

(Key and Solutions for AIMCAT1704)

Key

SECTION – I

| | | | | |
|------|-------|--------|-------|-------|
| 1. C | 8. D | 15. D | 22. C | 29. C |
| 2. D | 9. C | 16. A | 23. C | 30. D |
| 3. B | 10. C | 17. D | 24. A | 31. B |
| 4. A | 11. B | 18. C | 25. B | 32. 4 |
| 5. A | 12. A | 19. 45 | 26. C | 33. 3 |
| 6. D | 13. C | 20. C | 27. D | 34. 4 |
| 7. C | 14. B | 21. B | 28. A | |

SECTION – II

| | | | | |
|----------|-----------|-------|--------|-------|
| 1. D | 8. D | 15. 3 | 22. D | 29. D |
| 2. A | 9. 620 | 16. C | 23. C | 30. B |
| 3. D | 10. D | 17. D | 24. B | 31. 5 |
| 4. C | 11. 4 | 18. B | 25. 30 | 32. A |
| 5. 2 | 12. D | 19. D | 26. A | |
| 6. A | 13. C | 20. B | 27. 13 | |
| 7. 11050 | 14. 23625 | 21. C | 28. 5 | |

SECTION – III

| | | | | |
|-------|----------|-------------|--------|--------|
| 1. 32 | 8. 4 | 15. B | 22. A | 29. A |
| 2. B | 9. C | 16. 460 | 23. A | 30. C |
| 3. C | 10. 2 | 17. 90 | 24. 1 | 31. D |
| 4. B | 11. C | 18. 6 | 25. A | 32. 34 |
| 5. 14 | 12. 1093 | 19. A | 26. 7 | 33. 84 |
| 6. D | 13. C | 20. B | 27. D | 34. B |
| 7. D | 14. 5 | 21. 2033136 | 28. 29 | |

Solutions

SECTION – I

Solutions for questions 1 to 6:

Number of words and Explanatory notes for RC:

Number of words: 666

1. The beginning of the passage mentions that "Romanticism does two contradictory things to the notion of authorship." This is explained subsequently in the same paragraph.

Option A: According to the passage, the author becomes "supremely individualistic". However, there is "a de-individualisation of the author". These are the two contradictory things that romanticism does. The passage does not mention that the author has to follow approved conventions. Instead it states that the author "creates out of a spontaneous overflow of powerful feeling rather than by correctly and cleverly applying the approved... conventions". Hence, this option is incorrect.

Option B: The first part of this option is correct. The author becomes supremely individualistic when creating his work without caring for approved thematic, poetical and rhetorical conventions. However, the passage does not mention that these conventions arise from the collective conscience of the nation. Hence, this option is also incorrect.

Option C: The first part of the option that the author become individualistic is correct. According to the passage, the author responds "to the vibrancies and inspirations that waft through him, who becomes de-individualised". "the poet can become the voice of his nation". Hence, the source of his inspirations is the collective. Therefore, the inspiration for his work owes its origin to the collective consciousness of the nation. Hence, this option is the correct answer.

Option D: The passage does not prescribe that the author cannot use approved conventions. It only mentions that the author will consider these conventions a priority. Hence, this option is incorrect.

Therefore, the correct answer is option C.

Choice (C)

2. In the second paragraph of the passage, the author traces the "belief that the 'nation' is the collective author and articulator of a collective consciousness" and mentions that the Romantic period "is a crucial period to scrutinise in this respect".

Option A: The idea does not refer to how philology was conceptualized. It refers to the idea that the 'nation' is the collective author. Hence, this option is incorrect.

Option B: The author does not mention that he is trying to trace how a poet's individuality is celebrated alongside the collective authorship of the nation. He is trying to trace the pertaining to the second half of this option, i.e., how the

idea of collective authorship of nation came into being. Therefore, this option is not the correct answer.

Option C: The author talks about fairy tales and balladry later in the passage and does not refer to it here. Therefore, this option is also incorrect.

Option D: The belief that "the 'nation' is the collective author and articulator of a collective consciousness" was what the author tried to trace and according to him, "the origin of this idea can be found in Giambattista Vico's *Scienza Nuova* of 1725".

Hence, the correct answer is option D. Choice (D)

3. According to Giambattista Vico, the elements of mythology, epic poetry, language, and law form "an undifferentiated whole, and to study them a new kind of scientific endeavour is needed".

Option A: The passage mentions that Vico calls this "not by the appellation of 'philosophy' but by the almost-neologism 'philology'". The passage does not mention that 'philology' is a neology but as an "almost-neologism". This implies that this was not a term coined by him but Vico gave this term the meaning that is now widely accepted. Hence, this option is incorrect because it mentions that Vico coined the term 'philology'.

Option B: The passage mentions that to study the cultural elements "a new kind of scientific endeavour is needed, one which Vico calls, not by the appellation of 'philosophy' but by the almost-neologism 'philology'." From this, we can infer that Vico identified the need for separating this study from philosophy and used the term 'philology' to refer to this "new kind of scientific endeavour". Hence, this is the correct answer.

Option C: We cannot infer from the passage that Vico made philology popular. In the next paragraph, it is given that "almost no-one at the time still recalled Vico as the originator of this paradigm". Hence, this contradicts what is given in this option and hence, it is not the correct answer.

Option D: The basis of philology is the "undifferentiated whole" comprising "mythology, epic poetry, language, and law". This forms the basis of the study rather than the foundational moment when "each nation enters the stage of word history". Hence, this option is also incorrect.

Therefore, the correct answer is option B.

Choice (B)

4. The last paragraph of the passage talks about vernacular literature in Europe in the nineteenth century.

Option A: The passage mentions that "The rise of the vernacular literatures" involved "retrieval and publication of these primeval epics". The gaps or lacuna that were found in vernacular literatures were filled in using oral material. The rise of vernacular literature refers to the growth in popularity of vernacular literature. This rise in popularity resulted in their publication. Therefore, we can say that vernacular literature gained popularity during the nineteenth century and any gaps in the vernacular literature were filled based on oral literature. Hence, this is the correct answer.

Option B: The passage mentions that oral literature helped in publishing vernacular literature but it does not mention that vernacular literature became obscure. Hence, this option is incorrect.

Option C: The passage mentions that "the rise of vernacular literature... involved in large part the retrieval and publication of these primeval epics". However, from this we cannot infer that vernacular materials started to get published at this time. We can probably conclude that the quantity of the vernacular materials getting published during this time increased. Hence, this option is incorrect as it states that "vernacular materials started to get published in the nineteenth century".

Option D: The passage mentions that oral literature lends itself to vernacular literature wherever there are gaps in vernacular material and not the other way around. Hence, this option is incorrect.

Therefore, the correct answer is option A.

Choice (A)

5. The last paragraph of the passage talks about how a "reconceptualization" is required to see the "quality of epic" in

oral transmission. Further, he explains "How this reconceptualization came about is linked to the extraordinary European reception history of an oral text from the Balkans, the *Hasanaginica*"

Option A: According to the passage, *Hasanaginica* was extraordinarily received. This extraordinary reception reverberated "against the then-current debates around Ossian, Homer and the anonymous-epic beginnings of vernacular literatures". From this we can infer that *Hasanaginica* played a part in how the "reconceptualization" of oral literature came about. This reconceptualization is the recognition of the "quality of epic" in oral literature. Further, the "demotic performers" implies that oral literature is in colloquial language. Hence, we can say that it played a part in the recognition of the epic quality of oral literature which is usually in colloquial language.

Option B: The *Hasanaginica* is an oral text and we cannot infer from the passage that it contributed to the growth in the popularity of vernacular literature. We can infer that it probably could have contributed to the growth in the popularity of oral literature because of its "extraordinary European reception". Hence, this option is incorrect.

Option C: The passage does not talk about Balkan oral literature being superior to those from other areas. Hence, this option is also incorrect.

Option D: The author mentions that "the extraordinary European reception history... reverberating as it did against the then-current debates around Ossian, Homer and the anonymous-epic beginnings of vernacular literatures". But this does not imply that this work was better than vernacular literatures. Hence, this option is incorrect.

