right? They return a lost wallet because they are honest and recycle their trash because they care about the environment. ---- The reverse is also true ---- If we return a lost wallet, there is an upward tick on our honesty meter. After we drag the recycling bin to the curb, we infer that we really care about the environment. Hence choice A is not the answer.

Option B: The given statement does not point to a flaw in the theory or does not suggest how the theory can be misused. Hence choice B is not the answer.

Option C: The situation given in the question is a real one and not a hypothetical one. The sentence also does not present any argument favouring a hypothesis of the self-perception theory. So choice C is not the answer.

Option D: The self-perception theory claims that people's actions affect their personality traits and attitudes. The given sentence shows how this idea can be put to practical use, by getting people to change their behaviour which would lead to a change in their self-perception and thus their own personality. Also "with the assumption that changes in their inner dispositions will follow" in the question statement is a point which is repeated from the passage. {While it is true that behavior emanates from people's inner dispositions, Bem's insight was to suggest that the reverse also holds .... this self-inference process.} Hence choice D is the answer.

Choice (D)

#### Solutions for questions 25 to 27:

25. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. It establishes the background: that the first Nobel Prize in Medicine went to Emil von Behring. It

mentions a discovery: discovering how to employ antitoxins to treat diphtheria. Sentence 2 also has the proper nouns: Nobel prize in medicine and Emil von Behring. Sentences 2 and 4 form a mandatory pair. The pronoun 'he' in sentence 4 refers to "Emil von Behring" given in sentence 2. The pronoun 'them' in sentence 4 points to "antitoxins" in sentence 2. "how to employ antitoxins to treat diphtheria" in sentence 2 links with "could transfer them from infected horses to sick people by injecting those people with horse-blood serum" in sentence 4. Sentence 4 follows sentence 2. Sentence 4 is followed by sentence 1. "In the wake of this discovery" in sentence 1 links with "he could transfer them from infected horses to sick people ...." given earlier in sentence 4. "serum therapy" in sentence 1 points to "injecting those people with horse-blood serum" in sentence 4. Also "serum therapy became the main way of treating diphtheria, tetanus, scarlet fever and meningitis" in sentence 1 stresses "how to employ antitoxins to treat diphtheria" given earlier in sentence 2. So, 241. Sentence 1 is followed by sentence 5. "still employed for neutralizing snake venom ...." in sentence 5 attempts to contrast "serum therapy became, until the invention of antibiotics, the main way" given in sentence 1. Hence, 2415. Sentence 3 is the odd sentence out. It needs a precedent and more substantiation.

Ans: (3)

26. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It introduces the topic of discussion: NASA's yearly X-Hab competition invites university teams to design ... Sentence 5 is followed by sentence 3. "design deep space habitats and concepts that could someday be used by real astronauts" in sentence 5 links with "The designs often focus on space-worthy structural scaffolds, detailing vertical or horizontal building layouts that could survive the harsh environment on Mars or the moon" given in sentence 3. Sentence 3 is followed by sentence 1 which refers specifically to "this year's contest". Sentence 1 talks about the project included this year: a robotic garden or bioregenerative food system. Sentences 1 and 4 form a mandatory pair. "which they'll deliver to NASA next summer" in sentence 1 links with "the completed project" in sentence 4. "bioregenerative food system" in sentence 1 links with "grow, harvest and compost a variety of plants which astronauts can cultivate for food" in sentence 4. So 5314. Sentence 2 is the odd sentence out. It runs tangent to the topic of discussion. It represents a statistic and needs a precedent and more substantiation.

Ans: (2)

27. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the paragraph. It introduces the topic of discussion: Egypt's Old Kingdom ... dynamic period in the development of Egyptian art. Sentence 3 is followed by sentence 2. Sentence 3 is followed by sentence 2. "one of the most dynamic periods in the development of Egyptian art" in sentence 3 is followed by "During this period, artists learned ..." in sentence 2. Sentence 5 follows sentence 2. The pronoun "they" in sentence 5 refers to "artists" given in sentence 2. Sentence 5 is followed by sentence 1. "the earliest portraits of individuals" in sentence 5 links with "Besides portraits, they also perfected ...." in sentence 1. So, 3251. Sentence 4 is the odd sentence out. It does not refer to the development of Egyptian art. This sentence provides information about the king of Egypt. It can be a part of another para as it needs a precedent and further substantiation.

Ans: (4)

#### Solutions for questions 28 to 32:

28. We can understand that the "header" sentence makes a mention of Russia being separated from the Western civilization and culture. Sentence 4 links with the header sentence. "The modern age" in the header sentence links with "modernization of Russian society" in sentence 4. Also sentence 4 (through the contrast conjunction 'but') contrasts the point made in the header sentence. "considerable progress in the modernization of Russian society" in

sentence 4 contrasts "came late into the modern age" in the header sentence. "these earlier barriers" in sentence 4 points to "Russia was for many centuries separated, geographically and politically" in the header sentence. Sentence 4 is followed by sentence 2. "By the time the country was overtaken by the First World War" in sentence 2 follows in chronological order after "the eighteenth and nineteenth centuries ..... permitted" as given in sentence 4. Sentence 2 links with sentence 1. "its situation was not entirely discouraging" in sentence 2 links with "Industrialization was proceeding at a level only two or three decades behind that of the US" as mentioned in sentence 1. Sentence 3 mentions another encouraging point about the US and follows sentence 1. "assured total literacy within another two decades" in sentence 3 links with "only two or three decades behind that of the United States" given in sentence 1. It can be inferred that sentence 3 is the best sentence to immediately precede the "Footer" sentence. "under implementation a program of education reform" in sentence 3 links with "first really promising program for the modernization of Russian agriculture (the so-called Stolypin reforms)" in the footer sentence. Also "which, if allowed to continue unimpeded" in sentence 3 is structurally parallel to "by no means yet completed" in the footer sentence. "assured total literacy within another two decades" in sentence 3 links with "proceeding steadily and with good chances for ultimate success" in the footer sentence. Hence the sequence "4213" can best fit between the header and the footer.

Ans: (4213)

29. On a careful reading of the sentences, it can be observed that the header sentence talks about education becoming the focus of significant interest in Silicon Valley. Sentence 3 immediately follows the "header" sentence. "Established Silicon Valley technology companies ..... educational innovation and reform" in sentence 3 links with "education .... Silicon Valley, the world's most successful site of technical and economic innovation" in the header sentence. Sentence 3 is the only sentence to immediately follow the header sentence. The other sentences would need a precedent. Sentences 3 and 2 form a mandatory pair. "That year" in sentence 2 links with "since 2012" in sentence 3. Sentences 2 and 4 form another mandatory pair. The pronoun "It" in sentence 4 points to "the report published by Global Silicon Valley entitled American Revolution 2.0" So sentence 4 follows sentence 2. "educational transformation and reform" in sentence 4 links with "educational innovation and reform" given earlier in sentence 3. Sentence 1 (As a result) mentions the consequence of the point given in sentence 4 (described key technical catalysts for educational transformation and reform .... estimated the K-12 education market to be worth over \$2.2 trillion.) Sentence 1 comes immediately before the footer sentence. "a distinctive approach to education has emerged within Silicon Valley itself" in sentence 1 links with "Silicon Valley venture philanthropists, and the projects they promote and invest, take software development and computational products as the model..." Also "software development and computational products" in the footer sentence links with "cloud computing, wired classrooms, low-cost hardware, and software" mentioned earlier in sentence 4. Hence the sequence "3241" can best fit between the header and the footer.

Ans: (3241)

30. On a careful reading of the sentences, it can be observed that the header sentence introduces the term 'archaeology'. Sentence 2 logically follows after the header sentence. "Archaeology ..... understanding societies .... existed in the past" in the header sentence links with "Archaeologists excavate .... remains of societies ... thousands of years ago" in sentence 2. Sentence 2 is followed by sentence 1. It brings in a new point of view: uncover the skeletal remains of our ancestors. "techniques of archaeology to uncover the skeletal remains of our ancestors" in sentence 1 links with "Archaeologists excavate or survey the remains of societies" in sentence 2. Sentence 1 is followed by sentence 4. "to uncover the skeletal remains of our ancestors" in sentence 1 links with "findings of human

paleontology (the study of fossils)" in sentence 4. "pushed back our ancestry" in sentence 4 points to "ancestors from the distant past" in sentence 1. Sentence 4 is followed by sentence 3. "pushed back our ancestry as tool-using humans who walked on two legs to several million years ago" in sentence 4 is parallel to "our early human ancestors probably hunted and foraged for food on the continent of Africa" in sentence 3. Sentence 3 immediately precedes the footer sentence. "learned a great deal about our ancestors within the last few decades" in the footer sentence contrasts (through the use of the contrast conjunction 'although') "pushed back our ancestry .... to several million years ago" given in sentence 3. Hence the sequence "2143" can best fit between the header and the footer.

