

## (Key and Solutions for AIMCAT1818)

**Key****SECTION – I**

1. A	8. 1234	15. A	22. A	29. 1432
2. D	9. C	16. C	23. C	30. 1
3. B	10. A	17. D	24. D	31. 5
4. D	11. B	18. B	25. 4253	32. 3
5. 1234	12. D	19. A	26. 3514	33. 3
6. A	13. C	20. B	27. 5213	34. 3
7. D	14. D	21. C	28. 2431	

**SECTION – II**

1. B	8. C	15. D	22. 16	29. 9
2. C	9. B	16. D	23. 16	30. 56
3. D	10. A	17. C	24. 16	31. C
4. A	11. A	18. C	25. C	32. 11
5. D	12. D	19. D	26. D	
6. C	13. B	20. B	27. A	
7. A	14. A	21. 39	28. A	

**SECTION – III**

1. 3097	8. D	15. C	22. D	29. 13
2. C	9. D	16. 12	23. C	30. A
3. C	10. B	17. C	24. B	31. 3
4. B	11. B	18. 105	25. A	32. 120
5. D	12. D	19. C	26. A	33. B
6. B	13. 530	20. 1047552	27. B	34. C
7. A	14. B	21. C	28. A	

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

Number of words: 747

1. To put "lipstick on a pig" is a rhetorical expression, used to convey the message that making superficial or cosmetic changes is a futile attempt to disguise the true nature of something.

Refer to the second paragraph of the passage.

Option A: After over 30 years of "intellectual regress", the study of booms and busts now reminds him of a lipstick-wearing pig. The field is dominated by a tight-knit congregation unified by deference to authority, **not facts**. Their revered leaders rely on **high-handed assumptions** to make their models work. Their **naked assumptions** are clothed in fine theoretical robes. Hence choice A is correct.

Option B: Choice B is incorrect. The theories of the economists are based on naked assumptions or high-handed assumptions.

Option C: Choice C is wrong. The theories of the economists are not based on facts.

Option D: Choice D is distorted. The theories of the economists (and not other theories) are based on vague assumptions.

2. Refer to para 6. Many economists cling to stark, crude theories about market efficiency or rational behaviour precisely because it helps them pin down all those slopes and other parameters. If they did not care about these defining numbers, they could afford to entertain messy, finespun beliefs about human nature and market institutions. But then they would be called sociologists.

(Here the use of 'messy' is tongue-in-cheek, to mean that the human aspects would make possible a number of realities – therefore messy – and not just the 'neat' theoretical ones.) Hence choice D is the answer.

Option A: The pattern of dots will reflect shifts in demands as well as supply. To estimate one popular macroeconomic model, an economist must pin down the equivalent of 49 "slopes". Hence choice A is what an economist should do. But choice A is not the answer for the question.

Option B: Choice B has been contradicted by the information in para 6. It is when economists do not cling to crude theories about market efficiency or rational behaviour ....

Option C: Choice C is incomplete. It's not about entertaining vague assumptions. The passage says that if the economists didn't go by numbers alone, they could consider the human aspects of things.

Choice (D)

3. The author refers to Mr. Romer's dissent in the last para of the passage. But their continued interest in research proves that you do not have to leave the ivory tower to criticise it.  
 Option A: Choice A is incorrect. Mr Romer explains that because he is now a practitioner, with no need to add to his research credentials, he faces an unusually low price of dissent. Other leading critics are also professionally secure. But their continued interest in research proves that you do not have to leave the ivory tower to criticise it.

Option B: But their continued interest in research proves that you do not have to leave the ivory tower to criticise it. This makes choice B correct.

Option C: Choice C is out of scope. Hence choice C is not the answer.

Option D: While choice D may be true in another context, it is not what the quoted sentence in the question implies. Hence choice D is not the answer.

Choice (B)

4. The simplest blackboard model of demand and supply is represented in textbooks by two intersecting diagonal lines, one sloping upwards (because sellers supply more when prices are high) the other downwards (because buyers demand more when prices are low). One can only note their intersections, recording each combination of price and quantity, perhaps as dots on a graph. If supply (and only supply) moved randomly, the resulting dots would trace out the demand curve: they would show how much demand expands and contracts when prices fall and rise, thanks to variations in supply. The curve's slope and position would be "identified". But that is not how the world typically works. Instead, the pattern of dots will probably reflect shifts in demand as well as supply. This makes choice D the correct answer.

Choice (D)

5. Refer to para 5.

Statement 1: Economists can hunt for scraps of relevant microeconomic evidence, such as household surveys. So statement 1 is true.

Statement 2: They can wait for natural experiments. So statement 2 is true.

Statement 3: Or they can make flat assumptions: presuming, for example, that the monsoon affects food supply but not demand. Hence statement 3 is also correct.

Statement 4: Alternatively, they can rely on theory. Through logical reasoning they can try to deduce some law of markets or behaviour (perhaps that pay reflects productivity or that markets clear). So statement 4 is also correct.

Statement 5: If supply (and only supply) moved randomly, the resulting dots would trace out the demand curve: they would show how much demand expands and contracts when prices fall and rise, thanks to variations in supply. The curve's slope and position would be "identified". But that is not how the world typically works. Instead, the pattern of dots will probably reflect shifts in demand as well as supply. That makes it impossible to identify either curve from the dots alone. This identification problem is particularly severe in macroeconomics, which has a lot of moving parts, many of which move each other. Hence statement 5 is incorrect.

Ans: (1234)

6. Option A: Indeed, economists used humbly to admit they had pinned down their models by assuming one thing or another. Now, they do so by theorising one thing or another. But these deductive proofs often rely on earlier, questionable assumptions. In between the assumptions and the proof is enough mathematical "blah blah blah" (as Mr Romer puts it) to hide the assumptions' full role. This makes choice A correct.

Option B: Deductive proofs and assumptions are not problematic persay. Economists profess to solve the identification problem by relying on deep theory but instead rely on shallow assumptions. Hence choice B is incorrect.

Option C: Macroeconomic theories contribute to hypocrisy and obfuscation through shallow or questionable assumptions. Hence choice C is not the answer.

Option D: Choice D may be true or may be a part of the problem but it is not the exact implication of the sentence given in the question.

Choice (A)

### Solutions for questions 7 to 12:

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

Number of words: 738

- 7.

The ideaflow of the passage is:

Para 1 – Ideology, the way Hegel looks at it, could be secular, political, religious, cultural, moral/ social.

Para 2 – Hegel does not see a distinction between the ideological world and the material (practical/ temporal) world. What is true in one world could well have an impact on the other and vice-versa.

Para 3 – What underlies everything (i.e. both worlds) is consciousness.

Para 4 – Marx (consequently, the Left) has an entirely contradictory view. He equates consciousness with ideologies, and opines that they are the result of experience/ circumstances in the material (practical/ temporal) world.

Para 5 – This view is also held by the capitalist Right.

Para 6 – Weber's view (which turns out to be similar to Hegel's) is that ideals drive actions in the material world, and to understand that relationship, we have to study where it all begins – the spirit (i.e. consciousness).

Hence we can say that the roots of all ideology, according to the Hegelian view, lie in consciousness. Choice D is the answer.

Refer to para 1. Ideology in this sense is not restricted to the secular and explicit political doctrines we usually associate with the term, but can include religion, culture, and the complex of moral values underlying any society as well. This thought is somewhat reiterated in para 3. This consciousness may not be explicit and self-aware, as are modern political doctrines, but may rather take the form of religion or simple cultural or moral habits. But this does not imply that the roots of all ideology lie in what has been given in choices (A), (B) and (C). The roots of ideology can be traced to consciousness (according to para 3).

Choice (D)

8. Refer to the last para. The choices of leisure over income, or of the militaristic life of the Spartan hoplite over the wealth of the Athenian trader, or even the ascetic life of the early capitalist entrepreneur over that of a traditional leisured aristocrat, cannot possibly be explained by the impersonal working of material forces, but come preeminently out of the sphere of consciousness. This makes statements (1) and (3) true.

Refer to para 4. Whether a highly productive modern industrial society chooses to spend 3 or 7 percent of its GNP on defence rather than consumption is entirely a matter of that society's political priorities, which are in turn determined in the realm of consciousness. This makes statement (2) correct.

Refer to the first and last lines of the last para. Different economic performance of Protestant and Catholic communities throughout Europe and America ..... summed up in the proverb that Protestants eat well while Catholics sleep well ..... to understand the emergence of modern capitalism and the profit motive one had to study their antecedents in the realm of the spirit. Also refer to the first sentence of para 3: For Hegel, all human behavior in the material world, and hence all human history, is rooted in a prior state of consciousness. So statement (4) is also correct.

Ans: (1234)

9. For Hegel, all human behavior in the material world, and hence all human history, is rooted in a prior state of consciousness. Marx reversed the priority of the real and the ideal completely, relegating the entire realm of consciousness – religion, art, culture, philosophy itself – to a "superstructure" that was determined entirely by the prevailing material mode of production. Weber theorized that contrary to Marx, the material mode of production, far from being the "base," was itself a "superstructure" with roots in religion and culture, and that to understand the emergence of modern capitalism and the profit motive one had to study their antecedents in the realm of the spirit. Choice C has the correct viewpoints of Hegel, Karl Marx and Max Weber.

Option A: While Hegel's viewpoint is correctly mentioned, the viewpoints of Karl Marx and Max Weber are incorrectly given. Option B: While Marx's viewpoint is correctly mentioned, the viewpoints of Hegel and Max Weber are incorrectly mentioned.