Therefore, the correct answer is option A.

Choice (A)

6. The passage mentions the views of Wilhelm Grimm in the fourth paragraph. According to Wilhelm Grimm, "the most valuable (and archaic) specimens of a national literature were the anonymous, epic fragments".

Option A: According to Wilhelm Grimm, "anonymous epic pieces "seem to belong to the nation at large, merely enunciated by a given individual"" and the courtly poets who were the authors of chivalric romances were not quite master of their material and topics and often confuse the foreign tales." However, Grimm does not compare the popularity of the two. Hence, this cannot be inferred from the passage.

Option B: Grimm mentions that the "chivalric romance, produced by authors individually known by name are enervated, non-national and less impressive by comparison". Hence, Grimm considers chivalric romance to be languid. However, he does not state that the anonymous epic fragments complement these chivalric romance. Hence, this option is also incorrect.

Option C: Grimm mentions that the chivalric romance was less impressive than anonymous epic fragments. Hence, this option is also incorrect.

Option D: Grimm mentions that anonymous, epic fragments "have a firm, well-demarcated content reared on a straightforward base". And chivalric romances are "enervated, non-national and less impressive by comparison", apart from being 'confused foreign tales'.

Therefore, the correct answer is option D.

Choice (D)

Solutions for questions 7 to 12:

Number of words and Explanatory notes for RC:

Number of words: 631

7. The author at the beginning of the passage, asks the question "What is the alternative against which to judge the degree of inequality that we see?" He compares Florida and Cuba to talk about possible alternatives available for unequal societies.

Option A: The author's objective is not to contrast rich and poor societies. He tries to make a point that a society in

which every person is equally poor is not better than a society in which income inequalities exist. Hence, this option is incorrect.

Option B: The author is not of the opinion that inequality is better than equality. Throughout the passage he argues that inequality should be reduced. But by comparing Florida and Cuba, he emphasizes that along with inequality, other parameters must also be considered. Hence, this option is not the correct answer.

Option C: According to the passage, we can infer that the author feels that instead of saying Florida has too much inequality, we should say that Cuba has too much poverty. Hence, inequality in society should not be the only parameter for saying that a society is better/worse than another society. Therefore, this is the correct answer.

Option D: When talking about Florida and Cuba, the author does not talk about the strategies for countering inequalities. Hence, this option is incorrect.

Therefore, the correct answer is option C.

Choice (C)

8. The author mentions alternatives in the fourth paragraph which suggest hypothetical scenarios which would have resulted in lower income inequalities.

Option A: The alternatives mentioned by the author are not recommendations to those countries. The author states that "Communist victories in post-World War II elections in Italy and France that would have impoverished nations now in the rich North". This does not imply that the author thinks that these countries must do this now. Therefore, this option is incorrect.

Option B: The author does not say that it would be better if the alternatives happened. We cannot infer from the passage that the author would have liked this to have happened. Hence, this option is also incorrect.

Option C: The first alternative that the author mentions talks about an alternative which "would have impoverished nations now in the rich North". Hence, the author does not talk about making the North richer. Further, he also states that "But alternatives that would have made the South richer at the price of reducing the wealth of the North would require a wholesale revolution in human psychology". Therefore, this is not the correct answer.

Option D: The first alternative that the author states talks about how nations in the "rich North" could have been impoverished. The author also talks about "alternatives that would have enriched poor nations".

Therefore, the correct answer is option D.

Choice (D)

9. The fifth paragraph of the passage talks about the political-economic arrangements, what they can solve and what they cannot. He mentions that "The problems that can be addressed are those of poverty and social insurance—of providing a safety net—not of inequality".

Option A: Increasing the income of the poor will probably decrease poverty and this can be achieved through political-economic arrangements. Hence, this is not the correct answer.

Option B: Providing unemployment benefits to the poor can also be considered as a political-economic arrangement and hence, is not the correct answer.

Option C: The author says that "I don't see what alternative political-economic arrangements could make individuals' relative wealth closely correspond to their relative moral or other merit". Hence, ensuring that a person's income depends on his moral merit cannot be achieved through political-economic arrangement. Therefore, this is the correct answer.

Option D: Providing employment opportunities can also decrease poverty and hence, is not the correct answer.

Therefore, the correct answer is option C.

Choice (C)

10. According to the passage, "Ceci Rouse and Orley Ashenfelter of Princeton University report that they find no signs that those who receive little education do so because education does not pay off for them".

Option A: The passage states that "the returns to an extra year of schooling appear greater for those who get little education than for those who get a lot". Hence, the returns to an extra year of schooling for a university graduate will most probably not be high.

Option B: Ceci Rouse and Orley Ashenfelter do not talk about the employment status when talking about the payoff for an extra year of education. Hence, irrespective of whether a university graduate is employed or not, the returns for him will not be high.

Option C: For a person with "little education", "the returns to an extra year of schooling appear greater". Hence, for the person mentioned in this option, the returns will be high.

Option D: As compared to the person mentioned in option C, a person who finished schooling will not have higher returns.

Hence, among the given options, the person mentioned in option C will have the highest returns for an extra year of education.

Choice (C)

11. The author recommends an increase in the level of education in America. This will increase the number of educated workers and decrease the number of available less skilled workers. Because of the scarcity in less skilled workers, they will be paid more and hence, this will reduce the income inequality between less skilled workers and educated workers.

Option A: If the wages of less skilled workers are increased, it will decrease the income inequalities. Hence, this argument supports the recommendation of the author and does not weaken it.

Option B: If the income of an educated worker and less skilled worker become comparable, people will want to avoid incurring the cost of education. This will in turn increase the number of less skilled workers. This abundance will push their wages down and will increase the inequality. This option presents a counter argument to the recommendation of the author. Hence, this will weaken the author's recommendation.

Option C: If the schools are not equipped to provide education to a large number of people, this only presents a difficulty in implementing the recommendation of the author. However, this does not weaken the recommendation.

Option D: If there will be a greater requirement for less skilled workers, it will increase the demand for less skilled workers. In addition to this, if there is a scarcity of less skilled workers, their wages will increase. Hence, this option also does not weaken the author's recommendation.

Therefore, the correct answer is option B.

Choice (B)

12. In the last paragraph of the passage, the author tries to understand the primary reason for the increase in income inequality.

Option A: The author states that "the increase in inequality that we have seen in the past generation is predominantly a result of failures of social investment and changes in regulations and expectations". Hence, failures of social investments is the primary reason.

Option B: The increase in inequality is primarily due to "failures of social investment and changes in regulations and expectations". This has not been "accompanied by any acceleration in the overall rate of economic growth". Hence, the primary reason is the former but not the latter. Therefore, this option is not the correct answer.

Option C: The author mentions that the management skills of the top management has not increased in line with the increase in their salaries ("America's corporate CEOs and their near-peers earn ten times more today... more valuable nowadays"). Hence, this is not a reason.

Option D: The author mentions education as a way out for societies to lessen inequality. But he does not mention that illiteracy is a reason why income inequality has increased. Hence, this is not the correct answer.

Therefore, the correct answer is option A.

Choice (A)

Solutions for questions 13 to 15:

Number of words and Explanatory notes for RC:

Number of words: 354

13. The passage mentions that Apple bet on three things when it gambled and refused to help a law enforcement agency to "unlock the iPhone of the San Bernardino attacker".

Option A: The passage mentions that Apple thought that "neither the government nor any other agency would actually be able to hack into the locked phone and open it". However, the passage does not mention about Apple betting on the government taking help from a third-party. Hence, this is not the correct answer.

Option B: One of the things that Apple bet on was that "no terror attack that could be averted with the help of information locked up on the phone would occur". This does not mean that the information in the phone is not related to any terror attack. It only means that a terror attack which can be averted with the help of information in a phone is unlikely to occur. Hence, this option is also incorrect.

Option C: According to the passage, "no terror attack that could be averted with the help of information locked up on the phone would occur". Hence, this is the correct answer.

Option D: The author does not discuss the need for privacy when talking about Apple's gamble. Hence, this option is incorrect.

Therefore, the correct answer is option C.