Ans: (2143)

31. On a careful reading of the sentences, it can be observed that the header sentence introduces the topic of discussion: full sequencing of a human genome. The header sentence mentions the cost of bringing the full sequencing of a human genome to life, viz, \$3 billion. The header sentence and sentence 4 form a mandatory pair. "\$3 billion was the magic number" in the header sentence connects with "today it has decreased to just a **few thousand dollars**" in sentence 4. Sentence 4 (which mentions about the cost-effectiveness of genome sequencing in today's time) is best followed by sentence 3. "Genomic sequencing reveals the secrets our genes keep from us" in sentence 3 is parallel to "brought the full sequencing of a human genome to life" in the header sentence. Sentence 3 is followed by sentence 2 as sentence 2 provides an answer to "How is the full sequencing of a human genome actually done?" Sentence 1 follows sentence 2. "chemicals are applied to the sample" in sentence 1 follows sequentially after "blood or saliva samples are collected from the patient" in sentence 2. Sentence 1 is followed by the footer sentence. "these sequences" in the footer sentence links with "DNA housed inside of them" in sentence 1. "Sophisticated machines analyze these sequences" in the footer sentence follows sequentially after "chemicals are applied to the sample in order to break open the cell membranes and gather the DNA" in sentence 1. "what essentially the errors are across the 20,000 genes we all possess" in the footer sentence links with "Genomic sequencing reveals the secrets our genes keep from us" given earlier in sentence 3. Hence the sequence "4321" can best fit between the header and the footer.

Ans: (4321)

32. On a careful reading of the sentences, it can be observed that the header sentence introduces the topic of discussion: Our lack of awareness about human consciousness ... The header sentence is followed by sentence 1. "Our inability or to bring conscious spirituality to the forefront of our lives" in sentence 1 links with "Our lack of awareness about the capacity, and potential of human consciousness" in the header sentence. "has fostered a collective state of passivity and even apathy" in sentence 1 links with "has brought humanity to a critical threshold" in the header sentence. Sentence 1, which highlights a problem situation (Our inability or to bring conscious spirituality to the forefront of our lives), is followed by sentence 2, which mentions a corrective step or solution (A revolution in human consciousness is now required....). "break the spell of our ignorance" in sentence 2 links with "Our lack of awareness about the capacity, and potential of human consciousness" given in the header sentence and "Our inability or to bring conscious spirituality to the forefront of our lives" given in sentence 1. Sentence 2 is followed by sentence 3. "Now that we can engage with spiritual impulses, environmental impacts .... catalyze in us new patterns of consciousness, with emerging faculties of heightened perception and understanding" in sentence 3 points to "revolution in human consciousness" given in sentence 2. Sentence 3 is followed by sentence 4. "new patterns of consciousness, with emerging faculties of heightened perception and understanding" in sentence 3

links with " Such new energies" in sentence 4. "breaking the collective coma of our cosmic isolationism" in sentence 4 mirrors the introductory part in the header sentence "Our lack of awareness about the capacity, and potential of human consciousness". Sentence 4 is best placed before the footer sentence. " a new state of quantum consciousness will allow humanity access to an unimaginable energetic field of information" in the footer sentence links with "opening up transcendental patterns of thought that would bring humanity into a more direct relationship with intelligent cosmic forces" given in sentence 4. Hence the sequence "1234" can best fit between the header and the footer. The para isn't jumbled !

Ans: (1234)

#### Solutions for questions 33 and 34:

33. The para summarizes the essence of India and reflects its plurality i.e. a nation having many different groups of people belonging to various races. Secondly it talks about India's 'unity in diversity'. The people believe in tolerance. Thirdly Indian administrative structure is described as an efficient one.  
 Statement 2 contradicts the idea of the para by suggesting that 'India has no effective administrative system'.  
 Statement 5 also contradicts the idea of the para. The para mentions that 'Indians believe tolerance'. Hence statement 5 is incorrect.  
 Statement 1 does not conclude the para effectively. The penultimate sentence of the para already says that Indians believe in tolerance as a core value. Hence growth of religious tolerance need not be mentioned again. Between statements 3 and 4, statement 4 offers the best conclusion. Statement 3 makes India one of the democracies in the world, whereas statement 4 highlights 'pluralist' which focuses on the variety mentioned in the para. 4 is the correct answer.
- Ans: (4)
34. The para tells us about the efficiency of gene therapy for finding cure for diseases like AIDS, 'though it is in its infancy'. It also tells us that the level of achievement in the process of finding a treatment for AIDS is hampered by a small obstacle.  
 Statement 1 has a negative tone and does not conclude the para well. The para has a positive tone and proceeds logically with a smooth flow of the idea.  
 Statement 2 cannot complete the para. The penultimate sentence says that the gene is knocked off (its work is stopped) by a small protein in the virus called 'virion infectivity factor' (VIF). But the para also tells us that the gene named CEM 15 confers natural resistance to HIV infection. Hence 'have only a marginally better chance than others, in the fight against AIDS' would be an incorrect conclusion. Statement 2 is not the answer.  
 Statement 3 is incorrect as it stresses on the need for finding out the structure of the virus. The very first line mentions that the 'blue print of virus is known.'  
 Statement 4 forms a generalized positive conclusion and seems to link with the penultimate sentence of the para. But it would need further elaboration. It does not bring the thought flow to a close.  
 When we compare statement 4 with 5, statement 5 is specific, tells us about the future course of action and moreover complies with the smooth flow of idea. 5 is the appropriate statement to end the para.

Ans: (5)

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

## SECTION – II

**Solutions for questions 1 to 4:**

Let A, B, C and D represent the four persons and P, Q, R, S and T represent the five companies.

From the percentage increases in revenue for each company in 2012, we get that A or C can be the head of P; B or D can be the head of Q; A or C can be the head of R; D can be the head of S; B or D can be the head of T. Please note that even though among the five, the head of S can only be D, D need not necessarily be the head of S (because there are four persons and each headed one company, in each year, there will be one company not headed by any of the four persons).

Similarly, we can identify who can be the head of each company in each year. The following table provides the possibilities for the head of each company for each year:

Company	2012	2013	2014	2015	2016
Pay	A/C	B/D	C	B/D	A/C
Qwir	B/D	B/D	A/C	A/C	D
Relt	A/C	C	D	D	B/D
Sefol	D	B/D	A/C	D	A/C
Trun	B/D	A/C	B/D	A/C	D

In 2014, B has to be the head of one of the five companies. The only company that B can head in 2014 is Trun. Hence, B headed Trun in 2014. Similarly, in 2015, B must have headed Pay.

In any of the other years, B cannot be heading Trun or Pay (since each person headed a company for exactly one year). Hence, in 2012, B cannot be the head of Trun. Hence, in 2012, the only company for which B can be the head is Qwir. Hence, B was the head of Qwir in 2012.

In 2013, B cannot be the head of Qwir. Hence, B had to be the head of Sefol in 2013. In 2016, B had to be the head of Relt.

Similarly, A had to be the head of Trun in 2013. In 2015, he had to be the head of Qwir. In 2014, he had to be the head of Sefol. In 2016, he had to be the head of Pay. In 2012, he had to be the head of Relt.

In 2012, C had to be the head of Pay. In 2013, C had to be the head of Relt. In 2014, C had to be the head of Qwir. In 2015, C had to be the head of Trun and in 2016, C had to be the head of Sefol.

In 2014, D had to be the head of Relt. In 2015, D had to be the head of Sefol. In 2012, D had to be the head of Trun. In 2016, D had to be the head of Qwir. In 2013, D had to be the head of Pay.