Choice (C)

10. Refer to para 5. The materialist bias of modern thought is characteristic not only of people on the Left who may be sympathetic to Marxism, but of many passionate anti-Marxists as well. Indeed, there is on the Right what one might label the Wall Street Journal school of deterministic materialism that discounts the importance of ideology and culture. This makes choice A the correct answer. The remaining choices do not apply.

Choice (A)

11. Option A: Choice A is contradicted by the passage which emphasizes the doctrine of idealism. In fact, consciousness acts beyond the purview of the material world, the history of humanity and the future of a nation.

Option B: The passage introduces Hegel's perspective on consciousness and the role that it plays in determining various factors such as human history and the material world. The realm of consciousness in the long run necessarily becomes manifest in the material world, indeed creates the material world in its own image. To understand the emergence of modern capitalism and the profit motive one had to study their antecedents in the realm of the spirit. Hence choice B is the answer.

Option C: Though it has been mentioned in the second para that Hegel's view of the relationship between the ideal and the real or material worlds was an extremely complicated one, choice C is not the primary concern of the passage.

Option D: Consciousness exhibits itself by taking the form of the religious, cultural and moral inclinations in a given society. This is one of the premises in the passage. But the passage goes much more beyond this aspect to explain how consciousness determines all human behaviour in the material world. The word 'proves' also renders this choice wrong.

Choice (B)

12. Option A: The Wall Street Journal school of deterministic materialism discounts the importance of ideology and culture and sees man as essentially a rational, profit-maximizing individual. Hence choice A is true and is not the answer.

Option B: Refer to the boldfaced part of para 2. .... Also refer to para 3: Consciousness is cause and not effect, and can develop autonomously from the material world; hence the real subtext underlying the apparent jumble of current events is the history of ideology. So choice B is correct and is not the answer.

Option C: Paul Kennedy ascribed the decline of great powers to simple economic overextension. Therefore choice C is true and is not the answer.

Option D: Choice D is not correct and is the answer. Hegel did not believe that the real world conformed or could be made to conform to ideological preconceptions of philosophy professors in any simpleminded way, or that the "material" world could not impinge on the ideal.

Choice (D)

#### Solutions for questions 13 to 15:

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

Number of words: 473

13. Refer to the first para of the passage.

Option A: The Kindai University Fisheries Laboratory might not be the most enticing name for a fancy restaurant. The fancy restaurant has been named "..... Laboratory". Choice A is not true.

Option B: There is no data in the passage to support choice B. Option C: Diners who sample the fish appear satisfied with the quality of the *sashimi*, including the juicy slices of bluefin tuna, one of the most prized species of all. But the tuna in the restaurant ..... was not caught in the wild, but farmed. Hence choice C is the answer.

Option D: Choice D is not the answer. The Japanese government has resisted more stringent measures, including the complete ban on bluefin tuna fishing. The first part of choice D is also incorrect.

Choice (C)

14. Option A: Aquaculture might seem to offer a way out of this impasse. But the bluefin is hard to breed in captivity .... Choice A is not the view expressed by Atsushi Ishii in the passage.

Option B: The Japanese government has resisted more stringent measures, including the complete ban on bluefin fishing advocated by America. But it has not been mentioned in the passage that Atsushi Ishii supports this move by the Japanese government. So choice B is wrong. Option C: The Japanese government has resisted more stringent measures, including the complete ban on bluefin fishing advocated by America, among other countries. The Japanese government says that would not be warranted unless stocks drop for three years in a row – a hurdle that most conservationists consider too high .... The Japanese government is not at loggerheads with the Japanese conservationists and the American government. Hence choice C is not the answer.

Option D: Using wild fish for feed makes bluefin farming unsustainable, says Atsushi Ishii of Tohoku University. He sees aquaculture as a distraction from the thorny task of managing fisheries properly. So choice D is the answer.

Choice (D)

15. Option A: The last para helps us understand Naotoshi Yamamoto's view – that conservation efforts and awareness will not really help stop or reverse the drop in supply (that is, the drop in tuna population). [Note that, in saying they 'may' have to reduce consumption, he also implies some possibility of 'may not', and it can be inferred that he would consider this a possibility that depends on the success (and adequate success) of efforts for captive breeding of tuna.] However, in the last sentence of the passage, Naotoshi Yamamoto says: But in the end, they may just have to eat fewer fish. Hence choice A is the correct answer. Choice A is a better answer than choice B. Option B: From the last para, we can infer that conservation of bluefin tuna has come into the public consciousness. But the first part of choice B is not an adequate reason for consumers to reduce consumption. Conservation or no conservation, the consumption needs to be reduced because there aren't many numbers left. Choice B does not talk about the efforts needed to be made for (and the success thereof) the captive breeding of tuna. Also, "endangered species" is not the same as "species threatened with extinction".

Option C: Japan did agree to halve its catch of juvenile bluefin (fish too young to reproduce) in the northern Pacific last year. But choice C is not the implication of Naotoshi Yamamoto's statement in the last para of the passage.

Option D: The conservation body, International Union for Conservation of Nature, put bluefin tuna on its "red list" of species threatened with extinction. Hence "step-motherly treatment meted out to bluefin tuna by conservationists" is wrong. Choice D is not the answer.

Choice (A)

**Solutions for questions 16 to 18:****Number of words and Explanatory notes for RC:**

Number of words: 273

- 16.** The author calls politics a con game because the politicians deceive the voters into believing "the illusion that the men he chooses to lead him are of finer nature than he".  
 Option A: The voters believe that politicians will provide a better life to them. But the passage does not talk about politicians not keeping their promises. Even though the author might agree with this statement, the passage only talks about how the politicians model their image to gain the voters' confidence. Hence, this option is incorrect.  
 Option B: The passage mentions that "It has been traditional that the successful politician honor this illusion". However, it does not specify that the politicians do so only after winning the elections. Further, the author states that the politicians of today do not bother with honouring this illusion. Hence, this is not the correct answer.  
 Option C: The author calls politics a con game because the politicians present themselves in a better light and the voter is made to believe that the politicians are better than themselves. Because the politicians con the voters in this manner, the author calls politics a con game. Hence, this is the correct answer.  
 Option D: While the author mentions that advertising is a con game, it is not by associating itself with advertising that politics is called a con game. Hence, this is not the correct answer.  
 Therefore, the correct answer is option C. Choice (C)
- 17.** The author mentions that "It is not surprising then, that politicians and advertising men should have discovered one another."  
 Option A: We can infer from the passage that both advertisers and politicians deceive the public. But the objective of them is not to deceive the public. Advertisers deceive the public to sell goods, while politicians do so to gain votes. Hence, this option is incorrect.  
 Option B: The author does not talk about how much politicians are willing to spend on advertising. They operate in a similar manner and hence, the author feels that it is not surprising that they work together. Hence, this is not the correct answer.  
 Option C: The author does not talk about highlighting the virtues and vices of the politicians. Hence, this is not the correct answer.  
 Option D: The author mentions that advertisers and politicians realized that "the citizen did not so much vote for a candidate as make a psychological purchase of him". He also mentions that "there is a difference between the individual and his image". This gap is bridged by embellishment, which advertising helps accomplish. Hence, this is the correct answer. Choice (D)
- 18.** According to the passage, "It has been traditional that the successful politician honor this illusion. To succeed today, he must embellish it."  
 Option A: The author mentions that traditionally, a politician, to be successful, honors the illusion of being better than the voter, i.e., he tries to become a better person. However, this does not imply that only people who are better than voters became politicians. Hence, this is incorrect.  
 Option B: According to the author, traditionally, politicians tried to honor the illusion that voters had. But "To succeed today, he must embellish it". The next paragraph provides an example in which the politician must work on the image to appear a better person. Hence, this is the correct answer.  
 Option C: The passage talks about these roles (leading man, God, father...) when talking about the ideal president, and not about politicians in general.  
 Option D: The author does not mention that in the past, successful politicians did not advertise. We can only say

that they might not have advertised falsely. Hence, this option is incorrect.

Therefore, the correct answer is option B. Choice (B)

**Solutions for questions 19 to 24:****Number of words and Explanatory notes for RC:**

Number of words: 792

- 19.** Mongrel Nation would refer to a nation of mixed origin or character or descent.  
 Option A: It would be misleading to see immigration as a purely modern development. Since the 1840s, when Irish settlements in Britain reached major proportions due to the Great Famine (1845-52) the scale, pace and diversity of immigration have been considerable. Hence choice A is the correct answer.  
 Option B: Recent history requires that scholars and students alike come to terms with the variety of our cultural and ethnic heritage. Hence the antithesis of choice B is true.  
 Option C: The first part of choice C is true from the last sentence of the first para but choice C (comparison of Britain with America) is not the reason for the question.  
 Option D: .... the variety of our cultural and ethnic heritage. The idea of one history for one people (implicitly a white history for white people) has gone. Hence the converse of choice D is true. Choice (A)
- 20.** American scholarship has always reflected the special, indeed central, part played by immigrants in the history of the United States. The historian Oscar Handlin commented: 'Once I thought to write a history of the immigrants in America. Then I discovered that the immigrants were American history.'  
 Option A: Choice A is negative in tone. The comment is about the past and not the future. Hence 'predict the future of immigrants to America' as given in choice A is wrong.  
 Option B: American scholarship has always reflected the special, indeed central, part played by immigrants in the history of the United States. .... massive population movements of the eighteenth, and particularly the nineteenth centuries, American culture and ethnicity have been drawn from the four corners of the globe. The opening lines of the historian's Oscar Handlin's classic work .... sum up the importance of this dimension of the history of the USA. ... The second sentence of the first para implies that America developed when immigrants arrived on its shores. Hence choice B is the correct answer.  
 Option C: The comment of the historian is not about the comparison, in terms of numbers, between the immigrants and the native Americans. Hence choice B is beside the point.  
 Option D: Choice D paints immigration in a negative light. The passage does not throw any light on whether immigrants have been neglected or marginalized in America or whether there are any misconceptions about the immigration process as such. Hence choice D is incorrect. Choice (B)
- 21.** Option A: Choice A appears in para 4 but is out of context. A study of our clearly ethnically mixed recent history has been limited next to the American example. In fact, more words have been written on any one ethnic group in the USA – say Italian or Irish – than has been given over to all settlers in Britain since the 1840s. Hence choice A is not the answer.  
 Option B: Choice B is absurd. Refer to para 3. Since the 1840s, when Irish settlements in Britain reached major proportions due to the Great Famine (1845-52) the scale, pace and diversity of immigration have been considerable.  
 Option C: Refer to para 3. Since the 1840s, .... the scale, pace and diversity of immigration have been considerable. Recent history requires that scholars and students alike come to terms with the variety of our cultural and ethnic heritage. The idea of one history for one people (implicitly a

white history for white people) has gone. Ethnicity, as much as class or nation, must be a part of the historian's project. Hence choice C is the correct answer.