Choice (C)

14. In the third paragraph of the passage, the author states that "While Apple does not have any blood on its hands, as no terror attack took place, its stance on security looks unreal". According to the author, the law allows the government to examine the contents of a phone.

Option A: The author does not evaluate the reasons stated by Apple for refusing to help the FBI. Hence, this option is incorrect.

Option B: The author asks "Why would a company risk indirectly abetting a future strike by terrorists by insisting on defending the privacy of a slain terrorist?" We can infer from this that he feels that insisting on defending the privacy of a slain terrorist is not important as preventing future strikes by terrorist. Hence, this is the correct answer.

Option C: The passage does not mention that Apple is unaware of the laws. Hence, this option is also incorrect.

Option D: This is also not mentioned in the passage and is not the correct answer.

Hence, the correct answer is option B.

Choice (B)

15. The author presents his opinion on the trade-off between privacy and security in the last paragraph of the passage.

Option A: The author mentions that "Doctors and lawyers are useless if information is hidden from them". Further, he also says that "In the inevitable trade-off between privacy and security, compromising security is not an option, in these troubled times" However, from this we cannot infer that there is no place for privacy. In issues of national security, privacy should not be considered important. Hence, this option is too extreme and is not the correct answer.

Option B: The author does not mention that people should share all information about themselves. Hence, this option is also incorrect.

Option C: The author does not call for the removal of measures that protect the privacy of people. He does not discuss such measures in the passage. Hence, this option is incorrect.

Option D: The author states that "compromising security is not an option". Hence, we can infer that in issues of national security, privacy should take a backseat.

Therefore, the correct answer is option D.

Choice (D)

Solutions for questions 16 to 21:

Number of words and Explanatory notes for RC:

Number of words: 782

16. Refer to para 5. Music scholars have sometimes had good reasons for resisting the path of cross-cultural systemization. In the past, such approaches have frequently been linked to generalizations on race and normative assumptions about the characteristics of "primitive" and "civilized" cultures. The definition of universal categories often involved assumptions about purity or authenticity or progress that did not hold up under close scrutiny and distorted the interpretation of empirical data.

Option A: This is correct. The approaches were frequently linked to generalisations on race and culture, and this is why musicologists were justified in being skeptical about them.

Option B: Choice B is a distortion. The approaches were linked to generalisations, they did not cause them.

Option C: "...distorted the interpretation of empirical data..." is not the same as "invalidated by empirical data". Choice C is not appropriate.

Option D: While this does present the idea in the last sentence quoted above, this is not a complete answer since it only presents a contribution to the larger reason, ie. the approaches were often linked to generalisations. This subidea is included in statement B in the word
"unjustifiably".

Choice (A)

17. Few things get music scholars more nervous than cross-cultural comparisons. This means that cross-cultural comparisons was a major area of concern. The field of ethnomusicology was invented in order to deal with this areas of concerns. The last sentence of para 1 states that if human beings from different cultures share certain musical proclivities and practices, academics in the field would rather not hear about it. This means that if human beings from different cultures shared musical proclivities and practices, then the concerns which make music scholars worried would be eliminated.

Option A: Ethnomusicology was not invented to just inquire into a prevailing paradigm in the field of music. So choice A is incomplete and is not the answer.

Option B: From the last sentence of para 1: "..... rather not hear about it", from the first sentence of para 1: "..... more nervous than cross-cultural comparisons", and from "...that part of their mission.." we understand that "cross-cultural comparisons" cause anxieties in the course of ethnomusicology studies and discussions. But the field was not developed to address those anxieties. So choice B is incorrect.

Option C: The word 'skepticism' occurs in para 2. Many decades of skepticism have prevented the field of musicology from embracing the importance of musical universals. But choice C is not the answer. The passage does talk about recent findings in related fields that scholars have done. They are getting results from studies done in various other cultures as to why and how things are done.

Option D: From ".... than cross-cultural comparisons. The field of ethnomusicology, which was invented to inquire into this very subject, has grown increasingly uneasy with this part of its mission." we understand that comparisons are only one part of the field. So ethnomusicology was developed for more than just those comparisons. From the rest of the passage we can infer that the field deals with study of cross-cultural commonalities and differences in music, ie. the entire cross-cultural relationship. So choice D is correct.

Choice (D)

18. Music scholars prefer differences over similarities in the field of music. They express resistance to the privileging of similarities over differences. When the subject of musicology is addressed, it is always in the form of 'meta-

critiques about the concept of universals" rather than actual consideration of empirical evidence. Let physicists seek out unified theories — in the human sciences the motto has long been *vive la différence*.

Option A: Many decades of skepticism have prevented the field of musicology from embracing the importance of musical universals. This is a view of Steven Brown and Joseph Jordania. We cannot say that the author is skeptical or doubtful towards the tendency of a few music scholars to focus on cross-cultural differences rather than similarities. So choice A is not the answer.

Option B: There are no lines in the passage to indicate that the author is condescending towards the tendency of music scholars. Hence choice B is incorrect.

Option C: I would argue that the time has come to question this allegiance to the particular (specific) and reconsider the explanatory value of music universals (general). This makes the opinion of the author contentious to that of the music scholars. Hence choice C is the answer. The author is disputing or challenging the existing view of the music scholars. He is not merely contrarian i.e., presenting an opposite view.

Option D: From the first sentence of para 4, we can say that the author is not indifferent. So, choice D is false.

Choice (C)

new cultural universals are different from those of the past. They do not come pre-packaged with biased and normative assumptions about the stages of human progress. So choice A is contradicted by the fifth para of the passage.

Option B: The powerful methodological tools that accompany the new cultural universals are less susceptible to bias and misuse than the traditional approaches of empirical ethnography. From this, we can infer that the new cultural universals are not in favour of the conventional practices of empirical ethnography. Hence choice B is negated.

Option C: The new cultural universals now often arrive in tandem with powerful methodological tools, drawn from the sciences, statistics, and mathematics. In many cases, these methodologies are **less susceptible** to bias and misuse than the traditional approaches of empirical ethnography. This makes choice C the correct answer.

Option D: The definition of universal categories in the past often involved assumptions about purity or authenticity or progress that did not hold up under close scrutiny and distorted the interpretation of empirical data. The new cultural universals now often arrive in tandem with powerful methodological tools, drawn from the sciences, statistics, and mathematics. But choice D is related to the tools, not the new cultural universals and does not answer the question.

Choice (C)

21. Statement 1: Individual cultures, in the influential words of anthropologist Ruth Benedict, "are traveling along different roads in pursuit of different ends, and these ends and these means in one society cannot be judged in terms of those of another society, because essentially they are incommensurable (having no common basis)." So the view of Ruth Benedict would be parallel to the line of thinking of music scholars who prefer differences to similarities in the field of music. Hence statement 1 is not the answer.

Statements 2 & 3: This resistant attitude is so highly prevalent that researchers Steven Brown and Joseph Jordania, conclude that "many decades of skepticism have prevented the field of musicology from embracing the importance of musical universals." When the subject is addressed, they add, it is almost always in the form of "meta-critiques about the concept of universals," rather than actual consideration of empirical evidence. From this we cannot say that Steven Brown opposes the opinion of music scholars. Hence statements 2 & 3 are not the answers.

Statement 4: I would argue that the time has come to question this allegiance to the particular and reconsider the explanatory value of musical universals. The author cites important recent findings in related fields. We can say that the author opposes the view of music scholars in the passage. Refer to the last paragraph of the passage. Hence statement 4 is the answer.

Statement 5: The author makes a mention of Harvard professor E.J. Michael Witzel's paradigm-changing exploration of the origins of human mythology, which presents a serious challenge of the incommensurability model and should not be ignored by music scholars. 'a serious challenge' to a view would mean something that questions that view. That's good enough for 'not in favour of' which does not mean 'oppose'. It only means 'does not support.' Statement 5 is the answer.