The following table provides the company that each person headed during the given period:

Company	2012	2013	2014	2015	2016
Pay	C	D	–	B	A
Qwir	B	–	C	A	D
Relt	A	C	D	–	B
Sefol	–	B	A	D	C
Trun	D	A	B	C	–

1. In 2013, none of the four persons was the head of Qwir.  
Choice (B)
2. The head of Sefol in 2014 was Adam. This is the same as the head of Qwir in 2015.  
Choice (D)
3. Adam was made the head of Pay in 2016, while Devon was made its head in 2013.

Let  $x$  be the revenue of Pay in 2013.  
Revenue of Pay in 2016 =  $1.06 \times 0.87 \times 1.11 \times x = 1.0236x$   
Required ratio = 1.0236  
Choice (C)

4. For only two companies (Sefol and Trun), Devon was made the head of that company before Chandu was.  
Choice (A)

**Solutions for questions 5 to 8:**

Given that there are two grandparents, who have two children. One of them has three children and the other child is unmarried. Since there are ten persons and they belong to three generations, of the three children in the third generation, two should be married.

From (i), F is a male and has two sisters. Since F has two sisters, the three of them must belong to the third generation. Also, only one of F's sisters is married. Hence, F must also be married (since two of the three children in this generation must be married).

From (v), C belongs to the third generation, must be a female and has an uncle. Hence, the unmarried child of the grandparents is H, who is a male.

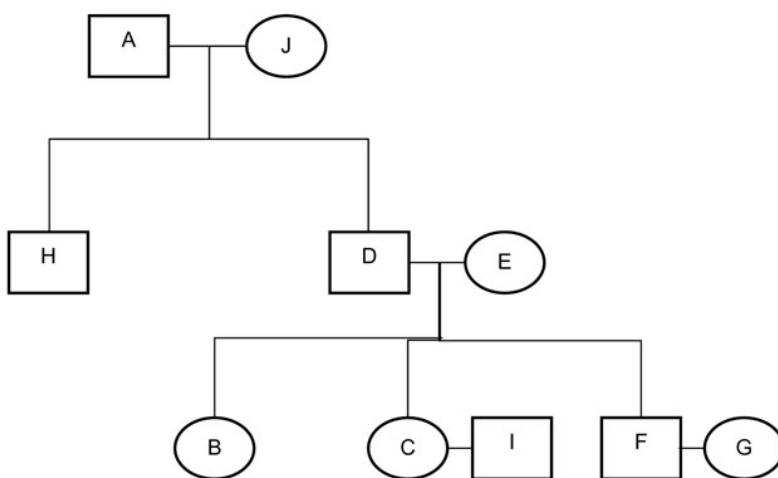
From (ii), H has a sister-in-law. Hence, H has to have a brother and both H and his brother are sons of A. Hence, A is one of the grandparents.

Also, B has a brother-in-law. Hence, B can be the husband of one of the three children in the third generation OR the unmarried child in the third generation.

From (iii), B is a female. Hence, B must be the unmarried female in the third generation. (Since B cannot be a husband). Hence, one of the persons in the couple in the second generation must be D.

From (iv), E must be the wife in the second generation and J must be a grandparent. From (iii), J is a female. Hence, J must be the grandmother. A must be the grandfather. D must be the son of A and J.

From (vi), G is a female. Hence, G must be the wife of F. Since I is remaining person, I must be the husband of C.  
The following diagram presents the relation between the ten persons:



- |  |            |   |
|--|------------|---|
| 5. I is the spouse of C.   | Choice (C) | 8. Among the given options, J is the mother of H. |
| 6. D is G's father-in-law.                                       | Choice (B) | Choice (C)  |
| 7. The pair of persons given in option D live in the same house. | Choice (D) |   |

**Solutions for questions 9 to 12:**

Given that, for each item, the number of items of each type form consecutive numbers.

Further, the price of each item is also the same. The price of an eraser must be a factor of the amounts spent by each of the five persons. Since they spent 320, 60, 250, 50, 80 for purchasing Erasers, the price of an Eraser can be 1/2/4/5/10/20.

Similarly, the price of a pen can only be 1/2/3/4/6/12.

The price of a Pencil can only be 1/2/3/4/6/8/12/24.

The price of a Stapler can only be 1/2/4/5/10/20.

The price of a Crayon can only be 1/2/4/8.

For each person, the amount that he spent for the five items will be equal to number of items  $\times$  price. The number of items for the five items must be consecutive integers. For each person, we have to factorize each number and see if the factors can form consecutive numbers. We can start with C because the amounts that C spent are lesser than those that others spent.

Since the price of an Eraser can be 1/2/4/5/10/20 and C spent 60 on erasers, C could have purchased 60/30/15/12/6/3 erasers. In this way we can list the possibilities (based on the price) for each item for C.

Item	Price	Number
Erasers	1/2/4/5/10/20	60/30/15/12/6/3
Pens	1/2/3/4/6/12	96/48/32/24/16/8
Pencils	1/2/3/4/6/8/12/24	168/84/56/42/28/21/14/7
Staplers	1/2/4/5/10/20	80/40/20/16/8/4
Crayons	1/2/4/8	40/20/10/5

C could not have purchased 168 Pencils because he could not have purchased the other items in the range of  $168 \pm 4$  (as they will form five consecutive integers). Similarly C could not have purchased 60 Erasers, 96 Pens, 80 Staplers, 84 Pencils, 56 Pencils or 48 Pens. If C purchased 42 pencils, C cannot have purchased 41 items of any type or 43 items of any type. Hence, 42 pencils is also not possible. If C purchased 40 Staplers or Crayons, C could not have purchased 41 or 39 items of any type. If C purchased 32 Pens, C could not have purchased 31 or 33 items of any type. Similarly, 30 Erasers (no 29 or 31 of any type), 28 Pencils (no 27 or 29 of any type), 24 Pens (no 23 or 25 of any type), 21 Pencils (no 22 or 19 of any type), 20 Staplers or Crayons (no 22 or 19 of any type), 16 Pens or Staplers (no 17 or 13 of any type), 15 Erasers (no 17 or 13 of any type), 14 Pencils (no 13 or 17 of any type), 12 Erasers (no 13 or 11 of any type), and 10 Crayons (no 11 or 9 of any type) can be eliminated.

Hence, the only possibility remaining for Crayons is 5, for Pencils is 7, for Pens is 8. Since C cannot purchase 9 of any type of item, the only possibility is if he purchases 4 Staplers and 6 Erasers.

Hence, C purchased 6 Erasers, 8 Pens, 7 Pencils, 4 Staplers, 5 crayons. The price of Erasers, Pens, Pencils, Staplers and Crayons are Rs. 10, Rs. 12, Rs. 24, Rs. 20 and Rs. 8 respectively.

We can find out the number of items that the other persons purchased from this and this is provided in the following table (with the price of each item given in parenthesis alongside it):

Person	Erasers (10)	Pens (12)	Pencils (24)	Staplers (20)	Crayons (8)
A	32	33	35	34	36
B	24	25	27	26	28
C	6	8	7	4	5
D	8	7	10	9	6

9. B purchased 24 erasers. Ans: (24)
10. D purchased a total of  $6 + 7 + 8 + 9 + 10 = 40$  items of the five types. Ans: (40)
11. The total number of staplers the four persons purchased  
 $= 34 + 26 + 4 + 9 = 73$  Ans: (73)
12. Only for D, the item on which he spent the maximum amount and the item for which he purchased the maximum number of are the same. Choice (B)

#### Solutions for questions 13 to 16:

From (ii), since there is one student who plays Volleyball, the sum of the number of students who play Hockey and Basketball must be 8 (since the team has 9 students, one of whom plays Volleyball). The number of students who play Volleyball must be 4.

From (iii), since there is one student who likes Biology, the number of students who like Mathematics must be 8. The number of students who like Biology must be 4.

From (i), If Hari selects one boy who likes Mathematics, all the students who like Biology, i.e., 4 students, can be in the team. In addition to this, all the girls who like Mathematics can be in the team. If the team size can be a maximum of 10, the girls who like Mathematics must be 5. Only then the number of students in the team can be 10 (as there will be 4 students who like Biology, 5 girls who like Mathematics and one boy who likes Mathematics). If the number of girls who like Mathematics is 5, the number of boys who like Mathematics must be 3 (since 8 students like Mathematics).