Option D: Choice D has been mentioned in para 2: Since the 1840s, when Irish settlements in Britain reached major proportions due to the Great Famine (1845-52) the scale, pace and diversity of immigration have been considerable. ... But this is not necessarily limited to Britain only. Choice D does not answer the question.   
 Choice (C)

22. Panikos Panayi trenchantly described ethnicity as the way in which members of a national, racial or religious grouping maintain an identity with people of the same community in a variety of official and unofficial ways. Dale T. Knobel, in *Paddy and the Republic: Ethnicity and Nationality in Antebellum America* (1986), writes of ethnicity as 'socio-psychological rather than anthropological', taking ethnicity to be subjective and ascribed rather than objective and ideal. (Social psychology is the scientific study of how people's thoughts, feelings, and behaviors are influenced by the actual, imagined, or implied presence of others. Social psychologists typically explain human behavior as a result of the interaction of mental states and immediate social situations.) Hence choice A comes closest to describing ethnicity as 'socio-psychological rather than anthropological'. Hence choice A is the answer.

Option B: Choice B is incorrect and out of context. Sense of identity with people of a community is important.

Option C: While choice C has been mentioned in para 1, it does not address the "socio-psychological rather than anthropological" comparison made, while describing ethnicity, in the penultimate para of the passage. Also "a unitary vision for a common people" is incorrect. ... (To talk of ethnic diversity in the United Kingdom, where ruling elites pride themselves on a unitary vision of one people, raises fear and excitement.) Hence choice C is incorrect.

Option D: Choice D does not tackle the 'socio-psychological angle' of ethnicity. The second part of choice D is out of scope. Hence it is not the answer.

Choice (A)

23. Option A: "immigration patterns" and "evolution and psyche of a nation" in choice A is out of scope. Hence choice A is not the answer.

Option B: The word 'only' in choice B makes it extreme. A historian would not just write but analyze the history of a nation. So choice B is wrong.

Option C: American scholarship has always reflected the special, indeed central, part played by immigrants in the history of the United States. ... Recent history requires that scholars and students alike come to terms with the variety of our cultural and ethnic heritage. The idea of one history for one people (implicitly a white history for white people) has gone. Hence choice C is the correct answer.

Option D: Europe's regions, small nations and languages look to the EU to protect and advance their precious cultural inheritance. Support for the small ethnic groups of Europe has resulted in increased funding opportunities for cultural activities, including native-tongue radio and television broadcasting and historical research. Even so, the recommendation in choice D is not the answer for the question.   
 Choice (C)

24. Option A: "labour that is cheap and disposable" in choice A is out of scope.

Option B: Ethnicity is described in the terms mentioned in Choice B, but it is not stated whether these imply positive and negative aspects of ethnicity. Hence choice B is not sufficient to answer the question.

Option C: To talk of ethnic diversity in the United Kingdom, where ruling elites pride themselves on a unitary vision of one people, raises fear and excitement. The idea of a multicultural national curriculum is the subject of intense debate. ... While the first part of choice C can be considered as a positive consequence of ethnicity, the second part of choice C need not be considered as a negative factor. Therefore choice C is not the answer.

Option D: Ethnicity is a positive concept, concerned with the mutualistic identification of, say, migrant groups, it is also negative, because as much as being the creation of the ethnic group, it is also manufactured from without. In the case of, say, Jewish settlers in Britain, this means ethnicity is both the identity conferred by the group and the stereotypes imposed by the British or by wider European or Christian ideas of race and history. So the positive and negative aspects of ethnicity are best illustrated by the example of the British Jews in the last couple of sentences of the last paragraph of the passage. Hence choice D is the answer.   
 Choice (D)

#### Solutions for questions 25 to 29:

25. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It mentions the term 'moral victory' and establishes the background of discussion: "moral victory" is not exclusive to sports. Sentence 4 is followed by sentence 2. "not exclusive to sports" in sentence 4 is linked with "But the term is heard most often after athletic contests ..." in sentence 2. Sentence 5 gives an example of "moral victory referring to the losing side of a close result against an opponent perceived as superior" in sentence 2. The para, quite effectively, ends with statement 3, the idea being that though media/ spectators (note the word 'describe' in sentence 4) may use the term 'moral victory', coaches and serious athletes prefer not to. Sentence 1 provides another example but it is incomplete/ inadequate, it does not explain the idea of 'moral victory'. The para doesn't really need two examples, the one about Frazier would do. So 4253 is a correct sequence and sentence 1 is the odd sentence out.

Ans: (4253)

26. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the paragraph. It mentions the background of the topic of discussion: When parents see their children's problems as opportunities to build the relationship .... Sentence 3 is followed by sentence 5. "totally changes the nature of parent-child interaction" in sentence 3 links with the consequence "Parents become more willing, even excited, ...." in sentence 5. Sentence 1 follows as an example of the points mentioned in sentences 3 and 5. Sentence 4 concludes the para. So, 3514. Sentence 2 stands out as the odd man sentence as it does not relate to the "parent-child interaction" theme of the other sentences.

Ans: (3514)

27. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It has a number of proper nouns and mentions the time period. It provides the topic of discussion: conduct an experiment on the culture of honour. Sentence 2 follows sentence 5. "They knew" in sentence 2 refers to "two psychologists at the University of Michigan – Dov Cohen and Richard Nisbett" in sentence 5. "what happened in places like Harlan in the nineteenth century was a product of patterns laid down in the English borderlands centuries before" in sentence 2 points to "culture of honour" mentioned in sentence 5. Sentence 2 is followed by sentence 1. "Interest was in the present day. Was it possible to find remnants of the culture of honour in the modern era?" in sentence 1 continues after "happenings in Harlan in the nineteenth century being a product of patterns laid down in the English borderlands centuries before" as given in sentence 2. Sentence 3 provides a detail of the experiment and concludes the paragraph. "with a view to figure out the insult that would go to the heart of a 18 year old's brain" is an objective of the "experiment on the culture of honour" mentioned in sentence 5. So, 5213. Sentence 4 is the odd man out as it runs tangent to the remaining sentences. It would need further elaboration and substantiation.   
 Ans: (5213)

28. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the

paragraph. It introduces the topic of discussion: Alcatraz Federal Penitentiary. Sentence 2 is followed by sentence 4 as it provides additional details about the Penitentiary. Sentence 4 is followed by sentence 3. "bay was the best guarantee that nobody would successfully escape" in sentence 3 points to "San Francisco Bay" and "surrounded on all sides by ice-cold water" in sentence 4. Sentences 3 and 1 form a mandatory pair. "nobody would successfully escape" in sentence 3 links with "no prisoner successfully escaped, though many attempted and were caught or killed in the act" in sentence 1. Sentence 1 concludes the para. So 2431. Sentence 5 is the odd man out as "secrets behind the impossible escape" in sentence 5 needs a precedent and further elaboration.

Ans: (2431)

29. On a careful reading of the sentences, it can be observed that sentence 1 is a general sentence that begins the paragraph. It introduces the term "Mitigated speech" and explains its meaning. Sentence 4 follows sentence 1 as sentence 4 tells us when we mitigate. Sentences 4 and 3 form a mandatory pair. "when we're being deferential to authority" in sentence 4 links with "You mitigate as you tell the boss" in sentence 3. Sentence 3 is followed by sentence 2. "In a situation like that, mitigation is entirely appropriate" points to "the mitigation situation with the boss" discussed in sentence 3. So, 1432. Sentence 5 is the odd man out as the contrast conjunction 'but' in sentence 5 does not contrast any point made in the remaining sentences. Also "crashes have been far more likely to happen" in sentence 5 needs more substantiation. Sentence 5 can come much later in the flow.

Ans: (1432)

#### Solutions for questions 30 to 32:

30. Part 1 is error free.

In part 2, 'large looms' needs to be replaced with 'looms large'.  
Part 3 has punctuation errors. There are commas required in various places. Part 3 should read: For a country not generally given to national chest thumping, the battle at Vimy, where Canadian troops overtook German lines, In part 4, "cast ..... for" is incorrect and should be replaced with "cast ..... as". The part should read: has been cast by many Canadians as a pivotal moment in their nation's formation.

In part 5, the adverb 'quietly' is misplaced. 'quietly' should be placed before 'placing candles on the steps of the monument'. The part should read: ..... and quietly placing candles on the steps of the monument for each of the Canadians who died.

Ans: (1)

31. Part 1 has an incorrect order of adjectives. Part 1 should read: The undulating golden sand dunes are so majestic Part 2 should have "that they have been turned into a national park". (so majestic that ....)