Statement 6: In linguistics, increasing focus on language macrofamilies, for example in the work of Joseph Greenberg or the Russian Nostratic linguists, is having a similar impact; the same is true of the genetic research into the so-called "African Eve." But Joseph Greenberg is only presenting some experimental finding and evidence. The evidence opposes the opinion of music scholars. We cannot say that Joseph Greenberg firmly opposes the view of music scholars in the passage. So statement 6 is not the answer.

Ans: (45)

21. Blind spot in the context of cultural blindness would imply picking out traits from a culture without understanding the relevance of that trait. Refer to the Western myth of Orpheus mentioned in para 7.

When Vittorio Macchioro first proposed, that Orpheus might be considered a shaman, similar to those documented in the anthropological literature, this view was shocking to classicists, yet even more surprising discoveries were soon made. Back at the same time Benedict was publishing her incommensurability thesis, A. H. Gayton was also sharing her finding that 50 different Native American tribes possessed an Orpheus myth. Later researchers have added to Gayton's findings, identifying more examples in Native American myths as well as in other cultures.) Till that time, no one knew that anyone possessed the myth of Orpheus.

But choice C is not the implication of the phrase "blind spots". The author gives the example of the Orpheus myth which was possessed by many different native American tribes to tell us that "blind spots" exist in the realm of music. He implies the many cross-cultural similarities in music which we are not yet aware of. This makes choice B the answer. Choice A again is not the implication of the phrase "blind spots" in the passage.

Choice (B)

Solutions for questions 22 to 24:

Number of words and Explanatory notes for RC:

Number of words: 517

22. Option A: This option implies that students are attracted to graphic novels but it does not provide a reason for the question.

Option B: Individual frames, speech bubbles, captions are used in the graphic novel format. Because contemporary students have a much wider visual vocabulary than we did growing up, I contend that the format offers great opportunities to teach as well as to entertain. Choice B offers a reason that the graphic novel format offers great opportunities to teach as well as to entertain. But choice B is not the answer to the question (reason for the inclusion of graphic novels in the classroom).

Option C: Let us look at the chain of causation in the first para . What the author is offering is that X leads to Y (stated), and Y leads to Z (implied). In which case, Y (not X) is the reason for Z. Wider visual vocabulary leads to greater opportunities for teaching and entertaining (stated), and these can be tapped when the medium is brought into the classroom (implied). Therefore, the use in the classroom is

20. Option A: In the past, approaches in cross-cultural systematization have frequently been linked to generalizations on race and normative assumptions about the characteristics of "primitive" and "civilized" cultures. The

prompted by the opportunities offered. Choice C is the answer.

Note: More examples: (i) Children are fascinated by fire and some hurt themselves playing with it. So, do we keep them away from matchboxes because they are fascinated, or because they get hurt? The answer is the latter. (ii) My niece has a great ear for music and this makes it easy to train her to play in tune with other instrumentalists. So, would the music teacher bring her into the orchestra for the former or for the latter? The answer is the latter.

Option D: Choice D looks close as an answer choice but is nowhere implied in the passage. Choice (C)

23. Option A: "All resources" in choice A makes the choice extreme.

Option B: Choice B does not talk about utilizing the opportunity or the potential of graphic novels. Hence it is not the answer.

Option C: The keyword "untapped" in the author's comment "Why leave any resource untapped?" refers to utilizing the opportunity that graphic novels present. Hence choice C is correct.

Option D: Choice D is not what the author would advocate. He would prefer that students practically implement a particular scene from a novel and encourage them to be more creative. Choice (C)

24. Option A: Graphic novels use the narrative techniques associated with comic strips. Both *Spring-Heeled Jack* and *MAUS* are graphic novels. *Spring-Heeled Jack* certainly employs comic strip narrative techniques but also uses a significant amount of text. Spiegelman (*MAUS*) uses only cartoon techniques to tell his story. So choice A is the answer.

Option B: Choice B is incorrect as the author has not said that *MAUS* does not use both text and graphic representation.

Option C: Choice C is incorrect. While *MAUS* is a graphic approach to the ever-expanding body of literature about the Second World War, we cannot say that *Spring-Heeled Jack* is about the Great Depression. The remainder of choice C is out of scope.

Option D: Choice D is incorrect as the author does not say in the passage that *MAUS* does not use humour. Even if it did, the exclusion of historical content in *MAUS* would not be an obvious differentiation. Choice D does not contrast *Spring-Heeled Jack* and *MAUS*. Choice (A)

Solutions for questions 25 to 28:

25. Choice A sounds like a conclusion sentence of a paragraph and cannot fit in the blank in the paragraph. The pronoun 'it' in choice A remains unqualified. Choice A disrupts the thoughtflow.

Choice B would be the best sentence to complete the paragraph. The pronoun 'those' in choice B refers to an astronomer or scientist. They see their quarry in the most special of circumstances and they mostly work with indirect measurements. Hence choice B is the answer.

The consequences of "their rocky surfaces are evaporating" as given in choice C have not been mentioned after the blank sentence. Also the pronoun "they" mentioned in the sentence following the blank refers to a person (scientist/ astronomer) and not to an exoplanet. Hence choice C would be a misfit in the blank in the paragraph.

Since "indirect measurements" has been mentioned and exemplified only in the last sentence of the paragraph, we can infer that choice D cannot fit as the blank sentence. Choice D can come as the first sentence of another paragraph after the given paragraph. It needs further elaboration. Choice (B)

26. "Such a player" in choice A is not qualified in the sentence just before the blank. Hence choice A cannot complete the blank sentence. The second sentence of the paragraph states: "The more inquisitive among them soon realise".

Choice B is out of scope. " losing important details, and the resulting strategies are an imperfect fit" needs a precedent and more substantiation.

Choice C is the answer. "The best is to start out in one of the grid's corners" is a provable ideal strategy. (When a provably ideal strategy such as this). Also "mathematicians describe that game as being "solved"" in choice C finds a continuation in the next sentence after the blank: quite a few games have now been solved in this formal mathematical sense.

Choice D cannot be the answer as the sentence prior to the blank is not negative in any sense. "attack the problem" is left unsubstantiated. Choice (C)

27. Choice A includes a positive point about Mr Buffet but is inappropriate as a last sentence since the penultimate line tells us that the book is a compendium 'stories' that Buffet's subordinates have been encouraged to share.

Choice B is negative in tone. It cannot continue the thoughtflow and complete the paragraph. The previous sentences speak positively about Mr Buffet and his company. Most people who run his businesses have been encouraged to tell their stories. Choice B can come as an introductory sentence of another paragraph much later in the text and it will need further elaboration or substantiation. Choice C sounds like a conclusion sentence of another paragraph that would discuss in detail the ingredients of Berkshire's management or strategies.

Choice D is a correct summation of the second paragraph. It relates Mr Buffet's management ideas with the company Berkshire. "company designed to thrive after he has gone" and "Berkshire Beyond Buffet" mentioned in para 2 link with "embed them permanently into the firm's internal systems" given in choice D. Choice (D)

28. Choices B and C are invalid as the paragraph does not talk about any conflict. Choice D doesn't illustrate the significance of Saraswati and the symbolic references associated with Saraswati. Choice D will need further elaboration. Choice A exhibits the confluence of the three rivers as mentioned earlier and also shows the significance of Saraswati. Choice (A)

Solutions for questions 29 to 31:

29. The para is not merely about selection of women for the 'introduction of phones'; it's about selecting women as 'village phone operators' who will be able to offer 'phone services' on retail. Then there's some indication of the impact and the users of the service.

While the second sentence of choice A is partly true, the first sentence of choice A can be ruled out. Hence choice A is not the correct summary.

Choice B is inexact as connectivity is not the focus of measures implemented by Grameen Bank. Also the last sentence of the paragraph is just mentioned verbatim. Choice B is incomplete as a summary.

Choice C sums up the essence of the paragraph as it covers all the important points.