From (iv), since one student who likes Mathematics and plays Hockey is in the team, the 4 students who like Biology can be in the team. The number of students who like Mathematics and play either Volleyball or Basketball must be 5. The number of students who like Mathematics and play Hockey must be 3 (since 8 students like Mathematics).

From (v), since there is one boy who likes Biology and plays Basketball, all the eight students who like Mathematics can be in the team. Since the maximum team size is 9, all the students who like Biology must be boys and play Basketball. Hence, there must be 4 boys who like Biology and play Basketball. Of these 4, one is selected and 3 are left out making the team size 9. The number of students who like Biology and play Hockey or Volleyball must be 0.

Since 3 students like Mathematics and play Hockey, the total number of students who play Hockey will also be 3. Since the sum of the number of students who play Hockey and Basketball is 8, the number of students who play Basketball must be 5. Of these 5 students, 4 students are boys and like Biology.

Also, 4 students play Volleyball and all these 4 students must like Mathematics (since all the students who like Biology play Basketball). There are a total of 7 boys and 5 girls. Of the 7 boys, 4 boys like Biology. Hence, among the students who like Mathematics, there must be 3 boys and 5 girls.

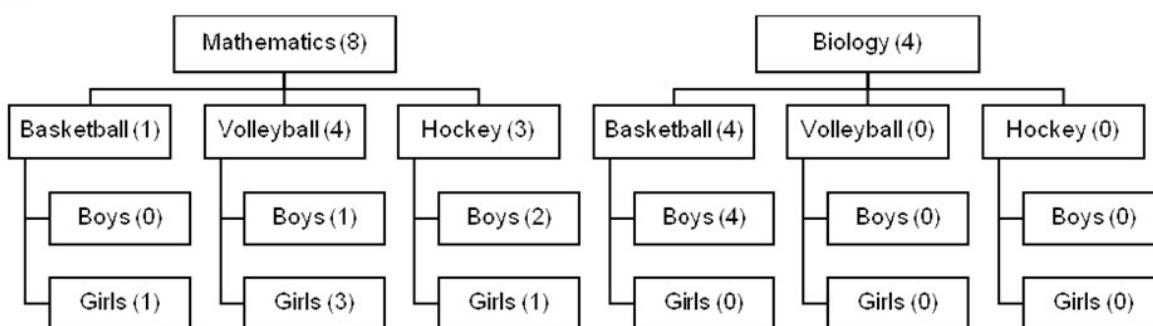
From (vi), if one boy plays Hockey is selected and one girl who plays Volleyball is selected, then the maximum team size can be 9. All the students, i.e., 4 students, who like Biology can be in the team, since they all play Basketball. The 1 student who plays Basketball and likes Mathematics will also be in the team. Among the students who like Mathematics, if there are 3 boys who play Hockey, only one among them will be selected. In this case, there must be exactly 2 girls who play Volleyball and one among them will be selected. This means that there must be 2 boys who play Volleyball. The number of boys who like Mathematics in this case will be at least 5. This is not possible.

Among the students who like Mathematics, if there are 2 boys who play Hockey, only one will be selected. There must be 3 girls who play Volleyball and one among them will be selected. Hence, there must be 1 boy who plays Volleyball. In this case, the student who likes Mathematics and plays Basketball must be a girl. IN this case, there will be 3 boys who like Mathematics and this case is possible.

Among the students who like Mathematics, if there is 1 boy who plays Hockey, he will be selected. There must be 4 girls who play Volleyball and one will be selected among them. In this case, there will be a maximum of 2 boys who like Mathematics, which is not possible.

Hence, there are 2 boys who like Mathematics and play Hockey, 1 girl who likes Mathematics and plays Hockey. There are 3 girls who like Mathematics and play Volleyball and 1 boy who likes Mathematics and plays Volleyball. The student who likes Mathematics and plays Basketball is a girl.

The following diagram provides the number of students (in parenthesis) who like each subject, of each gender and who play a certain sport:



13. There are five girls among the twelve students.  
Choice (C)
14. If Hari selects one boy who likes Biology, then he has to leave out three other students.  
If he selects one girl who likes Hockey, he does not have to leave any student out. Hence, he can select a maximum of 9 students.  
Ans: (9)
15. The number of girls who like Mathematics is 5.  
Ans: (5)
16. The number of girls who play Volleyball is 3.  
Choice (A)

#### Solutions for questions 17 to 20:

Let  $n_1, n_2, n_3 \dots$  represent the number of days on which 1 book, 2 books, 3 books... were borrowed. From the first and last rows, we can see that on each day at least 1 book was borrowed and not more than 10 books were borrowed on any day.

$$\begin{aligned}
 &\text{Given that } n_1 + n_2 = 10 \\
 &n_2 + n_3 + \dots + n_{10} = 24 \\
 &n_2 = 10 + 24 - 30 = 4 \Rightarrow n_1 = 6 \\
 &n_1 + n_2 + n_3 + n_4 = 16 \\
 &n_4 + n_5 + \dots + n_{10} = 18 \\
 &\Rightarrow n_4 = 16 + 18 - 30 = 4 \Rightarrow n_3 = 16 - 4 - 10 = 2 \\
 &n_1 + n_2 + \dots + n_6 = 24 \\
 &n_6 + n_7 \dots + n_{10} = 8 \\
 &\Rightarrow n_6 = 24 + 8 - 30 = 2 \Rightarrow n_5 = 24 - 2 - 16 = 6 \\
 &n_1 + n_2 + \dots + n_8 = 29 \\
 &n_8 + n_9 + n_{10} = 5 \\
 &n_8 = 29 + 5 - 30 = 4 \Rightarrow n_7 = 29 - 4 - 24 = 1 \\
 &n_9 + n_{10} = 1 \Rightarrow n_{10} = 1 \text{ and } n_9 = 0
 \end{aligned}$$

The following table provides the above information:

Number of books	1	2	3	4	5	6	7	8	9	10
Days	6	4	2	4	6	2	1	4	0	1

17. Only on 1 day, seven books were borrowed.  
Choice (B)
18. The total number of books borrowed during the 30 days  
 $= 6 + 4 \times 2 + 2 \times 3 + 4 \times 4 + 6 \times 5 + 2 \times 6 + 1 \times 7 + 4 \times 8 + 1 \times 10 = 127.$   
 Total rental charge earned =  $127 \times 5 = 635$   
Choice (A)
19. The lowest value of  $m = 0$  for  $n = 9$ .  
Ans: (9)
20. Only Statement III is true.  
Choice (B)

**Solutions for questions 21 to 24:**

From (ii), the painting of Rock was four places to the right of the painting by Vincent. From (v), the painting of Rock was not at any extreme end. Hence, the painting by Vincent has to be at the extreme left and the painting of Rock has to be fifth from left.

From (iv), the painting of Apple and the painting by Pablo are at extreme ends. Since the painting by Vincent is at the extreme left, the painting by Pablo cannot be at the extreme left. Hence, the painting of Apple must be at the extreme left and the painting by Pablo must be at the extreme right.

From (i), the painting of Flower is not at the extreme right (since Pablo did not paint the painting of the Flower).

From (iii), John cannot be at the extreme right.

If painting by John is fifth from left, the painting of the Flower cannot be to its right. Hence, this is not possible.

If painting by John is fourth from left, the painting of Flower cannot be to its immediate right and it also cannot be at the extreme right. Hence, this is also not possible.

If the painting by John is third from left, the painting of the Flower cannot be fourth from left. It cannot be fifth from left (because the painting of Rock is fifth from left). It cannot be at the extreme right. Hence, this is also not possible.

If the painting by John is second from left, the painting of the Flower can be fourth from left. This is the only possible combination for the two paintings.

From (ii), the painting by Eduardo and that by Leonardo are not adjacent to each other. Hence, they must be third from left and fifth from left in any order. Hence, the painting by Claude must be fourth from left. From (i), the painting of the Kitten must be third from left. From (v), the painting of Ship is to the immediate left of the painting by Eduardo. This is possible only if Eduardo is third from left and the painting of the Ship is second from left. Pablo would have painted the painting of Fountain.