In part 3, the adverbs 'only' and 'improbably' are misplaced. Part 3 should read: at the world's only indoor sand museum to mount an exhibit of improbably intricate tableaus,

Part 4 should have the present perfect tense: have sculpted scenes  
Part 5 is error free.

Ans: (5)

32. Part 1 has an error of preposition. The part needs 'staring into' and not 'staring in'.

Part 2 has an error of subject-verb agreement. The part should read: this artist known for his love-it-or-hate-it artworks is orchestrating his own comeback.

Part 3 has no errors. (Note the correct use of tense, modifiers, punctuation and overall sentence construction in part 3.)

Part 4 needs the indefinite article 'an' before 'underwater fantasy'.

Part 5 needs 'like' in place of 'as'. (with sculptures like the Buddha and hundreds of other objects ....)

Ans: (3)

#### Solutions for questions 33 and 34:

33. On a careful reading of the paragraph, it can be inferred that the highlighted sentence does not belong to blank (1). The sentence is completely out of place in blank (1), as it interrupts the flow of thought. "No Wall Street investment bank was as well-connected, as arrogant, as influential" in the sentence after blank (1) needs to continue after the sentence preceding blank (1) (Goldman Sachs was in a class of its own).

The highlighted sentence is a misfit in blank (2). The sentence preceding blank (2) has some facts "like the rest of its industry, it has not fully recovered from the near-death experience of 2008". The highlighted sentence once again having the contrast conjunction 'but' is out of place.

The highlighted sentence cannot be a part of blank 4. The second para is positive about Goldman Sachs. The highlighted sentence needs to come much earlier in the flow. The highlighted sentence can be best placed in blank (3). "But even so it is a shadow of its former self", contrasts the preceding sentence "Goldman's shares trade virtually at book value." "But even so" would somehow liken the situation at Goldman Sachs to that of the other banks: Deutsche Bank, Citigroup, Bank of America. The highlighted sentence at the end of the first para correctly presents the slide from the opening sentence: "In its pomp, Goldman Sachs was in a class of its own."

Ans: (3)

34. On a cursory reading of the paragraph, one can understand that the paragraph talks about the fight against cancer.

The highlighted sentence is a poor example of an introductory or opening statement of the paragraph. The paragraph best begins with the sentence following blank (1): The lexicon of oncology is filled with military metaphors: .....

The highlighted sentence does not belong to blank (2). The highlighted sentence would interfere with the thought flow if placed in blank (2). The sentences preceding blank (2) talk about cancer by referring to metaphors. Also "those weapons may be conventional (surgery), chemical (cancer-killing drugs) or nuclear (radiation therapy)" as mentioned in the sentence following blank 2 links very well with "whatever weapons" as given in the sentence preceding blank 2.

The sentences preceding blank 3 talk positively about weapons to fight cancer. There is even talk of biological agents, in the form of viruses specifically tailored to seek out and eliminate their tumorous targets. The sentence succeeding blank 3 starts with the contrast conjunction 'but'. The highlighted sentence best fits in blank 3 serving as a bridge between 'the positive view points about cancer weapons' and 'the new line of thought "but rather one who overcomes the armies of his enemies without having to fight them himself."

The highlighted sentence does not fit in blank (4) as it would interfere with the thought flow. The last three sentences of the paragraph need no run continuously.

Ans: (3)

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

#### SECTION – II

#### Solutions for questions 1 to 4:

Among the four persons who was serviced by a hairdresser, the person who spent the least time would have been serviced first. Since John takes between 11 minutes to 15 minutes to cut one person's hair, Akhil must have been the first to be serviced by John.

Similarly, Hardip must have been serviced by Jack. Either Narendra or Govind would have been serviced by Gary.

Since Akhil was serviced by John, the next person to have been serviced by John would have spent at least  $13 + 11 = 24$  minutes and at most  $13 + 15 = 28$  minutes in the saloon.

From the table, Narendra must be the second person to have been serviced by John.

Hence, Govind is the first person that Gary serviced.

The second person that Jack would have serviced waited for at least  $17 + 16 = 33$  minutes and at most  $17 + 20 = 37$  minutes. Either Ram or Das can be this person.

The third person that John serviced would have spent at least  $24 + 11 = 35$  minutes and at most  $24 + 15 = 39$  minutes. From the table, we can see that only Das can be this person. The fourth person to be serviced by John must have spent at least 47 minutes and at most 51 minutes. Neeraj has to be the fourth person.

John	
Person	Service Time
Akhil	13
Narendra	11
Das	12
Neeraj	14

Jack	
Person	Service Time
Hardip	17
Ram	16
Anant	19
Nitin	17

Gary	
Person	Service Time
Govind	22
Jayant	21
Gautam	24
Shiv	23

1. Anant was serviced by Jack. Choice (B)
2. John took a maximum of 14 minutes to service any customer. Choice (C)
3. Ram was not serviced by John. Choice (D)
4. Among the given options, Neeraj waited for the maximum amount of time (36 minutes). Choice (A)

#### Solutions for questions 5 to 8:

5. By observation, we can see that for Company E and Company F, the profit percentage is greater than 100%.

$$\text{Profit percentage of Company A} \cong \frac{105}{120} \times 100$$

$$\text{Profit percentage of Company B} \cong \frac{60}{85} \times 100$$

$$\text{Profit percentage of Company C} \cong \frac{75}{105} \times 100$$

$$\text{Profit percentage of Company D} \cong \frac{70}{125} \times 100$$

Hence, the lowest profit percentage is for Company D. Choice (D)

6. By observation, we can see that the profit has to be the maximum for either Company A or Company F.

Profit of Company A in 2015  $\cong 105$

Profit of Company A in 2016  $\cong 25$

Difference = 80

Profit of Company F in 2015  $\cong 115$

Profit of Company F in 2016  $\cong 15$

Difference = 100

Hence, the maximum difference is approximately ₹100 lakhs. Choice (C)

7. By observation, we can see that Company A and Company F do not have 30% profit percentage in 2016.

For all the other companies, the profit percentage is greater than 30% in both the years. Choice (A)

The second person serviced by Gary must have spent at least 43 minutes and at most 47 minutes. From the table, Jayant is the second person serviced by Gary.

The third person serviced by Gary must have spent at least 64 minutes and at most 67 minutes. Gautam must be the third person to be serviced by Gary. The last person to be serviced by Gary must have spent at least 88 minutes and at most 92 minutes. Shiv has to be the fourth person serviced by Gary.

Since Das is serviced by John, Ram must be the second person to have been serviced by Jack. The third person serviced by Jack must be Anant and the fourth person to be serviced by Jack must be Nitin.

The following table provides the order in which each of the three barbers serviced the customers and the time taken by them for servicing each customer:

8. Profit percentage of Company A across the two years

$$\cong \frac{105 + 25}{120 + 225} = 37.7\%$$

Profit percentage of Company B across the two years

$$\cong \frac{60 + 80}{85 + 140} = 62.2\%$$

Profit percentage of Company C across the two years

$$\cong \frac{75 + 42}{105 + 120} = 52\%$$

Profit percentage of Company D across the two years

$$\cong \frac{70 + 93}{125 + 55} = 90.5\%$$

Profit percentage of Company E across the two years

$$\cong \frac{70 + 75}{60 + 100} = 87.5\%$$

Profit percentage of Company F across the two years

$$\cong \frac{115 + 15}{55 + 190} = 53.1\%$$

The profit percentage of Company D is the highest across the two years. Choice (C)

#### Solutions for questions 9 to 12:

From (iii), Balu owns a snake. The persons adjacent to Balu cannot have the rat or the eagle. The persons adjacent to Balu cannot have the cat as well (since Balu is two places to the right of the person who owns the cat). Since Balu is not at any end, the persons adjacent to Balu must have the dog and the pigeon. From (i), Ankit owns the dog and is to the immediate left of Ghosh. Since Ankit owns the dog, he must be standing adjacent to Balu. Also, since Ghosh is to the immediate right of Ankit, Ankit can only be to the right of Balu. Hence, Ankit is to the right of Balu and Ghosh is to the right of Ankit. The person to the immediate left of Balu must own the pigeon. The person to the immediate left of the person who owns the pigeon must own the cat.

The sixth person can be to the immediate left of the person who owns the cat or to the immediate right of Ghosh. The sixth person must own either an eagle or a rat. In either case, he

cannot be adjacent to the person who owns a cat. Hence, this person must be to the immediate right of Ghosh.

From (ii), Cary must be the first person from the left (who owns the cat). From (iv), Hari must be at the extreme right and must own the eagle. Ghosh owns the rat and David must be the second person from the left. He owns the pigeon.

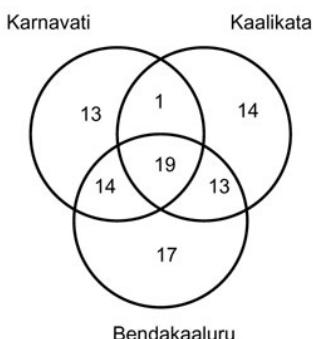
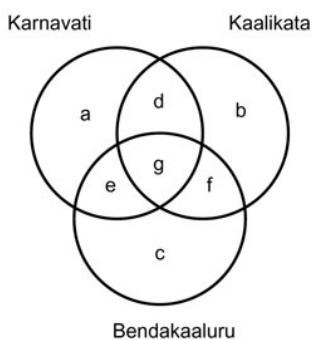
The following table provides the order in which the six persons are standing along with their pets:

Order	1	2	3	4	5	6
Person	Cary	David	Balu	Ankit	Ghosh	Hari
Pet	Cat	Pigeon	Snake	Dog	Rat	Eagle

9. Hari owns the eagle. Choice (B)
10. No one is standing to the left of the person who owns a cat (i.e., Cary). Choice (A)
11. Cary is standing adjacent to David. Choice (A)
12. Both the cat and the eagle at the two extreme ends. Choice (D)

#### Solutions for questions 13 to 16:

Let the below Venn diagram represent the number of persons who voted for each of the three cities.