Choice D is ruled out because the paragraph talks about Grameen Bank, but women's empowerment is not explicitly mentioned. Choice (C)

30. The paragraph mentions the three stages that art goes through. Choice A is very negative in its tone and says that each stage that art goes through has a degenerating effect on art. This is nowhere mentioned in the paragraph. Choice B mixes up the first and second stages of art. Moreover, in the second stage, material from life is refashioned and used in art, but nowhere has it been stated that life influences style and treatment. Also choice B misinterprets the point about the last stage of art. Art, when dominated by life in all respects, is an example of decadence, but that it is a reflection of the decadence in society cannot be gathered from the paragraph. Choice C fails to mention that the last stage of art consists of decadence. Choice C mentions wrongly that life has three stages. The last sentence in

choice C is incorrect. Only choice D correctly captures the essence of the paragraph.

Choice (D)

31. Choice A does not talk about the relationship that Britain shared with India. The last sentence in choice A is incorrect. Hence, choice A can be eliminated. Choice C is not an accurate summary. There are some extra details mentioned like "..... after the industrial revolution of England". Also it is incorrect to say that the Britishers regarded India as a home away from home. Hence choice C is not true. Choice D talks about the way the Indian economy was affected, but also talks about a symbiotic relation, which was not the case with Britain and India. The last sentence in choice D is out of scope. Hence, choice D can be ruled out. Only, choice B talks about how the Indian economy was affected in a major way during the British Raj. Hence, choice B.

Choice (B)

Solutions for questions 32 to 34:

32. 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 term 'Armenian Genocide'. Sentence 2 is followed by sentence 1. "Ottoman government's systematic **extermination** of up to 1.5 million of its minority Armenian subjects" in sentence 2 is linked with "Ottoman authorities rounded up and deported 270 Armenian intellectuals eventually **murdered**" in sentence 1. Sentence 1 which mentions the starting date of the Armenian genocide is then followed by sentence 6 (during and after World War I). So, 216. Sentence 6 is followed by sentence 5. "implemented in two phases" in sentence 6 is followed by "the first phase" in sentence 5. Sentence 5 (The first phase) and sentence 3 (This was followed by form a mandatory pair. Sentences 5 and 3 elaborate on the two phases of the implementation of the Armenian Genocide (which is mentioned earlier in sentence 6). Hence 21653. Sentence 4 is the odd sentence out as it will need further elaboration and substantiation.

Ans: (4)

33. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. Obesity is a big problem. The reason for calling obesity a big problem has been mentioned in sentence 1 (This is because). Sentence 1 provides a few statistics. So sentence 4 is followed by sentence 1. Sentence 6 (.... **also** leads) follows sentence 1 with another statistic. Sentence 5 talks about current trends and continues the discussion. Sentences 5 and 2 form a mandatory pair. "On current trends" in sentence 5 links with "Even over the past three decades" in sentence 2. "half of the world's adults will be fat by 2030" in sentence 5 links with "no nation has slimmed down" in sentence 2. So, 41652. Sentence 3 is the odd man out as it needs a precedent and more substantiation. It talks about a course of action and can be a part of another paragraph.

Ans: (3)

34. On a careful reading of the sentences it can be observed that sentence 5 is a general sentence that begins the paragraph. "You will find a number" in sentence 5 is followed by an introduction of the ISBN in sentence 3. So sentence 3 follows sentence 5. Sentence 1 continues the historical discussion about the ISBN. The Number was invented in Britain and took off rapidly as an international system for classifying books. Sentence 2 brings in a new point of view: the ISBN hampers small publishers. Sentences 2 and 6 form a mandatory pair. "individual publishers" in sentence 2 links with "digital self-publishing" in sentence 6. Sentence 6 provides a contrasting view of ISBNs with the contrast conjunction 'yet'. Sentence 6 concludes the paragraph. So, 53126. Sentence 4 is the odd sentence out. "That may be true" needs a precedent. The latter half of sentence 4 needs more substantiation.

Ans: (4)

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

SECTION – II

Solutions for questions 1 to 4:

For any tanker, let c be the capacity (in litres) of the tanker, s be the speed (in kmph) of the tanker, r be the rate of leak (in litres/minute) of the tanker, and d be the distance (in km) to the destination.

The amount of water left in a tanker when it reaches the destination = $c - r \times 60 \times \frac{d}{s}$

For Tanker A, amount of water left

$$= 8000 - 6 \times \frac{d}{20} \times 60 = 8000 - 18d$$

For Tanker B, amount of water left

$$= 2500 - 4.5 \times \frac{d}{45} \times 60 = 2500 - 6d$$

For Tanker C, amount of water left

$$= 6000 - 5 \times \frac{d}{25} \times 60 = 6000 - 12d$$

For Tanker D, amount of water left

$$= 7000 - 8 \times \frac{d}{30} \times 60 = 7000 - 16d$$

1. For India Gate Gully, A, C and D can supply the water.

Water in Tanker A will be $8000 - 18 \times 90 = 6380$ litres

Water in Tanker C = $6000 - 12 \times 90 = 4920$ litres

Water in Tanker D = $7000 - 16 \times 90 = 5560$ litres.

Hence, Tanker D will be used for supplying water.

Choice (D)

2. Amount of water in Tanker D must be more than 5000 litres.

Hence, $7000 - 16d \geq 5000 \Rightarrow d \leq 125$

Hence, option D is eliminated.

Jammy will use Tanker C if $6000 - 12d \geq 5000 \Rightarrow d \leq 83.33$

Jammy will use Tanker A if $8000 - 18 \geq 5000 \Rightarrow d \leq 166.67$

Jammy cannot use Tanker B for supplying 5000 litres of water.

Hence, Jammy will definitely use Tanker D for any distance between 83.33 km and 125 km. From the options, the answer is option A.

Choice (A)

3. Tanker C must have at least 2000 litres of water.

Hence, $6000 - 12d \geq 2000 \Rightarrow d \leq 333.33$

Tanker D will have at least 2000 litres of water if $7000 - 16d \geq 2000 \Rightarrow d \leq 312.5$

Tanker A will have at least 2000 litres of water if $8000 - 18d \geq 2000 \Rightarrow d \leq 333.33$

Tanker B will have at least 2000 litres of water if $2500 - 6d \geq 2000 \Rightarrow d \leq 83.33$

Between Tanker C and Tanker D, Jammy can use Tanker C if the amount of water in Tanker C is less than or equal to the amount of water in Tanker D.

Hence, $6000 - 12d \leq 7000 - 16d \Rightarrow d \leq 250$ km.

For any distance between 250 km and 312.5 km, Tanker D will be used.

For Tanker C and Tanker A, $6000 - 12d \leq 8000 - 18d \Rightarrow d \leq 333.33$ km.

Similarly, for Tanker C and Tanker B, we get $6000 - 12d < 2500 - 6d \Rightarrow d > 583.33$ km. This is not possible and hence, for any distance less than 83.33 km, only Tanker B will be used.

Hence, for a distance between 83.33 km and 250 km, Tanker C will be used.
 For a distance between 312.5 km and 333.33, Tanker C will be used.
 Required range will be (83.33, 250] OR (312.5, 333.33].
 Choice (D)

Tanker A will have $8000 - 18 \times 300 = 2600$ litres of water.
 Tanker C will have $6000 - 12 \times 300 = 2400$ litres of water.
 Tanker B will have $2500 - 6 \times 300 = 700$ litres of water.
 Jammy will use Tanker D if the required quantity of water is between 700 litres and 2200 litres.
 The required range is (700, 2200] (since for 700 litres, he will use B).
 Choice (C)

4. Given that the distance is 300 km.
 Tanker D will have $7000 - 16 \times 300 = 2200$ litres of water.

Solutions for questions 5 to 8:

Any student who has been given data of only Day 1 would have reported 360° and the angles reported by each of the other students who has been given one additional data point will be in descending order.

E would have been given the data for only Day 1. G would have been given the data for the first two days (since the angle reported by G is the second highest value).

Let x be the number of cars sold on Day 1.

On the second day, x resulted in an angle of 216° . Hence, the total number of cars sold on the first two days combined will be

$$360 \times \frac{x}{216} = \frac{5x}{3}$$

Similarly, for the first three days, the total number of cars sold will be $360 \times \frac{x}{144} = \frac{5x}{2}$

Similarly, for the first four, five, six, seven and eight days, the total number of cars sold will be $\frac{15x}{4}, 5x, \frac{20x}{3}, \frac{15x}{2}, 10x$.