The following table provides, for each painting, its order, numbered 1 to 6, from left to right, and the person who painted it:

Order	1	2	3	4	5	6
Painting	Apple	Ship	Kitten	Flower	Rock	Fountain
Painter	Vincent	John	Eduardo	Claude	Leonardo	Pablo

21. John painted the painting of the Ship. Choice (B)
22. The painting of the Rock is to the immediate right of the painting by Claude. Choice (B)
23. Eduardo painted the painting of the Kitten. Choice (D)
24. There are two paintings between the painting by Leonardo and the painting of the Ship. Choice (C)
- However, since the fare charged for any value between 6 and 7 is the same, the value of  $x$  can be greater than 6 km.  
Choice (C)
26. Since Tarun did not purchase a pass for Metro bus, it is possible that  $m$  is less than 4 km. However, if  $m$  is less than 4 km, distance travelled by luxury bus can be at most 6 km. The total cost for tickets in Luxury bus in this case will be Rs. 3000. This means that he will not buy the monthly pass for Luxury bus as well. Since he purchased a pass for Luxury bus,  $m$  has to be greater than 4.  
For Luxury bus, we get the following inequality:  

$$\left(60 + 20\left(\frac{3m}{2} - 4\right)\right) \times 30 > 6300$$

$$\Rightarrow m > 7.67$$
 For Metro bus, we get the following inequality:  

$$(30 + 10(m - 4)) \times 30 < 2200$$

$$\Rightarrow m < 8.33$$
 Since the fare does not change for any part of an additional km, the only integral value that  $m$  can take is 8.  
Choice (A)

**Solutions for questions 25 to 28:**

25. For travelling from home to office, the ticket cost will be Rs. 60. For travelling from office to gym, the ticket cost will be Rs. 60.

If  $x < 4$ , he will spend Rs. 60 to travel from gym to home. His total cost per day will be Rs. 180. Since the lowest number of days in a month in 2015 is 28 (in February), he will spend a total of  $180 \times 28 = 5040$  per month. He will not buy a monthly pass in this case. Hence,  $x$  is definitely greater than 4.

The total ticket cost for travelling from gym to office  
 $= 60 + 20(x-4)$

Total ticket cost for February 2015  
 $= (120 + 60 + 20(x-4)) \times 28$

This cost should be greater than 6300 for Rakesh to buy a monthly pass on each month of 2015.

$$\therefore (120 + 60 + 20(x-4)) \times 28 > 6300$$

$$\Rightarrow x > 6.25$$

27. Statement I: If  $n$  is less than 4, he will spend Rs. 60 every day and he will not buy a monthly pass in February 2015. Therefore,  $n$  should be more than 4.  
For February 2015,  

$$(60 + 10(2n - 8)) \times 28 < 2200$$

$$\Rightarrow n < 4.93$$

27. Statement I: If  $n$  is less than 4, he will spend Rs. 60 every day and he will not buy a monthly pass in February 2015. Therefore,  $n$  should be more than 4.  
For February 2015,  

$$(60 + 10(2n - 8)) \times 28 < 2200$$

$$\Rightarrow n < 4.93$$

Since the fare is the same for any part of an additional km, for any  $n$  between 4 and 5, he will be charged for an entire km, i.e., for a total of 5 km and he is better off by buying a Metro pass. Hence, statement I is not definitely true.

Statement II: For May 2016, even if he travels for less than 4 km, he will spend  $20 \times 2 \times 31 = 1240$ . Hence, he will always buy a monthly pass for Ordinary bus in May 2016. Hence, this statement is not definitely true.

Statement III: If  $n$  is less than 4, he will spend Rs. 120 every day and he will not buy a monthly pass in February 2016. Therefore,  $n$  should be more than 4.  
 $(120 + 20(2n - 8)) \times 29 > 6300$

$$\Rightarrow n > 6.43$$

Since the fare is the same for any part of an additional km, for any  $n$  between 6 and 7, he will be charged for an entire km, i.e., for a total of 7 km and he is better off by buying a Luxury pass. Hence, statement III is not definitely true.

Hence, none of the statements is definitely true.

Choice (A)

28. For Hiren,  
 $(20 + 8(h - 4)) \times 31 < 1000$   
 $h < 5.53 \Rightarrow h \leq 5$  (since the fare is the same for any part of an additional km)  
For Lal,  
 $(30 + 10(l - 4)) \times 31 < 2200$   
 $\Rightarrow l < 8.1 \Rightarrow l \leq 8$   
For Krish,  
 $(60 + 20(k - 4)) \times 31 < 6300$   
 $\Rightarrow h < 11.16 \Rightarrow h \leq 11$   
Therefore, the maximum values of  $h$ ,  $l$  and  $k$  are 5, 8 and 11. Hence,  $h < l < k$ .

Choice (B)

#### Solutions for questions 29 to 32:

Let 1 to 5 represent the order in which the students attempted the sections in the examination.

From (ii), Pavan could not have attempted QA section first and Kiran could not have attempted the QA section last.

From (iii), Ankit could have started the RC section last and could not have started the VA section first.

From (iv), none of the three students could have attempted LA section last and DM section first.

From (iii), Kiran must have started VA section after both Pavan and Ankit finished the DM section. But Pavan and Ankit could not have started DM section first. Hence, the earliest that the two of them can start the DM section is second. Hence, Kiran can start the VA section either 3<sup>rd</sup> or 4<sup>th</sup> or 5<sup>th</sup>.

From (v), Ankit **started** the QA section 30 minutes after Kiran **finished** the VA section. Hence, if Kiran attempted VA section 3<sup>rd</sup>, Ankit must have attempted QA section last. Since Kiran can start the VA section only 3<sup>rd</sup>, 4<sup>th</sup> or 5<sup>th</sup>, Kiran must have attempted VA section 3<sup>rd</sup> and Ankit must have attempted QA section last.

Since Kiran has attempted VA section 3<sup>rd</sup>, both Ankit and Pavan must have started DM section second. From (iv), LA must be the first section for both Ankit and Pavan.

From (iii), Ankit finished RC before VA. Hence, Ankit must have started RC 3<sup>rd</sup> and VA 4<sup>th</sup>.

From (v), Pavan started RC 30 minutes after Ankit started VA. Hence, Pavan must have started RC last.

From (ii), Pavan started QA 30 minutes after Kiran started QA. The only possibility for this is Kiran starting QA 2<sup>nd</sup> and Pavan starting QA 3<sup>rd</sup>. Pavan must have started QA 4<sup>th</sup>.

Both Pavan and Ankit attempted LA first. Hence, Kiran cannot attempt LA first. Hence, Kiran attempted LA 4<sup>th</sup> and DM 5<sup>th</sup>. Kiran must have attempted RC first.

The following table provides the order in which the students attempted the five sections:

Student	1	2	3	4	5
Ankit	LA	DM	RC	VA	QA
Pavan	LA	DM	QA	VA	RC
Kiran	RC	QA	VA	LA	DM

29. When Ankit was attempting the VA section, Kiran was attempting the LA section.

Choice (A)

30. VA was not attempted last by any of the three students.

Choice (C)

31. Kiran started three sections, RC, QA and VA, before any of the other two students started that section.

Choice (C)

32. The third and the fifth sections that each student attempted was not the same. Hence, for 60 minutes, the three students were attempting three distinct subjects.