From (i),  $b = a + d$

From (ii),  $d + e + f = 28$

And  $d + e + f + g = 47$

$$\Rightarrow g = 19$$

From (iii),  $b + f = 8 + g \Rightarrow b + f = 27$

From (iv),  $c + e = 31$

And  $a + d + g + e = 47 \Rightarrow a + d + e = 28$

From (v),  $e + g = 33 \Rightarrow e = 14$

However,  $a + d + e = 28 \Rightarrow a + d = 28 - e = 14$

From (i),  $b = a + d \Rightarrow b = 14$

From (iii),  $b + f = 27 \Rightarrow f = 13$

From (ii),  $d + e + f = 28 \Rightarrow d = 28 - 14 - 13 = 1$

From (i),  $a + d = 14 \Rightarrow a = 13$

From (iv),  $c + e = 31 \Rightarrow c = 17$

The above Venn Diagram provides these values.

13. The number of employees who voted for both Kaalikata and Bendakaaluru but not Karnavati =  $f = 13$ .  
Choice (B)

14. The city which received the highest number of votes is Bendakaaluru.  
The number of employees who voted for Bendakaaluru = 63  
Choice (A)

15. The number of employees who voted for only Kaalikata = 14.  
This is the same as the number of employees who voted for both Bendakaaluru and Karnavati but not Kaalikata (i.e.,  $e = 14$ ).  
Choice (D)

16. The number of employees who voted for Karnavati = 47  
The number of employees who voted for Kaalikata = 47  
Required difference = 0.  
Hence, the answer is none of the above. Choice (D)

#### Solutions for questions 17 to 20:

17. We can see that each cost head increases from one year to the next (with only one exception – Rent in 2013). Hence, the maximum cost incurred by the company will be in 2016. The total cost (in mn) incurred by the company in 2016 = 594.6  
Choice (C)

18. Percentage increase in Raw Material Cost

$$= \frac{268 - 254}{254} = 5.5\%$$

Percentage increase in Administrative Costs

$$= \frac{6}{123} = 4.87\%$$

$$\text{Percentage increase in Interest} = \frac{2.4}{21.5} = 11.16\%$$

Percentage increase in Other Finance Costs

$$= \frac{5.5}{52.8} = 10.42\%$$

Hence, the highest percentage increase is for Interest.  
Choice (C)

19. Since the administrative costs is directly proportional to the total number of tires manufactured, the number of tires manufactured in any year will be the Administrative Cost  $\times$  Constant ( $k$ ).

Hence, raw material cost per tire manufactured in 2012

$$= \frac{254}{123k} = \frac{2.065}{k}$$

Raw material cost per tire manufactured in 2013

$$= \frac{268}{129k} = \frac{2.077}{k}$$

Raw material cost per tire manufactured in 2014

$$= \frac{274}{141k} = \frac{1.943}{k}$$

Raw material cost per tire manufactured in 2015

$$= \frac{291}{146k} = \frac{1.993}{k}$$

Raw material cost per tire manufactured in 2016

$$= \frac{321}{153k} = \frac{2.098}{k}$$

Hence, the highest raw material cost per tire manufactured is in 2016.  
Choice (D)

20. In 2013, Rent decreased as compared to the previous year. In 2014, Raw Material Cost and Interest increased by less than 5%. In 2015, all the three costs increased by more than 5%. In 2016, Rent increased by less than 5%. Hence, the given condition is satisfied for only one year (2015).  
Choice (B)

#### Solutions for questions 21 to 24:

21. All the cubes in the second layer from the bottom will be green. The cubes which are not at any edge will have all its faces green. All the cubes on the layer above it and below it will be touching the cubes on this layer. The cubes on these layers which are at the edges will not be touching the cubes which are painted green on all faces. Only the 9 cubes which are in the middle of the layer will be touching cubes which are painted green on all faces.

Since there are two layers (one above and one below), 18 cubes will have one of its faces touching a cube painted green on all its faces.

Further, in the second layer, the cubes which are at the edges but not at the corners will have one face touching the face of another cube painted green on all its faces. There will be 12 such cubes. Also, the nine cubes which are painted green on all the faces will be touching the faces of each other. Hence, these 9 cubes will also satisfy the given condition.

Therefore, a total of  $18 + 12 + 9 = 39$  cubes will have at least one face touching the face of another cube painted Green on all its faces.  
Ans: (39)

22. The 25 cubes in the bottom most layer are all painted red. The 12 cubes at the edges will be painted black on at least two faces (since this is the bottommost layer). The 4 cubes at the corners will have three faces painted black. Hence,  $12 + 4 = 16$  cubes which are at the edges and at the corner will be painted black on at least two faces and painted red on at least one face.  
Ans: (16)

23. Since the cubes in the top most layer are painted brown, all the 25 cubes in the layer below it will be touching a cube painted brown on at least one face. Of these 25 cubes, all the cubes on the edges will be painted black on at least one face. Hence, a total of 16 cubes satisfy the given condition.  
Ans: (16)

24. Since all the cubes in the fourth layer are painted yellow on at least one faces, all the cubes above this layer and all the cubes below this layer will be in contact with the cubes painted yellow on at least one face.  
For the cubes below this layer, there will be four cubes at the four corners for which two faces are painted black.  
For the cubes above this layer, i.e., the topmost layer, all the cubes which are at the edges but not at the corners, i.e., 12 cubes, will have two faces painted black.  
Hence, a total of 16 cubes will satisfy the given condition.  
Ans: (16)

#### Solutions for questions 25 to 28:

From (i), one of the six planets must be the least dense and fourth largest. From (ii), Planet 1B is not that planet. From (iii), Planet 1E is the third densest and hence, is not the least dense planet mentioned in (i). From (iv), Planet 1A is denser than two other planets and hence, is not the least dense planet. From (v), Planet 1D is not the planet mentioned in (i). Since Planet 1C is denser than at least one planet, this cannot be the planet mentioned in (i). Hence, Planet 1F must be the planet which is the fourth largest and the lightest.

From (ii), Planet 1B is less dense than Planet 1D. Planet 1D is the second densest. Hence, Planet 1B can only be the fifth densest. Planet 1C must be the densest.

From (iv), Planet 1A is larger than at least two planets. Since Planet 1F and Planet 1D are the fourth and third largest respectively, Planet 1A can be the largest or the second largest.

From (vi), Planet 1C must also be the largest or the second largest. However, since Planet 1C is the densest, it cannot be the largest (from (i)). Hence, Planet 1C must be the second largest and Planet 1A must be the largest. From (iii), Planet 1B and Planet 1E must be the fifth largest and smallest respectively.

The following table provides the order of the destines and the sizes of the six planets:

Order of Density (from densest to least dense)	Order of Size (from largest to smallest)
Planet 1C	Planet 1A
Planet 1D	Planet 1C
Planet 1E	Planet 1D
Planet 1A	Planet 1F
Planet 1B	Planet 1B
Planet 1F	Planet 1E

25. Only for Planet 1B, the given condition is satisfied.  
Choice (C)
26. The densest planet is Planet 1C. Four planets are smaller than Planet 1C.  
Choice (D)
27. Both Planet 1B and Planet 1E satisfy the given condition. From the given options, the answer is Planet 1B.  
Choice (A)
28. The planet which is denser than exactly three other planets is Planet 1E. Five planets are larger than Planet 1E.  
Choice (A)

#### Solutions for questions 29 to 32:

29. The withdrawal charges for February was ₹225, which can be expressed as  $50 \times 4 + 25$ , i.e., Hari withdrew more than ₹10000 4 times and withdrew between ₹5000 and ₹10000 once.  
However, this is not possible as he would have withdrawn a minimum of ₹45000 in this case.  
Even if Hari withdrew more than ₹10000 thrice and withdrew between ₹5000 and ₹10000 thrice, the minimum amount that he would have withdrawn will still be ₹45000.  
Hence, Hari must have withdrawn more than ₹10000 thrice, withdrew between ₹5000 and ₹ once and withdrew less than ₹ five times (totalling to ₹2500). In this case, it is possible for him to withdraw ₹37500 ( $30000 + 5000 + 2500$ ).  
Therefore, he must have withdrawn cash at least 9 times in February.  
Ans: (9)

30. The withdrawal charge for January was ₹600. Hence, Hari could have withdrawn 60 times in January. If he withdrew 60 times in January, he must have withdrawn ₹9167 each time. But in this case the withdrawal charge will not be ₹10 per withdrawal.  
Hence, Hari could have withdrawn 55 times for less than ₹5000 and once for more than ₹.  
Therefore, Hari could have withdrawn a maximum of 56 times in January.  
Ans: (56)

31. The maximum number of times that Hari can withdraw cash in March = 35 (each time he will withdraw an average of 1842.86, which is possible).  
Based on the withdrawal charge, the minimum number of times that Hari can withdraw cash in March =  $350/50 = 7$   
But he cannot withdraw more than ₹10000 7 times in March (since he withdrew only ₹ in March).  
Hence, Hari could have withdrawn more than ₹10000 6 times and less than ₹5000 5 times.  
The minimum number of times that Hari could have withdrawn in March =  $6 + 5 = 11$   
The minimum number of times Hari could have withdrawn cash in April = 6 (he withdrew an average of ₹30000 each time)  
The maximum number of times Hari could have withdrawn in April =  $300/10 = 30$   
In this case, he must have withdrawn an average of ₹18000 each time which is not possible.