Hence, the number of cars sold on the second day will be $\frac{5x}{3} - x = \frac{2x}{3}$

Similarly, the number of cars sold on the third day will be $\frac{5x}{2} - \frac{5x}{3} = \frac{5x}{6}$

The number of cars sold on the fourth, fifth, sixth, seventh and eighth days will be $\frac{5x}{4}, \frac{5x}{4}, \frac{5x}{3}, \frac{5x}{6}$ and $\frac{5x}{2}$.

The following table provides the number of cars sold on each day in terms of x :

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Cars | x | $\frac{2x}{3}$ | $\frac{5x}{6}$ | $\frac{5x}{4}$ | $\frac{5x}{4}$ | $\frac{5x}{3}$ | $\frac{5x}{6}$ | $\frac{5x}{2}$ |

5. Given $x = 3000$. On two days (Day 6 and Day 8), the number of cars sold was greater than $1.5x$.

Ans: (2)

6. Required ratio = $\frac{5}{6} \times \frac{2}{5} = \frac{1}{3}$

Choice (A)

7. Given $\frac{5x}{4} = 33150$

$$\Rightarrow x = 26520$$

$$\text{Required difference} = \frac{5x}{3} - \frac{5x}{4} = \frac{5x}{12} = 11050$$

Ans: (11050)

8. Total number of cars sold = $10x$

$$\text{Required percentage} = \frac{5}{6 \times 10} = 8.33\%$$

Choice (D)

Solutions for questions 9 to 12:

The following table presents the marks of the students in the Quarterly and Half-yearly examinations:

| Student | Quarterly | Half-yearly |
|-----------|-----------|-------------|
| Ayush | 84 | 91 |
| Bhavin | 85 | 78 |
| Divit | 78 | 87 |
| Eshan | 69 | 74 |
| Gurkiran | 72 | 65 |
| Hansh | 68 | 73 |
| Harikiran | 77 | 83 |
| Himmat | 74 | 71 |

Since Divit was ranked 1st, his must be the highest score and his score must lie between 78 and 87.

Ayush was ranked 2nd and his score must lie between 84 and 91. Ayush cannot score more than 85 (since Divit can score a maximum of 86). Therefore, Ayush would have scores 85. Divit would have scored 86.

Bhavin, ranked 3rd, can score in the range of 79-84. Harikiran would have scored in the range of 78-82.

Himmat, ranked 5th, would have scored 72 or 73 marks.
 Eshan, ranked 7th, must have scored in the range of 70-73.
 The marks of Gurkiran must be between the marks of Himmat and Eshan.

Gurkiran can score in the range of 66 to 71. Gurkiran cannot score less than Eshan. Hence, Gurkiran should score a minimum of 71 (since Eshan can score a minimum of 70). Hence, Gurkiran would have scored 71 marks.

Eshan must have scored 70 and Hansh must have scored 69. The following table provides these values:

| Student | Quarterly | Half-yearly | Annual |
|-----------|-----------|-------------|--------|
| Ayush | 84 | 91 | 85 |
| Bhavin | 85 | 78 | 79-84 |
| Divit | 78 | 87 | 86 |
| Eshan | 69 | 74 | 70 |
| Gurkiran | 72 | 65 | 71 |
| Hansh | 68 | 73 | 69 |
| Harikiran | 77 | 83 | 78-82 |
| Himmat | 74 | 71 | 72/73 |

9. Maximum possible score = $85 + 84 + 86 + 70 + 71 + 69 + 82 + 73 = 620$ Ans: (620)
10. Eshan would have scored $69 + 74 + 70 = 213$ across the three exams.
 Gurkiran would have scored $72 + 65 + 71 = 208$ across the three exams.
 Hansh would have scored $68 + 73 + 69 = 210$ across the three exams.
 Himmat would have scored $74 + 71 + \frac{72}{73} = \frac{217}{218}$ across the three exams.
 Hence, Himmat would definitely have the highest total irrespective of his marks in Annual examination.
 Choice (D)
11. Four students scored more than 75 marks in the Annual examination. Ans: (4)
12. Ayush and Divit scored more than 80 marks. The remaining students must have scored less than 80. Hence, Bhavin

would have scored 79 and Harikiran would have scored 78 marks.

However, the score of Himmat cannot be determined.
 Hence, the average cannot be determined.

Choice (D)

Solutions for questions 13 to 16:

For any day, let the quantity of rice that he purchased from A and B be a and b respectively.

$$\text{Given } a + b = 150.$$

For any day, let the value given in the graph, i.e., $0.8a + 0.6b$ be x .

$$b = \frac{120 - x}{0.2}$$

On Sunday, $0.8a + 0.6b = 102 \Rightarrow a = 60$ and $b = 90$

On Monday, $0.8a + 0.6b = 100.5 \Rightarrow a = 52.5$ and $b = 97.5$

Similarly, we can find the values for the other days. We can also calculate the total cost of purchasing the rice and the total revenue from selling the rice flour on each day.

The following table presents this information:

| Day | Quantity from A | Quantity from B | Total Cost | Total Revenue |
|-----------|-----------------|-----------------|------------|---------------|
| Sunday | 60 | 90 | 3450 | 4080 |
| Monday | 52.5 | 97.5 | 3487.5 | 4020 |
| Tuesday | 75 | 75 | 3375 | 4200 |
| Wednesday | 30 | 120 | 3600 | 3840 |
| Thursday | 90 | 60 | 3300 | 4320 |
| Friday | 105 | 45 | 3225 | 4440 |
| Saturday | 112.5 | 37.5 | 3187.5 | 4500 |

13. The required ratio is the highest for Wednesday, which is $\frac{3840}{3600} = 0.9375$. Choice (C)
14. Total cost incurred = ₹23625. Ans: (23625)
15. On three days, Sunday, Monday and Wednesday, Kalidas procured more than 80 kg rice from B. Ans: (3)
16. The difference was more than ₹1000 on Thursday, Friday and Saturday. Choice (C)

Solutions for questions 17 to 20:

Between 10:30 and 10:40 (this interval was selected because the rate is highest for this and hence, the taps which were opened during this interval can be easily identified), 3000 litres of water was filled. Hence, the rate of flow into the tank was 300 litres/minute. This could have happened only when Tap 1, Tap 2 and Tap B are open at the same time.

From 10:20 to 10:30, the rate of flow was 150 litres/minute. Hence, the taps that were open must be Tap 1, Tap 2, Tap B and Tap C. From 10:10 to 10:20, Tap 1, Tap B and Tap C must be open. From 10:00 to 10:10, Tap 1 and Tap C must be open. Similarly, we can deduce which taps were open from 10:40 to 11:40. This information is presented in the table below:

| Time | Rate of Flow | Taps Open |
|---------------|--------------|-------------------------------|
| 10:00 – 10:10 | 30 | Tap 1 – Tap C |
| 10:10 – 10:20 | -50 | Tap 1 – Tap B – Tap C |
| 10:20 – 10:30 | 150 | Tap 1 + Tap 2 – Tap B – Tap C |
| 10:30 – 10:40 | 300 | Tap 1 + Tap 2 – Tap B |
| 10:40 – 10:50 | 100 | Tap 1 – Tap B |
| 10:50 – 11:00 | 10 | Tap 1 – Tap A – Tap B |
| 11:00 – 11:10 | -170 | – Tap A – Tap B |
| 11:10 – 11:20 | 30 | Tap 2 – Tap A – Tap B |
| 11:20 – 11:30 | 110 | Tap 2 – Tap A |
| 11:30 – 11:40 | -90 | – Tap A |

17. Tap B was open for the longest duration (70 minutes).
Choice (D)
18. Tap A and Tap C were not open at the same time.
Choice (B)
19. The maximum number of taps were open at 10:23.
Choice (D)
20. Tap A and Tap 2 were open at 11:25. Hence, among the given taps, only one tap, i.e., Tap A, was open at 11:25.
Choice (B)

22. The average weight

$$= \frac{58+62+69+64+76+78+74+70+59+91+68+64+62+81+84}{15} = 70.67 \quad \text{Choice (D)}$$

23. The ratio is less than 2.5 for 8 people, C, D, E, F, G, J, N and O.
Choice (C)

24. Body Mass Index of A = $\frac{58}{1.52^2} = 25.1$

Body Mass Index of F = $\frac{78}{1.74^2} = 25.76$

Body Mass Index of I = $\frac{59}{1.54^2} = 24.88$

Body Mass Index of M = $\frac{62}{1.56^2} = 25.48$

Hence, the highest Body Mass Index is for F.