Ans: (60)

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

## SECTION - III

Solutions for questions 1 to 34:

1.  $S_1 = n/2 [2a + (n-1)d]$   
 $2S_1 = n [2a + (n-1)d]$ ,  
 $S_2 = n [2a + (2n-1)d]$   
 $S_4 = 2n [2a + (4n-1)d]$   
 $2S_1 + S_2 - S_4 = 4an + 3n^2d - 2dn - 4an - 8n^2d + 2nd = -5n^2d$ .  
So, M is dependent only on n and d. Choice (A)

2.  $PT = PU - TU = 16 \text{ cm}$   
 $US = TS - UT = 16 \text{ cm}$   
Similarly,  $SC = RD = 24 \text{ cm}$ ,  
 $QV = WR = 18 \text{ cm}$  and  $PA = QB = 20 \text{ cm}$   
Hence the perimeter of PQRS  
 $= (PT + TU + US) + (SC + CD + DR)$   
 $+ (RW + WV + VQ) + (QB + BA + AP)$   
 $= (42 + 50 + 44 + 46) \text{ cm} = 182 \text{ cm}$ . Choice (B)

3. Let the scores of A, B, C, D and E be a, b, c, d and e  
Let them be in ascending order.

$$\text{So, } \frac{a+b+c}{3} = 119 \quad (1) \text{ and}$$

$$\frac{a+b+d}{3} = 121 \quad (2) \text{ and}$$

$$\frac{e+d+c}{3} = 132 \quad (3)$$

$$\frac{e+d+b}{3} = 129 \quad (4)$$

In the process of finding these ten averages, since each of a, b, c, d, e is used the same number of times, (6 times) the average of a, b, c, d, and e and the average of the ten averages are equal.

$$\Rightarrow \frac{a+b+c+d+e}{5} = \frac{1254}{10} = 1254$$

$$\Rightarrow a+b+c+d+e = 627 \quad (5)$$

By  $3((1) + (3) - (5))$ ,  $c = 3(119 + 132) - 627 = 132$

By  $3((2) + (3) - (1))$ ,  $d = 3(121 + 132) - 627 = 132$

By substituting c and d in (3), we get e = 138

Ans: (138)

4. We have to distribute 80 berries among 14 boys, i.e., write 80 as the sum of 14 natural whole numbers, where as many as possible of the numbers are distinct.

$\Rightarrow$  We should consider  $1 + 2 + \dots + 12 = 78$  (among 12 boys) and the other two berries have to be distributed among the remaining two boys. Each of the two boys must be given one berry. Hence, three boys will have one berry each.

$\Rightarrow {}^3C_2$  = three pairs of boys have the same number of berries each. Choice (D)

5. Let x and y be the bigger and smaller parts respectively.

$$\text{Given that } \frac{x+y}{y} = \frac{x^2}{y^2} \Rightarrow xy + y^2 = x^2$$

$$\Rightarrow x^2 - xy - y^2 = 0$$

$$\Rightarrow \left(\frac{x}{y}\right)^2 - \left(\frac{x}{y}\right) - 1 = 0 \text{ which is a quadratic in } \left(\frac{x}{y}\right).$$

$$\therefore \frac{x}{y} = \frac{1 \pm \sqrt{1+4}}{2} = \frac{1+\sqrt{5}}{2} \text{ (as } \frac{x}{y} > 0\text{)}$$

$$\text{Hence, } \frac{y}{x} = \frac{2}{\sqrt{5}+1} = \frac{\sqrt{5}-1}{2} \approx \frac{2.236-1}{2} = 0.618$$

$\approx 0.62$

Choice (C)

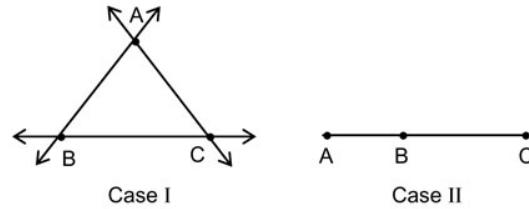
6.  $S = \sqrt{1 + \left(\frac{1}{2}\right)^2 + 2(1)\left(\frac{1}{2}\right)} + \sqrt{1 + \left(\frac{1}{6}\right)^2 + 2(1)\left(\frac{1}{6}\right)} + \dots +$

$$\begin{aligned} & \sqrt{1 + \left(\frac{1}{650}\right)^2 + 2(1)\left(\frac{1}{650}\right)} \\ &= \sqrt{\left(1 + \frac{1}{2}\right)^2} + \sqrt{\left(1 + \frac{1}{6}\right)^2} + \dots + \sqrt{\left(1 + \frac{1}{650}\right)^2} \\ &= \left[1 + \frac{1}{1(2)}\right] + \left[1 + \frac{1}{2(3)}\right] + \dots + \left[1 + \frac{1}{25(26)}\right] \\ &= 25 + \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \dots + \frac{1}{25} - \frac{1}{26} \\ &= 25 + 1 - \frac{1}{26} = 25 + \frac{25}{26} = \frac{675}{26} \end{aligned}$$

Choice (B)

7. Using 16 points of which a set of 5 points are collinear and also another set of 4 points are collinear, the number of straight lines that can be drawn is  ${}^{16}C_2 - {}^5C_2 - {}^4C_2 + 2$ . In this case we do not get  ${}^{16}C_2$  lines as when m points are collinear instead of giving  ${}^mC_2$  lines they result in only one line.

Now consider the given figures:



In the first case we have 3 lines and 3 line segments, whereas in the second case we have a single line as  $\overleftrightarrow{AB} \equiv \overleftrightarrow{AC} \equiv \overleftrightarrow{BC}$ , but even in this case we have 3 line segments  $\overrightarrow{AB}$ ,  $\overrightarrow{BC}$  and  $\overrightarrow{AC}$ , as  $\overrightarrow{AB} \neq \overrightarrow{BC} \neq \overrightarrow{AC}$ . Hence there is no loss of line segments if some points are collinear.

$\therefore$  number of line segments in the given case =  ${}^{16}C_2$

Hence, the required difference =  ${}^5C_2 + {}^4C_2 - 2 = 14$

Choice (A)

8. Let the age of Pavan's daughter be d. The age of Pavan will be  $3d$  and the age of his son will be  $\frac{3}{2}d$ .

The age of Pavan will become twice that of his daughter age after x years (say).

$$\therefore \frac{3d+x}{d+x} = 2$$

$$\Rightarrow x = d$$

Thus the age of Pavan then will be  $3d + d = 4d$  years and

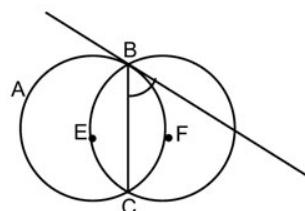
$$\text{his son's age will be } \frac{3}{2}d + d = \frac{5d}{2}$$

Ratio of Pavan's age to his son's age will there be

$$\frac{4d}{\left(\frac{5d}{2}\right)} = \frac{8d}{5d} = \frac{8}{5}$$

Choice (C)

9.



In the above figure, the circles are equal as EF is a common radius. Hence triangles BEF and FEC are equilateral. Hence  $\angle BEF = \angle CEF = 60^\circ$

$$\angle BEC = \angle BEF + \angle CEF = 120^\circ$$

$$\angle BAC \text{ (not shown)} = 1/2 \angle BEC = 60^\circ$$

(Angle subtended by a chord at a point of the circumference will be half of the angle it subtends at the centre). By alternate segment theorem,  $\angle CBF = \angle BAC = 60^\circ$   
Choice (A)

10.  $91 \times 8 = 728 = 3^6 - 1$  and  
 $3^{1000} = 3^4(3^6)^{166} = 81(729)^{166}$

Consider the remainder when  $3^{1000}$  is divided by 728.

$$\text{Rem} \left[ \frac{3^{1000}}{728} \right] = \text{Rem} \left[ \frac{81(729)^{166}}{729-1} \right] \text{ (By remainder theorem)}$$

$$= 81(1)^{166} = 81$$

$$\text{So, } 3^{1000} = 728k + 81 = 91(8k) + 81$$

$$\therefore \text{Rem} \left[ \frac{3^{1000}}{91} \right] = 81$$

#### Alternative Solution 1:

The remainders when the successive powers of 3 starting from  $3^1$  are divided by 91 are 3, 9, 27, 81, 61, 1, 3, 9, ....  
So, the remainder cycle repeats with a period of 6.

$$\therefore \text{Rem} \left[ \frac{3^{1000}}{91} \right] = \text{Rem} \left[ \frac{3^{6(166)+4}}{91} \right] = \text{Rem} \left[ \frac{3^4}{91} \right] = 81$$

#### Alternative Solution 2:

91, being a composite number, can be expressed as  $91 = 13 \times 7$ .