Hari could have withdrawn less than ₹5000 25 times and more than ₹10000 once.  
Hence, the maximum number of times he could have withdrawn in April =  $25 + 1 = 26$   
Since the number of times he withdrew in the two months is the same, the number of times he withdrew must be between 11 and 26.  
From the given options, only option C falls in this range.  
Choice (C)

32. From the solution to the previous question, the number of times that he withdrew cash in March lies between 11 and 35.

The minimum number of times that he withdrew cash in February = 8  
Since he withdrew equal number of times in March and February, the minimum number of times that he withdrew in February is 11.  
Ans: (11)

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

### SECTION – III

#### Solutions for questions 1 to 34:

1. Let the base of the number system be  $a$ .

$$\begin{aligned} \therefore (53)_a (22)_a &= (1,276)_a \\ \Rightarrow (5a+3)(2a+2) &= (a^3 + 2a^2 + 7a + 6) \\ \Rightarrow 10a^2 + 6a + 10a + 6 &= a^3 + 2a^2 + 7a + 6 \\ \Rightarrow 10a^2 + 16a &= a^3 + 2a^2 + 7a \\ \Rightarrow a^2 - 8a - 9 &= 0 \\ \Rightarrow (a+1)(a-9) &= 0 \\ \Rightarrow a = -1 \text{ or } +9 & \end{aligned}$$

Now  $-1$  is discarded, since the base of any number system is always a natural number greater than 1. Hence,  $a = 9$ .

#### Alternative Solution:

Using number system multiplication, when we multiply 53 and 22, the product of 2 and 3 is 6 (which is the last digit of product) and the second last digit (i.e., 7) of the product is the sum of 6 (in the second row of long multiplication) and the last digit of 10 (i.e.,  $5 \times 2$ ) expressed in that particular number system. So the base must be 9 ( $\because 7 - 6 = 1$ , which must be the last digit of 10 in the number system).

$$\therefore a = 9 \text{ and } (4221)_9 = 4(9^3) + 2(9^2) + 2(9) + (1) = 3097 \quad \text{Ans: (3097)}$$

2. Let A do 'a' amount of work per day.

Let B do 'b' amount of work per day.

The work done in 17 days when A started is  $9a + 8b$ .

When B started, the work done in  $17 \frac{3}{4}$  days is  $9b + 8 \frac{3}{4}a$

$$\therefore 9a + 8b = 8 \frac{3}{4}a + 9b \Rightarrow a = 4b \rightarrow (1)$$

A does 4 times the work that B does in the same time.

$$\therefore A \text{ will take } 9 + \frac{8}{4} \text{ (days taken by B) or 11 days}$$

To complete the work individually.

B takes 4 times the time A takes = 44 days

$$\text{Hence, A and B together will take } \frac{1}{\left(\frac{1}{11} + \frac{1}{44}\right)} = 8 \frac{4}{5} \text{ days}$$

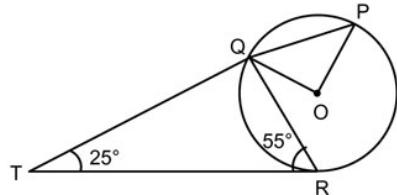
#### Alternative Solution:

From (1), in above solution,

$$\text{The total amount of work} = 9a + 8b = 9(4b) + 8b = 44b.$$

The amount of work done by A and B together in one day  
 $= a + b$   
 $= 4b + b = 5b$ .  
 $\therefore$  The time taken by A and B together to complete the job  
 $= \frac{44b}{5b} = 8 \frac{4}{5}$  days. Choice (C)

3.



In  $\triangle QTR$ ,  
 $\angle QTR + \angle QRT + \angle RQT = 180^\circ$ .  
 $\angle RQT = 180^\circ - (55^\circ + 25^\circ) = 100^\circ$   
 $\angle ORT = 90^\circ$ . (TR is a tangent to the circle at R)  
 $\angle QRT + \angle ORQ = 90^\circ$   
 $\angle ORQ = 90^\circ - 55^\circ = 35^\circ$ .  
 $OQ = OR$   
 $\therefore \angle OQR = \angle ORQ = 35^\circ$ .  
 $\angle RQT + \angle PQR = 180^\circ$  (PQT is a straight line)  
 $100^\circ + 35^\circ + \angle PQO = 180^\circ$   
 $\angle PQO = 45^\circ$   
In  $\triangle OQP$ ,  $OQ = OP$   
 $\therefore \angle OPQ = \angle PQO = 45^\circ$   
 $\therefore \angle POQ = 90^\circ$  Choice (C)

4. Investments of Ram and Shyam are in ratio

$$36000 : 54000 = 2 : 3$$

Let the total profit be P and let the salary which Ram got be S.  
After the salary, the remaining profit is distributed in the ratio 2 : 3

$$\text{Ram receives } \frac{2}{5}(P - S)$$

$$\text{Shyam receives } \frac{3}{5}(P - S)$$

The total amounts received are in ratio 3 : 2

$$\frac{\left(S + \frac{2}{5}(P - S)\right)}{\left(\frac{3}{5}(P - S)\right)} = \frac{3}{2} \text{ (given)}$$

$$S + \frac{2}{5}(P - S) = \frac{3}{2} \times \frac{3}{5}(P - S)$$

$$\Rightarrow S + 0.4P - 0.4S = 0.9P - 0.9S$$

$$\Rightarrow 1.5S = 0.5P$$

$$\Rightarrow S = \frac{P}{3} \text{ or } 33\frac{1}{3}\% \text{ of P.}$$

#### Alternative Solution:

Given Ram and Shyam received amounts in the ratio of 3 : 2 and their investments were in the ratio of 2 : 3.

Let the total profit = 5 units. Therefore, Shyam received 2

units based on investment alone, i.e., Ram received  $\frac{2}{3} \times 2$

$= \frac{4}{3}$  units based on investment alone.

Hence, Ram received  $3 - \frac{4}{3} = \frac{5}{3}$  units as salary. Therefore,

Ram's salary is  $\left(\frac{1}{3}\right)^{\text{rd}}$  of total profit, i.e.,  $33\frac{1}{3}\%$ .

Choice (B)

5. Each successive term can be split into two components as below

$$\left(\frac{1}{1} - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \dots + \left(\frac{1}{98} - \frac{1}{99}\right)$$

$$= 1 - \frac{1}{99} = \frac{98}{99}$$

Choice (D)

6. The required patterns are

11 12	22 23	33 34	44 45	55 56
66 67	77 78	88 89	89 90	

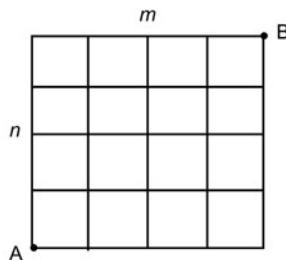
There are 9 vertical lines.

Choice (B)

7. The easiest way of solving this problem is by taking the value of  $m$  and  $n$  as 3 and 3 and checking the number of ways manually. Only Choice (A) satisfies.

**Alternative solution:**

The path will be composed of  $(m + n - 2)$  segments, each of length equal to the length of the side of squares of the grid. Out of these,  $(m - 1)$  segments  $m$  will be horizontal and  $(n - 1)$  will be vertical.



$\therefore$  Number of paths = number of ways of choosing  $(m - 1)$  segments out of  $(m + n - 2)$  segments.

$$= \binom{m+n-2}{m-1}$$

$$= \frac{(m+n-2)!}{(m-1)!(n-1)!}$$

Choice (A)

8. Given  $x, y, z \in \mathbb{R}$ ,  $y = \log_2(x)$ .

$$z = |y|^2 + 3|y| - 10.$$

$$\Rightarrow (|y| + 5)(|y| - 2)$$

$$\text{As } z \geq 0, |y| \leq -5 \text{ and } |y| \geq 2$$

$$|y| \leq -5 \text{ is not possible.}$$

$$\therefore |y| \geq 2 \Rightarrow y \leq -2 \text{ or } y \geq 2$$

The values of  $y$  and the corresponding values of  $x$  are tabulated below

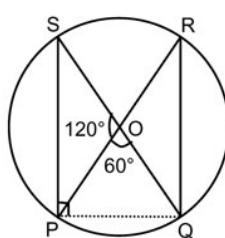
$$\begin{array}{cccccc} y & -\infty & -2 & 2 & \infty \\ x & 0 & 1/4 & 4 & \infty \end{array}$$

Alternatively, using the option, if we check for value of  $x$  as  $x = 2, 64, 1/4$ , we can eliminate options (A), (B) and (C).

$\therefore$  The required range of  $x$  is  $(0, 1/4] \cup [4, \infty)$

Choice (D)

- 9.



$\triangle SPQ$  is right-angled (angle in a semicircle)

$\angle POQ = 180^\circ - 120^\circ = 60^\circ$  and  $OP = OQ$  = radius (i.e.