Choice (B)

Solutions for questions 25 to 28:

Let the number of players who played only for ManC, ManZ and ManD be a , the number of players who played only for ManC and ManZ be b , the number of players who played only for ManC and ManU be c , the number of players who played only for ManU and ManZ be d , the number of players who played only for ManT, ManU and ManZ be e .

From (i), $10 + 13 + e = 7 + 9 + 2 + a + b + d + e \Rightarrow a + b + d = 5$

From (ii), $13 + 4 + 2 + a + b + c = 15 + 9 + a \Rightarrow b + c = 5$

From (iii), $11 + 10 + 2 + c + d + e = 4 + 10 + 13 + e \Rightarrow c + d = 4$

From (iv), $a + b = 3$

Hence, $d = 2$, $c = 2$, $a = 0$, $b = 3$.

Since total number of players is 100, $e = 11$.

25. Number of players who played for exactly two teams
 $= 4 + 3 + 9 + 2 + 2 + 10 = 30$ Ans: (30)

26. Number of players who played for ManC = 24
Number of players who played for ManD = 26
Number of players who played for ManT = 34
Number of players who played for ManU = 38
Number of players who played for ManZ = 34
Hence, the highest is for ManU. Choice (A)

27. Number of players satisfying the given criteria = $2 + e = 13$.
Ans: (13)

28. Number of players who played for ManZ and ManC but not for ManD = $2 + b = 5$
Ans: (5)

Solutions for questions 29 to 32:

Since Ram was two levels ahead of Jack by Wednesday, Ram must be at L4 by Wednesday (since Jack cannot start the game on Wednesday and finish it by Saturday). Jack must be at L2 on Wednesday. Since Ram is at L4 on Wednesday, he must have played the preceding three levels on Sunday, Monday and Tuesday.

Solutions for questions 21 to 24:

21. The persons whose height is at least 160 cm are B, E, F, G, H, J, K, L and O.
Of these people, five people, B, G, H, K and L, have a weight of at most 75 kg.
Choice (C)

From (ii), Pradeep could have started before Tarun and finished after Tarun only if Pradeep started the game on Sunday and finished it on Saturday. Tarun could have finished the five levels starting from Monday and finishing on Friday.

Since Pradeep and Ram started playing the game on Sunday, no one else could have started the game on that day.

Lohit could have been playing L3 on Wednesday or Thursday (since he cannot have played on Sunday). Sravan could have been playing L4 on Thursday or Friday. From (iii), Lohit would have played L3 on Thursday and Sravan would have played L4 on Thursday.

Since Lohit played L3 on Thursday, he would have played L4 and L5 on Friday and Saturday. Since Sravan was playing L4 on Thursday, he must have started playing on Monday and played one level on each consecutive day until Thursday.

Since Tarun and Sravan started playing the game on Monday, no one else could have started playing the game on that day. Since Jack and Lohit could not have started the game in Monday, they must have started the game on Tuesday. Jack would have played L3, L4 and L5 on Thursday, Friday and Saturday respectively.

On Tuesday and Wednesday, five persons played the game. Hence, Pradeep could not have played on Tuesday and Wednesday.

On Thursday, Ram could not have played the game because other five persons were playing the game.

At most one among Sravan and Ram would have played L5 on Friday. Both of them could have played L5 on Saturday as well.

The following table presents the distribution:

| | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---------|-----|-----|-----|-----|-----|-----|-----|
| Jack | X | X | L1 | L2 | L3 | L4 | L5 |
| Lohit | X | X | L1 | L2 | L3 | L4 | L5 |
| Pradeep | L1 | L2 | X | X | L3 | L4 | L5 |
| Ram | L1 | L2 | L3 | L4 | X | | |
| Sravan | X | L1 | L2 | L3 | L4 | | |
| Tarun | X | L1 | L2 | L3 | L4 | L5 | X |

29. 4 or 5 friends could have finished the game on the last day.
Hence, the answer cannot be determined.

Choice (D)

30. Ram would have played L5 on Friday. From the options, he would have been the first to finish the five levels.

Choice (B)

31. Five friends could have played L5 on the last day.
Ans: (5)

32. Jack and Lohit definitely played all the five levels on the same days.

Choice (A)

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

SECTION – III: QA

Solutions for questions 1 to 34:

1. The sum of the scores of the two teams playing a match is 2, irrespective of the outcome of the match.
The total number of matches played in the tournament is $32C_2 = \frac{32 \times 31}{2} = 496$

The total number of points = 496(2) [Each match involves two points]

The points scored by the team scoring the highest number of points will be minimum when these points are equally divided among all the teams participating, such that every team ends up with $\frac{496(2)}{32} = 31$ points

Therefore, the score of the team that scores the highest number of points must be at least one more than 31, i.e., 32 points.

Alternately, if we consider all the matches ending in draws, each team will end up with 31 points (the number of matches played by each team). Now, the team scoring the highest number of points must have won atleast one of its matches, i.e., it's score must be one more than 31, i.e., 32

Ans: (32)

2. Number of questions correctly answered by Arif

$$= 15 + \frac{(T-24)}{4}$$

It is given that, he correctly answered 40% of the questions in the paper overall.

$$\therefore 15 + \frac{(T-24)}{4} = \frac{40}{100} T$$

$$15 + \frac{T}{4} - 6 = \frac{2}{5} T$$

$$\Rightarrow \frac{2}{5} T - \frac{T}{4} = 9$$

$$\therefore \frac{3}{20} T = 9$$

$$\Rightarrow T = 60$$

Therefore T can assume only one value.

Choice (B)

3. Quantity of salt in the initial mixture = $\frac{n}{100}(n)$

$$\text{Quantity of salt in the final mixture} = \frac{n^2}{100} + a$$

Total quantity of the final mixture = $n + 2a$

It is given that

$$\frac{n^2}{100} + a = \frac{(n-20)}{100} (n+2a)$$

$$n^2 + 100a = (n-20)(n+2a)$$

$$n^2 + 100a = (n-20)(n+2a)$$

$$n^2 + 100a = n^2 + 2na - 20n - 40a$$

$$20n = a(2n - 140)$$

$$\Rightarrow a = \frac{10n}{n-70}$$

Choice (C)

4. Interest accrued in three years = $(1.375 - 1) = 0.375$

$$= \frac{3}{8} \text{ th of the sum.}$$

Hence, interest per annum = $\frac{1}{8}$ of sum for interest to equal twice the sum, number of years required
 $= \frac{2}{\left(\frac{1}{8}\right)} = 16$.

Choice (B)

5. The total work (in man days) is 560 man days.

| Day | No. of persons | Work done in man days |
|-------|----------------|-----------------------|
| 1 | 1 | 1 |
| 2 | 2 | 1 + 2 |
| 3 | 3 | 1 + 2 + 3 |
| 4 | 4 | 1 + 2 + 3 + 4 |
| | | |
| n | n | $(1 + 2 + 3 + 4 + n)$ |

Therefore, on the n^{th} day the work done is $1 + 2 + \dots + n$
 $= \frac{n(n+1)}{2}$

If we denote the work done on the n^{th} day by t_n ,

$$\text{then } t_n = \frac{n(n+1)}{2}$$

\therefore Total work done in n days = $t_1 + t_2 + \dots + t_n$

$$= \sum \frac{n(n+1)}{2}$$

$$= \sum \frac{n^2}{2} + \sum \frac{n}{2}$$

$$= \frac{n(n+1)(2n+1)}{12} + \frac{n(n+1)}{4}$$

$$= \frac{n(n+1)(n+2)}{6}$$

We need to find a value of n , such that

$$\frac{n(n+1)(n+2)}{6} \geq 560$$

$$\Rightarrow n(n+1)(n+2) \geq 6 \times 7 \times 8 \times 10$$

$$\Rightarrow n(n+1)(n+2) \geq 14 \times 15 \times 16$$

$$\therefore n = 14$$

Therefore, the work gets completed in 14 days.