$$\therefore \text{Rem} \left[ \frac{3^{1000}}{91} \right] = \text{Rem} \left[ \frac{3^{1000}}{13 \times 7} \right]$$

$$\text{Consider } \text{Rem} \left( \frac{3^{1000}}{7} \right)$$

$$\text{Rem} \left( \frac{3^3}{7} \right) = 6 \text{ or } -1.$$

$$\Rightarrow \text{Rem} \left( \frac{3^{1000}}{7} \right) = \text{Rem} \left( \frac{(3^3)^{333} \times 3}{7} \right) = (-1) \times 3 = -3 \text{ or } 4.$$

$$\text{Consider } \text{Rem} \left( \frac{3^{1000}}{13} \right)$$

$$\text{Rem} \left( \frac{3^3}{13} \right) = 1$$

$$\Rightarrow \text{Rem} \left( \frac{3^{1000}}{13} \right) = \text{Rem} \left( \frac{(3^3)^{333} \times 3}{13} \right)$$

$$= 1 \times 3 = 3.$$

The remainder of  $\frac{3^{1000}}{91}$  is such that when divided by 7, it leaves a remainder 4 and when divided by 13 leaves a remainder 3. Of the given choices only 81 satisfies.  
Ans: (81)

11.  $a = 4b = 9c \quad \dots (1)$

$$3a = 6d = 8e \quad \dots (2)$$

Multiplying (1) with 3 and combining it with (2), we have

$$3a = 12b = 27c = 6d = 8e$$

$$\text{As } \frac{d}{b} = 2, \frac{d}{b} \text{ is an integer.}$$

$$\frac{e}{c} = \frac{27}{8} \text{ Hence it is not an integer.}$$

$\frac{ad}{e} = \frac{8}{3}d$ . Only if d is a multiple of 3,  $\frac{ad}{e}$  is an integer.

As  $27c = 6d$ ,  $d = \frac{9}{2}c$ , d is a multiple of 3 and choice (3) is true.

$\frac{ae}{d} = 2e$  and hence it is an integer.

Only choice (2) is false.

Choice (B)

12. Let the sum of all the 7 numbers be S. The sum of the six known elements of the set is 37.

Whatever the value of 'a', the median lies between 6 and 9, both inclusive.

When mean = 6,  $S = 42 \Rightarrow a = 5$ , and 6 is also the median, which is possible.

When mean = 7,  $S = 49 \Rightarrow a = 12$ , then 7 is not the median, which is a contradiction.

When mean = 8,  $S = 56 \Rightarrow a = 19$ , then 8 is not the median, which is a contradiction.

When mean = 9,  $S = 63 \Rightarrow a = 26$ , and 9 is also the median, which is possible.

$\therefore$  'a' can assume two values.

Choice (B)

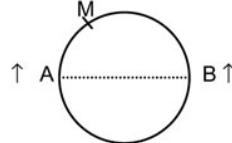
13. The total distance Ajay can cover

$$= \frac{8}{60} (12 + 6 + 3 + 1.5 + \dots)$$

$$= \frac{8}{60} \left[ \frac{12}{1-1/2} \right] = \frac{192}{60} = 3.2 \text{ km}$$

The total distance Brij can cover =  $\frac{8}{60} [24 + 12 + 6 + 3 + \dots]$

$$= \frac{8}{60} \left[ \frac{24}{1-1/2} \right] = 6.4 \text{ km}$$



$$\widehat{AM} = 250 \text{ m and } \widehat{BM} = 500$$

It may be observed that the ratio of their speeds 1 : 2 at any point of time. So, except for the first meeting, when they together cover 750 m, for each of the subsequent meetings they together cover a distance of 1500 m.

The total distance they can cover together =  $3200 + 6400 = 9600 \text{ m}$

$$\therefore \text{Number of meetings possible} = 1 + \frac{9600 - 750}{1500}$$

$$= 6.9$$

i.e. a total of 6 meetings are possible.

Ans: (6)

14. All the functions in the options are of the form

$$f(x) = y = \frac{ax+b}{cx+d} \rightarrow (1)$$

If  $f(x)$  is reflexive, we should get  $x$  from  $y$  with the same

$$\text{operation i.e., } x = \frac{ay+b}{cy+d} \rightarrow (2)$$

$$(1) \Rightarrow ycx + yd = ax + b$$

$$\Rightarrow x(cy - a) = -yd + b$$

$$\Rightarrow x = \frac{-dy + b}{cy - a} \rightarrow (3)$$

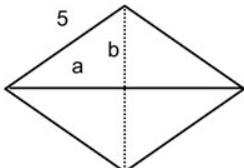
Comparing (3), (2) we see that if  $a = -d$ ,  $f(x)$  is reflexive. Among the options, only in (2)  $a \neq -d$ .

**Alternative solution:**

Each of the choices can be re-organised to express  $x$  as a function of  $y$  (as done in equation (3) above) and it can be checked for each case as to whether  $x = f(y)$ .

Choice (B)

15.



Let the diagonals of the rhombus be  $2a$  cm and  $2b$  cm. The area is  $2ab$  cm $^2$ . We have  $a^2 + b^2 = 25$  and  $a + b = 6$ . Therefore  $2ab = 11$ .

Choice (C)

16. If  $\frac{q+2r}{p} = \frac{r+2p}{q} = \frac{p+2q}{r} = n$

$$k = \frac{(q+2r)+(r+2p)+(p+2q)}{(p+q+r)} = 3$$

i.e.,  $q + 2r = 3p$  and  $p + 2q = 3r$ 

$$\therefore q + 2r = 3(3r - 2q) = 9r - 6q \Rightarrow q = r$$

Similarly,  $p = q$ .

$$\therefore p = q = r \text{ and } \frac{3r+p}{p+q-r} = 4. \quad \text{Ans: (4)}$$

17. The numbers 0, 1, 2, 3, 4, 5, 10, 11, 12, ... in base 6 system correspond to 0, 1, 2, 3, 4, 5, 6, 7, 8, ... in base 10 system.

Now the first hundred numbers will be

$$0 + 1 + 2 + 3 + 4 + 5 + 6 + \dots + 99 = \frac{99(100)}{2}$$

$$= (4950)_{10}$$

6	4950	
6	825	0
6	137	3
6	22	5
3		4

$$\therefore (4950)_{10} = (34530)_6$$

Ans: (34530)

18. Sum of the digits in the even places of the given number

$$= 22 + b.$$

Sum of the digits in the odd places of the given number  
=  $19 + a$ .

$$22 + b - (19 + a) = 3 + b - a \text{ which must be 0 or a multiple of 11.}$$

As  $b > a$ ,  $3 + b - a > 3$ . It is  $\neq 0$  (It is a multiple of 11)

As  $b$  has a maximum value of 9 and  $a$  has a minimum value of 1,  $b - a$  has a maximum value of 8. Hence  $3 + b - a \leq 11$ . As  $3 + b - a$  must be a multiple of 11,  $3 + b - a = 11 \Rightarrow b - a = 8$  i.e.,  $b = 9$  and  $a = 1$ .  $a + b = 10$ . The remainder obtained when the number is divided successively by  $a + b$  i.e., 10 and a i.e., 1 are 9 and 0 respectively. Hence, the sum of the remainders is 9.

Choice (D)

19. Let the cost price for Jaideep be Rs.100. So his marked price is  $100(1.5) = 150$  and his selling price = 150 (0.6) = 90.

∴ Jaideep makes a loss of 10%.

Choice (B)

20. If capacity of 11<sup>th</sup> tap =  $C$ , then the combined capacity of all taps numbered below it =  $C$ .

⇒ Capacity of 12<sup>th</sup> tap = Sum of all taps numbered below it =  $C + C = 2C$

But it is given that  $2C - C = 1792$ 

$$\Rightarrow C = 1792$$

Now capacity of 10<sup>th</sup> tap will be (capacity of 11<sup>th</sup> tap) / 2.

$$\text{Similarly, capacity of 8<sup>th</sup> tap} = \frac{\text{Capacity of 11<sup>th</sup> tap}}{2 \times 2 \times 2}$$

$$= \frac{1792}{8} = 224 \text{ litres/hr.}$$

Choice (C)

21. Total number of rings available is 50.

These 50 rings have to be grouped into 5 groups.

The minimum number of rings for any group is 1.

Using the analogy of placing 50 balls in 5 boxes, the number of different ways is  ${}^{50-1}C_{(5-1)} = {}^{49}C_4$ 

Choice (A)

22. Let  $ad = bc = k$  and let  $S = a + b + c + d$

$$\therefore d = \frac{k}{a} \text{ and } c = \frac{k}{b}.$$

$$S = a + b + c + d = \left(a + \frac{k}{a}\right) + \left(b + \frac{k}{b}\right)$$

The minimum value of the expression  $a + \frac{k}{a}$  is  $2\sqrt{k}$ .