$8\sqrt{3}$  cm). Hence  $\triangle POQ$  is equilateral and  $PQ = 8\sqrt{3}$  cm

Now in  $\triangle SPQ$ ,  $SP = \sqrt{SQ^2 - PQ^2}$

$$= \sqrt{(2 \times 8\sqrt{3})^2 - (8\sqrt{3})^2} = 24 \text{ cm}$$

$\Rightarrow$  Area of  $\triangle SPQ$ , right-angled at P, will be  $\frac{1}{2} SP \times PQ$

$$= \frac{1}{2} \times 24 \times 8\sqrt{3}$$

$$= 96\sqrt{3} \text{ sq.cm.}$$

Choice (D)

10. After a markup of  $x\%$ , the marked price becomes

$$\text{₹}(1000 + 10x)$$

After a discount of  $\frac{2x}{5}\%$ , the selling price becomes

$$(1000 + 10x) \left(1 - \frac{2x}{500}\right) = 1000 + 6x - \frac{x^2}{25} \rightarrow (1)$$

$$\text{Given, final profit} = \frac{2x}{5}\%$$

$$\Rightarrow \text{Selling Price} = 1000 + 1000 \times \frac{2x}{500}$$

$$= 1000 + 4x \rightarrow (2)$$

Solving (1) = (2) gives  $x = 50$

$$\Rightarrow \text{discount} = \text{MP} - \text{SP} = (1000 + 10x) - (1000 + 4x) = 6x = \text{₹}300$$

**Alternative Solution:**

Since  $CP = 1000$ , and  $MP = 1000 + 10x$  and  $SP = 1000 + 4x$ , discount was  $MP - SP = 6x$ .

$$\text{If, } 6x \text{ (discount)} = D, \text{ then } x = \frac{D}{6} \text{ and } 10x = \frac{5}{3}D, \text{ and}$$

$$\text{discount } \frac{2x}{5}\% \text{ of M.P.} = \left(\frac{2}{500}\right)\left(\frac{D}{6}\right) \times \left(1000 + \frac{5D}{3}\right) = D$$

From the choices, only  $D = 300$  satisfies the above equation.

Choice (B)

11. Simplifying the given equation

$$\frac{b+a+1}{ab} = \frac{1}{n} \Rightarrow n(a+b+1) = ab$$

Since  $a$  and  $b$  are primes and  $a+b+1 \neq a$  or  $b$ , we have  $n = 1$ , and  $a+b+1 = ab$

$$\Rightarrow ab - a - b = 1$$

$$\Rightarrow ab - a - b + 1 = 2$$

$$\Rightarrow (a-1)(b-1) = 2$$

$$\Rightarrow a = 2 \text{ (or 3);}$$

$$b = 3 \text{ (or 2)}$$

$$\therefore |a - b| = 1$$

$$\text{and } |a - b| - n = 0$$

**Alternative Solution:**

Trying  $a = 2$  and  $b = 3$ , gives  $n = 1$ .

$$\text{Hence, } |a - b| - n = 0$$

Choice (B)

12. Let the required value be  $x$ .

$$\frac{1}{6 + \frac{1}{2+x}} = x \Rightarrow \frac{2+x}{6(2+x)+1} = x \Rightarrow 6x^2 + 12x - 2 = 0$$

$$\Rightarrow x = \frac{-12 \pm \sqrt{192}}{12}$$

Also it can be observed that the given expression has all positive terms.

$\therefore x$  is positive

$\frac{-12 - \sqrt{192}}{12}$  is negative, while  $\frac{-12 + \sqrt{192}}{12}$  is positive.

$$\therefore x = -\frac{-12 + \sqrt{192}}{12} = \frac{-3 + 2\sqrt{3}}{3} \quad \text{Choice (D)}$$

13. When 1000 is divided by 1001, it leaves a remainder of -1  
Now, 853853 ..... (100 digits) = 8,538, ..... 538  
Can be written as

$$8(10^{99}) + 538(10^{96}) + 538(10^{93}) + 538(10^{90}) \\ + 538(10^3) + 538$$

$= 8(1000)^{33} + 538(1000)^{32} + \dots + 538(1000)^2 + 538(1000) + 538$   
When this is divided by 1001, we get a remainder of

$$8(-1)^{33} + 538(-1)^{32} + 538(-1)^{31} + 538(-1)^{30} + \dots + 538 \\ = -8 + (538 - 538) + \dots + (538 - 538) + 538 = 530$$

$\therefore$  The remainder is 530

#### Alternative Solution:

Since any six-digit number of the form  $xyzxyz$  is divisible by 1001 (because  $xyz \times 1001 = xyzxyz$ ), any number (whose number of digits is a multiple of six) of the form  $xyzxyzxyz.....$  upto, say, 6k digits will be divisible by 1001. Hence, 853853 ..... upto 96 digits will be divisible by 1001.

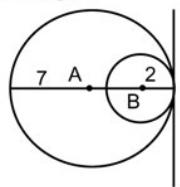
Now, the required remainder is simply that of the last four digits, i.e., 8538, divided by 1001, i.e., 530.

Ans: (530)

14. Let A(3, 7) and B(-1, 4) be the given centres.

$$\text{Then } AB = \sqrt{(-1-3)^2 + (4-7)^2} = \sqrt{16+9} = 5 \text{ units}$$

$\therefore AB = 5 = 7 - 2$  = difference of the radii of the two circles.  
Hence, the circles touch each other internally and have only one common tangent.



Choice (B)

15. We can observe that both  $f(x, y)$  and  $g(x, y)$  are always positive for non-zero real numbers  $x$  and  $y$ . While we cannot conclude anything about their difference, we can definitely say that their sum will be positive. Hence, choice (C) is the right option.

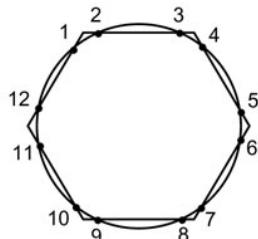
#### Alternative Solution:

For  $x = -2$  and  $y = 1$ ,

$$f(x, y) = 1 \text{ and } g(x, y) = 1$$

$\therefore$  the choices (A), (B) and (D) all yield the value 0.  
Hence, choice (C) is the right option. Choice (C)

- 16.



As shown above, the numbers of points of intersection can be at most 12. [When the radius of the circle is greater than  $\frac{\sqrt{3}}{2}$  times the side of the hexagon but less than the side of the hexagon]

Ans: (12)

17.  $20 = 2^2 \times 5$  since  $2^2 < 5$ , highest power of 20 in  $n!$  is determined by highest power of 5.

$$\text{In } 100!, \text{ the highest power of 5 is } \left[ \frac{100}{5} \right] + \left[ \frac{20}{5} \right] = 24$$

$$\text{In } 115!, \text{ the highest power of 5 is } \left[ \frac{115}{5} \right] + \left[ \frac{23}{5} \right] = 27$$

$\therefore$  Highest power of 5 in  $120!$  Will be  $27 + 1 = 28$

Highest power of 5 in  $125!$  Will be  $28 + 3 = 31$

Because  $125 = 5^3$ ,

$\therefore$  3 additional 5s are included.

$\therefore 30$  is not possible

Choice (C)

18. Let the price of the ticket be  $= ₹(60 + x)$ , where  $x > 0$ .  
The number of people in the audience would then be  $300 - 2x$ .

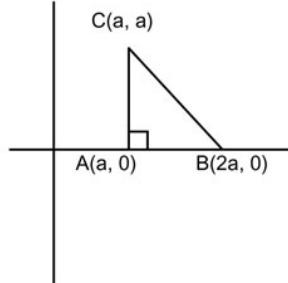
$$\therefore \text{The revenue of the theatre owner (in ₹)} \\ = (60 + x)(300 - 2x)$$

$$= (18000 + 180x - 2x^2) = 9000 + 90x - x^2$$

This is quadratic expression which achieves a maximum value when  $x = -\frac{b}{2a} = -\frac{90}{-2} = 45$

Hence, the price of ticket at maximum revenue is  $= (60 + 45) = ₹105$ . Ans: (105)

- 19.



We can see that  $AB = AC = a$  and  $\angle CAB = 90^\circ$

$\therefore$  ABC is a right angled isosceles triangle

$$\therefore \text{Its area} = \frac{a^2}{2} = 16$$

$$\Rightarrow a = \sqrt{32} = 4\sqrt{2} \quad (\text{as } a > 0) \quad \text{Choice (C)}$$

20.  $A = \{1, 2, 3, \dots, 20\}$

Total Number of subsets  $= 2^{20}$

The product of all the elements of any subset will be even if the subset has at least one even number.

So, only if the subset has all odd numbers, the product will not be even.

Now, total number of subsets with all elements odd

$$= 2^{10} \quad (\because \text{There are 10 odd numbers}) \quad (\text{Including null set})$$

$\therefore$  Total number of subsets whose product of elements is even  $= 2^{20} - 2^{10} = 1047552$ . Ans: (1047552)

21. Let the first term and common difference of the progression be  $a$  and  $d$  respectively

$$\therefore (a + d) + [a + (9 - 1)d] + [a + (18 - 1)d]$$

$$= [a + (8 - 1)d] + [a + (16 - 1)d]$$

$$\Rightarrow 3a + 26d = 2a + 22d$$

$$\Rightarrow a + 4d = 0. \therefore \text{The fifth term of the progression is 0.}$$

Choice (C)

22. Triangles AGD and EFC are similar.

$$\therefore \frac{DG}{CF} = \frac{AG}{EF}$$

$$\therefore (AG)(CF) = (DG)(EF) = DG^2 = 36$$

When the product of two quantities is constant, their sum is minimum when the quantities are equal.

$$\therefore AG + CF \text{ is minimum when } AG = CF = \sqrt{36} = 6 \text{ cm.}$$

$$\therefore AC = AG + GF + CF \text{ has a minimum value of 18 cm.}$$

Choice (D)

23. Let the road from A to B be downhill for a distance of  $x$  km, and uphill for a distance of  $(d - x)$  km.

Where  $d$  = distance between the two towns.

Now, on the return journey  $(d - x)$  km will be downhill and  $x$  km will be uphill.

Hence total distance downhill =  $x + (d - x) = d$

and total distance uphill =  $(d - x) + x = d$

$$\therefore \text{total time} = \frac{d}{40} + \frac{d}{80} = 9 \text{ hours (given)}$$

$$\therefore 3d = 80 \times 9 \Rightarrow d = 240 \text{ km.}$$

Choice (C)

Alternatively, once it is found that the distance travelled at either speed is the same, since ratio of speeds is  $1 : 2$ , the ratio of time taken to go uphill to that taken to go downhill is  $2 : 1$  (i.e., time is inversely proportional to speed). Since, total time taken for uphill and downhill is nine hours, time taken to go downhill is 3 hours and that to go uphill is 6 hours.

$$\therefore \text{Distance covered} = 40 \times 6 \text{ (or } 80 \times 3\text{)} = 240 \text{ km}$$

24.  $R = P_1 \cdot \bar{P}_2 \bar{P}_3 \dots \dots \dots \dots \quad (1)$

$$100R = P_1 P_2 P_3 \cdot \bar{P}_2 \bar{P}_3 \rightarrow (2)$$

$$\text{Subtracting (1) from (2), } 99R = P_1 P_2 P_3 - P_1$$

$$R = \frac{P_1 P_2 P_3 - P_1}{99}$$

As  $99R$  is an integer, any multiple of  $99R$  is always an integer. Hence of the options, only  $396R$  is a multiple of  $99R$ .

Choice (B)

25. We can compare all the options with ABCD ( $A > B > C > D > 0$ )

In each option, we are increasing two of the numbers. The product of the resulting 4 numbers would be the least if the bigger numbers are increased (The effect of increasing the smaller numbers i.e. D or C would be more significant).

$$\therefore (A - x)(B - x)CD \text{ would be the least.}$$

Choice (A)

26. Total number of black squares in a chess board is 32.

Number of ways of selecting two black squares is  ${}^{32}C_2 = 496$ .

There are a total of eight rows and eight columns.

In every row and column there are four black squares each. Number of ways of selecting two black squares which are in the same row or column

$$= 8 \times {}^4C_2 + 8 \times {}^4C_2 = 8 [6 + 6] = 96$$

Therefore, total number of ways of selecting two black squares so that the squares must not lie in the same row or column is  $496 - 96 = 400$ .

#### Alternative Solution:

There are a total of 32 black squares. For each black square, there are seven black squares (including itself) that lie in either the same row or column. Hence, we can choose any of the remaining  $(32 - 7)$  black squares.

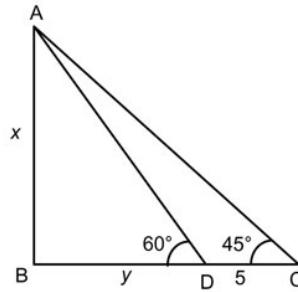
Hence,  $32(32 - 7) = 800$  pairs.

But each pair is counted twice.

Therefore  $800/2 = 400$  pairs.

Choice (A)

- 27.



AB is the lighthouse. Let its height be  $x$ .

At C, the angle of elevation is  $45^\circ$  and at D, it is  $60^\circ$

$$DC = x - \frac{x}{\sqrt{3}} = x \left( \frac{\sqrt{3} - 1}{\sqrt{3}} \right) = 5 \text{ m (given)}$$

$$\therefore x = \frac{5\sqrt{3}}{\sqrt{3} - 1} \text{ m}$$

$$= \frac{5\sqrt{3}(\sqrt{3} + 1)}{2} = \frac{15 + 5\sqrt{3}}{2}$$

Choice (B)

28. Given Q  $\left( \frac{-4}{3}, \frac{16}{3} \right)$  is the reflection of P  $\left( \frac{10}{3}, \frac{-10}{3} \right)$  on a

line (say L = 0)

Now the foot of the perpendicular (R) drawn from Q on L = 0 is the midpoint of PQ.

$$\therefore R = \left[ \frac{\frac{10}{3} - \frac{4}{3}}{2}, \frac{\frac{-10}{3} + \frac{16}{3}}{2} \right] = \left( \frac{2}{2}, \frac{2}{2} \right) = (1, 1)$$

Choice (A)

29. There are all together  $x$  questions. The number of students who made 1 or more mistakes is  $2^{x-1}$ . The number of students who made 2 or more mistakes is  $2^{x-2}$  and so on.... Finally the number of students who made  $x$  mistakes is  $2^0$ . We may imagine that these numbers represent mistakes rather than students. Specifically, we may imagine that the number  $2^{x-1}$  represents the first mistakes of all the students who made 1 or more mistakes. Similarly,  $2^{x-2}$  represents the second mistakes of students who made 2 or more mistakes and so on. Finally,  $2^0$  represents the  $x^{\text{th}}$  mistake of the only student who made  $x$  mistakes.

Thus, the total number of mistakes is  $2^0 + 2^1 + \dots + 2^{x-1}$

$$= 2^x - 1 = 8191 \text{ (given)}$$

$$\therefore x = 13$$

Ans: (13)

30. Let the correct equation be  $x^2 + bx + c = 0$

$\therefore$  The equation copied by Ganesh would have been,

$$x^2 + bx - c = 0$$

and the equation copied by Sarath would have been

$$x^2 - bx - c = 0$$

(as the mistakes were committed only in the signs)

$\therefore$  According to Ganesh's equation, 12 is a root.

$$\therefore 144 + 12b - c = 0 \quad \dots (1)$$

According to Sarath's equation, 2 is a root

$$\therefore 4 - 2b - c = 0 \quad \dots (2)$$

$$(1) - (2) \text{ gives}$$

$$14b = -140$$

$$\Rightarrow b = -10$$

Substituting the value of  $b$  in (2),

$$2b = 4 - c \Rightarrow -20 = 4 - c$$

$$c = 24$$

$\therefore$  The correct equation is  $x^2 - 10x + 24 = 0$

$$\Rightarrow (x - 6)(x - 4) = 0$$

$$x = 6, \text{ or } x = 4$$

$\therefore$  difference between its roots is 2.

Choice (A)

31. As  $\{x\}$  denotes the fractional part of  $x$ ,  $x = [x] + \{x\}$  -- (1)

$9\{x\} = 2x + [x]$  (given) using (1) we get

$$9\{x\} = 2([x] + \{x\}) + [x] \Rightarrow 3[x] + 2\{x\}$$

$$\Rightarrow 7\{x\} = 3[x] \Rightarrow \{x\} = \frac{3[x]}{7}$$

$$\text{as } 0 \leq \{x\} < 1, 0 \leq \frac{3[x]}{7} < 1, \Rightarrow 0 \leq [x] < 7/3$$

$[x] = 0, 1 \text{ or } 2$

$$\Rightarrow \{x\} = 0, \frac{3}{7} \text{ or } \frac{6}{7} \text{ respectively and } x = 0, \frac{10}{7} \text{ or } \frac{20}{7}$$

Ans: (3)

32. For  $k \leq 100$ , the distance covered by B in the  $k^{\text{th}}$  minute is more than that by A

$$200 + 0.1k - (189 + 0.15k) = 3 \text{ (given)}$$

$$\Rightarrow 11 - 0.05k = 3$$

$$\Rightarrow 0.05k = 8$$

$\therefore k = 160$  (which is not possible, as  $k \leq 100$ )

But the distance covered per minute by B remains constant after the first 100 minutes at  $200 + 10 = 210 \text{ m}$

$$\text{Hence } 210 - (189 + 0.15k) = 3$$

$$21 - 0.15k = 3$$

$$\therefore 0.15k = 18$$

$$\Rightarrow k = 120$$

Ans: (120)

33. Rate at which water flows from the pipe into the tank

= speed of flow  $\times$  area of cross-section

$$= 2 \text{ cm/sec} \times 9 \text{ cm}^2 = 18 \text{ cm}^3/\text{sec}$$

Capacity of the tank =  $18 \text{ cm}^3/\text{sec} \times 30 \times 60 \text{ seconds}$

In the presence of the leak, rate of filling =  $18 - 6$

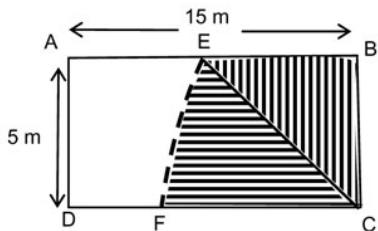
$$= 12 \text{ cm}^3/\text{sec}$$

$$\therefore \text{Time taken to fill the tank} = \frac{18 \times 30 \times 60}{12} \text{ seconds}$$

$$= 45 \text{ minutes}$$

Choice (B)

- 34.



ABCD be the rectangular field and let the goat be tied at vertex C with rope CE of length 10 m.

The area accessible to the goat is

Total Area = Area of sector ECF + Area of right  $\triangle$  ECB

So, first we need to calculate BE

Since BEC is a right angled  $\triangle$ ,

$$BE^2 + BC^2 = EC^2$$

$$\Rightarrow BE^2 + 5^2 = 10^2$$

$$\Rightarrow BE^2 = 100 - 25 = 75$$

$$\Rightarrow BE = 5\sqrt{3} \text{ m}$$

$$\text{Now, } \tan(\angle ECB) = \frac{BE}{BC} = \frac{5\sqrt{3}}{5} = \sqrt{3}$$

$$\Rightarrow \angle ECB = 60^\circ$$

$$\therefore \angle ECF = 30^\circ \text{ (i.e., angle of sector ECF)}$$

$$\begin{aligned} \text{Total area} &= \left( \frac{30^\circ}{360^\circ} \right) (\pi r^2) + \frac{1}{2}(BE)(BC) \\ &= \frac{\pi(100)}{12} + \frac{1}{2}(5\sqrt{3})(5) \\ &= \frac{100\pi + 150\sqrt{3}}{12} \end{aligned}$$

Choice (C)

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