Therefore, the minimum value of  $S$  is  $4\sqrt{k}$  (:a and b can vary independently)As  $S$  is given to be 20,

$$4\sqrt{k} \leq 20 \text{ or } k \leq 25.$$

The maximum value of  $k$  (or  $ad$ ) is 25.

Ans: (25)

23. To get an average of 50%, Pooja has to select at least one subject with less than 50% and at least one subject with more than 50%.

If  $T_6$  is selected, any two subjects, except ( $T_2$ ,  $T_5$ ), can be selected.

$$\Rightarrow \text{Number of ways} = {}^5C_2 - 1 = 9 \text{ ways.}$$

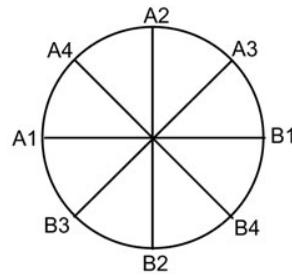
If  $T_5$  is selected (now  $T_6$  should not be considered), then any two subjects from  $T_1$  through  $T_4$  can be selected.

$$\Rightarrow \text{Number of ways} = {}^4C_2 = 6$$

$$\therefore \text{Total number of ways} = 15$$

Choice (B)

24. With five cuts we could cut the sphere into 16 identical pieces. Let us see how this can be done



The above figure gives the top view after four cuts that are perpendicular to the equatorial plane of the sphere. And the fifth cut will be along the equatorial plane and it doubles the above eight pieces in number. It can also be noted that each cut passes through the sphere (through its centre) completely. Each such cut would produce two circular surfaces with each of the surface equal to the equatorial circle. Let  $r$  be the radius of the sphere. So, five cuts will produce an area =  $(5)(2\pi r^2) = 10\pi r^2$   
Original area =  $4\pi r^2$

$$\therefore \text{Increase in area} = \frac{10\pi r^2}{4\pi r^2} (100\%) = 250\%$$

Choice (C)

25.  $3^{2003} - 1, 3^{2003} + 1$  are consecutive even numbers

So, their GCD is 2

$$\text{LCM} = \frac{\text{Product}}{\text{GCD}} = \frac{3^{4006} - 1}{2},$$

$$\text{The last digit of this is } \frac{3^2 - 1}{2} = 4$$

Ans: (4)

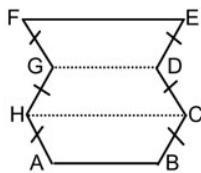
26. Let the roots of the given quadratic be
- $\alpha$
- and
- $\beta$
- .

$$\text{The equation whose roots are } \frac{1}{\alpha}, \frac{1}{\beta} \text{ is } cx^2 + bx + a = 0.$$

$$\text{The equation whose roots are } \frac{1}{2\alpha}, \frac{1}{2\beta} \text{ is } c(2x)^2 + b(2x) + a = 0 \text{ or } 4cx^2 + 2bx + a = 0.$$

Choice (B)

- 27.



The simplest way to solve such problems is to divide the given figure into smaller convex polygons. In the given figure, draw a line joining G to D and another line joining H to C. Now, sum of interior angles of the three concave quadrilaterals must be equal to  $3 \times 360^\circ = 1080^\circ$

Note :  $1080^\circ$  is the sum of all interior angles of all octagons, whether concave or convex. Choice (C)

28. Let the number of cats be
- $c$
- .

Number of mice eaten by each cat must be more than  $c$  say  $c+k$ .

$$\text{Total number of mice} = c(c+k) = 999919$$

$$\text{The nearest perfect square is } (1000)^2 = 1000000.$$

$$\text{Now } 99919 = 10000 - 81 = (1000)^2 - (9)^2$$

$$= (1000 + 9)(1000 - 9) = (1009)(991)$$

Each cat eats more mice than the total number of cats present. So, there were 991 cats and each cat eats 1009 mice. This is the only possible solution as both 991 and 1009 are prime numbers.

**Alternative solution:**

Since each cat ate the same number of mice, the total number of mice must be divisible by the number of cats. From the choices, none of 667, 899, 1147 (In fact, since mice > cats, number of cats cannot exceed 1000, as  $1000 \times 1000 > 999919$ . Hence 1147 cannot be the answer) exactly divides 999919 (to be found out by dividing). Hence Choice (D).

Choice (D)

29. Let the number of one rupee, fifty-paise and twenty-five paise coins be
- $a, b$
- and
- $c$
- respectively.

$$\text{Given, } 100a : 50b : 25c = 5 : 6 : 7$$

$$\Rightarrow a : b : c = 5 : 12 : 28$$

$$\therefore b = \frac{12}{45} \times 135 = 36$$

Ans: (36)

30. The radius of the circle is the perpendicular distance of the given tangent from the centre of the circle.

$$\Rightarrow r = \frac{|6-1|}{\sqrt{3^2 + 1^2}} = \frac{5}{\sqrt{10}}$$

Let the other tangent through the origin be  $y = mx$  i.e.,  $mx - y = 0$

$$\therefore \frac{5}{\sqrt{10}} = \left| \frac{2m+1}{\sqrt{m^2 + 1}} \right| \Rightarrow 3m^2 + 8m - 3 = 0$$

$$\Rightarrow m = -3; \frac{1}{3}$$

Given, the tangent has slope = -3

$$\text{Hence, the required tangent has slope} = \frac{1}{3}$$

$$\Rightarrow y = \frac{x}{3} \text{ or } x - 3y = 0 \text{ is the tangent.}$$

Choice (C)

31. Let the initial amount of milk and water (in the mixture) be
- $4x$
- and
- $5x$
- respectively. Let the rate of evaporation of milk and water be
- $2y$
- and
- $3y$
- respectively (per minute)

$$\text{Now given after } 12\frac{6}{7} \text{ minutes i.e. after } \frac{90}{7} \text{ minutes,}$$

the ratio of milk to water is inverse of 4 : 5 i.e. 5 : 4

$$\therefore \frac{4x - \frac{90}{7}(2y)}{5x - \frac{90}{7}(3y)} = \frac{5}{4}$$

$$\Rightarrow 16x - \frac{90(8y)}{7} = 25x - \frac{90(15y)}{7}$$

$$\Rightarrow 9x(7) = 90(7y) \Rightarrow \frac{y}{x} = \frac{1}{10}$$

Now let the mixture be 50% after  $n$  minutes.

$$\Rightarrow \frac{4x - n\left(\frac{2x}{10}\right)}{5x - n\left(\frac{3x}{10}\right)} = \frac{1}{1} \Rightarrow n = 10 \text{ min}$$

∴ The milk was boiled for an extra time of  $2\frac{6}{7}$  minutes.

Choice (B)

32. Since,
- $b > 0$
- and
- $d > 0$
- :

$$\text{and } \frac{a}{b} < \frac{c}{d}, \text{ either both } a \text{ and } c \text{ are positive or}$$

both negative or  $a$  is negative and  $c$  positive. In all

$$\text{the cases, } \frac{a}{b} < \frac{a+c}{b+d} < \frac{c}{d} \quad \text{Choice (A)}$$

$$33. f(a+b) = f(a)g(b) + g(a)f(b)$$

$$g(a+b) = g(a)g(b) + f(a) + f(b)$$

$$\therefore g[(a+b) + c] = g(a+b)g(c) + f(a+b)f(c)$$

$$= g(a)g(b)g(c) + f(a)f(b)g(c) + g(a)f(b)f(c)$$

Setting  $b = a$  and  $c = a$ , we get

$$\therefore g(3a) = [g(a)]^3 + 3[f(a)]^2g(a) \quad \text{Choice (C)}$$

$$34. (x-20)(x-8) = 2^y.$$

As  $(x-8)$  and  $(x-20)$  are integers, each has to be a power of 2. Therefore, we need two powers of 2 which differ by 12, i.e., 4 and 16.

As  $(4)(16) = (-16)(-4) = 2^6$ , the possible values of  $(x, y)$  are  $(24, 6)$  and  $(4, 6)$ .

Ans: (2)

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