Ans: (14)

6. We need to convert 75 in the decimal system to base 7

| | | |
|---|----|-----------|
| 7 | 75 | Remainder |
| 7 | 10 | 5 |
| 7 | 1 | 3 |
| | 0 | 1 |

Therefore $(75)_{10} = (135)_7$

Thus, in base 7 it is a number comprising three consecutive odd digits.

Alternative Solution:

Since $75 > 7^2$, i.e., 49, $(75)_{10}$ when written in base 7 will comprise at least three digits. Also, since 75 is odd, all three digits cannot be even. Hence, only choice (D) is possible.

Choice (D)

7. The minute hand covers 360° in one hour, whereas the hour hand covers 30° in one hour. Hence, minute hand moves at a relative (angular) speed of

$\frac{360^\circ}{60} - \frac{30^\circ}{60} = 5.5^\circ$ per minute faster than the hour hand. (This result may be committed to memory for convenience).

Given the angle between the minute hand and hour hand was 55° when Harshita left and also when she returned.

Now, the minute hand could have been 55° behind the hour hand when she left and then travelled (overtaken) to exactly 55° ahead of it by the time she returned. In which case, the time elapsed would be $\frac{55^\circ + 55^\circ}{5.5^\circ} = 20$ min.

However, it is possible that the minutes hand was already 55° ahead (when she left) and then moved through $360^\circ - (55^\circ + 55^\circ)$, i.e., 250° , to arrive at a position that was 55° behind the hour hand (when she returned). The time elapsed for this case would be $\frac{250^\circ}{5.5^\circ} = 45.45$ min.

Any other possible configuration of initial and final positions would take more time than 45.45 min. For example, the minute hand could move through exactly 360° , (i.e., from being 55° behind to again being exactly 55° behind) taking $\frac{360}{5.5} = 65.45$ minutes.

Since it is given that she returned in less than 45 minutes, she must have spent 20 minutes outside. Choice (D)

8. Let the measure of the third side be x

By triangle inequality,

$$x + 7 > 12 \quad \text{and} \quad 7 + 12 > x \\ \Rightarrow x > 5 \quad \Rightarrow x < 19$$

Therefore, the perimeter of the triangle, $P > 7 + 12 + 5$, i.e., $P > 24$ and $P < 7 + 12 + 19$, i.e., $P < 38$.

$\therefore 24 < \text{perimeter} < 38$.

The perimeter of the triangle cannot be equal to 22 or 24 or 38 or 39, i.e., four values. Ans: (4)

9. As the quadratic expression attains a maximum value (at $x = 10$), the graph of the given expression is a parabola pointing downwards and a is negative.

Again, the maximum value of the expression is at

$$x = \frac{-b}{2a} = 2 \Rightarrow b = -4a$$

$\therefore b$ is positive [$\because a$ is negative]

Again, the product of the two roots, $\left(\frac{c}{a}\right)$, is negative,

implying c is positive.

Therefore, a is negative, whereas both b and c are positive. Choice (C)

10. $N = 364n^5 = 2^2 \times 7^1 \times 13^1 \times n^5$

As 2, 7 and 13 are factors of N , so N has at least three prime factors.

Again, it is given that N has 182 factors

$$182 = 2^1 \times 7^1 \times 13^1$$

Thus, N must have exactly three prime factors.

$$N = (p_1)^1 (p_2)^6 (p_3)^{12}$$

and No. of factors of $N = (1+1)(6+1)(12+1) = 182$.

$\therefore n = 2^x \times 7^y$ or $2^x \times 13^z$ } $\therefore 2$'s power in N is more than 1 and 2 must be present in n

$$\therefore n^5 = 2^{5x} \times 7^{5y} \text{ or } 2^{5x} \times 13^{5y}$$

We observe that x must be 2 and y must be 1

$$\therefore N = 2^2 \times 7^1 \times 13^1 (2^2 \times 7)^5 = 2^{12} \times 7^6 \times 13^1 \text{ or}$$

$$N = 2^2 \times 7^1 \times 13^1 (2^2 \times 13)^5 = 2^{12} \times 13^6 \times 7^1$$

Thus, N can assume two values.

Ans: (2)

11. Points which are equidistant from the coordinate axes must lie on the line $y = x$ or $y = -x$

Therefore, points on the line $2x + 3y = 6$ which are equidistant from the coordinate axes must be those points where $2x + 3y = 6$ intersects $y = x$ or $y = -x$

Points of intersection of $2x + 3y = 6$ and $y = x$ is $\left(\frac{6}{5}, \frac{6}{5}\right)$, whereas the lines $2x + 3y = 6$ and $y = -x$ intersects at $(-6, 6)$

Therefore two points on the given line are equidistant from the coordinate axes. Choice (C)

12. $pqr + s$ will be even when both pqr and s are even, or when both pqr and s are odd.

pqr will be odd when each of p, q and r is odd

$$\text{No. of ways } pqr \text{ is odd} = (4)(4)(4) = 64$$

(\because Each of p, q and r is an integer among 1, 3, 5 and 7)

Therefore, the number of ways when pqr is even

$$= (7)(7)(7) - (4)(4)(4) = 279$$

Therefore, pqr and s are both odd in (64×4) ways and

pqr and s are both even in (279×3) ways.

Thus, the number of ways in which $pqr + s$ is even is $64(4) + 279(3) = 1093$ ways. Ans: (1093)

13. We proceed from the given equations

$$(i) \ xy = -101 \quad (y \text{ is inversely proportional to } x)$$

$$(ii) \ 3x = 5y$$

$$\Rightarrow y = \frac{3}{5}x \quad (y \text{ is directly proportional to } x)$$

$$(iii) \ 4x + 5y = 0$$

$$\Rightarrow y = -\frac{4}{5}x \quad (y \text{ is directly proportional to } x)$$

$$(iv) \ x + y = 2$$

$$\Rightarrow y = 2 - x \quad (y \text{ is neither directly nor inversely proportional to } x)$$

Hence, in only one of the given equations is y neither directly nor inversely proportional to x .

Choice (C)

14. Let $\left(\frac{50}{a-50} - 1\right)$ be equal to x^2 , where x is a whole number.

$$\therefore x^2 + 1 = \frac{50}{a-50}$$

$\therefore (x^2 + 1)$ must be a factor of 50

The factors of 50 are 1, 2, 5, 10, 25 and 50.

We list down the values of $(x^2 + 1)$, x and a in the following table.

| $(x^2 + 1)$ | x | a |
|-------------|-----|-----|
| 1 | 0 | 100 |
| 2 | 1 | 75 |
| 5 | 2 | 60 |
| 10 | 3 | 55 |
| 50 | 7 | 51 |

Thus, for five values of a , the given expression equals to square of a whole number.

Ans: (5)

15. $27^x + 27^{x-1} = 252$

$$27^x + \frac{27^x}{27} = 252$$

$$\frac{28}{27} (27^x) = 252$$

$$\Rightarrow 27^x = 3^5 \Rightarrow 3^{3x} = 3^5$$

$$\therefore 3x = 5$$

$$\therefore (3x)^x = \left(\frac{5}{3}\right)^3 = 5(25)^{\frac{1}{3}}$$

Choice (B)

16. Let us denote the length, the breadth and the height of the box by l , b and h respectively.

The sum of all the edges = $4(l + b + h) = 112$

$$\Rightarrow l + b + h = 28$$

Again, the distance between one corner and the farthest corner from that, i.e., the longest diagonal of the box = $\sqrt{l^2 + b^2 + h^2} = 18$

$$\Rightarrow l^2 + b^2 + h^2 = 324$$

$$\text{Now, } (l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + lh)$$

Therefore the total surface area of the box

$$= 2(lb + bh + lh)$$

$$= (l + b + h)^2 - (l^2 + b^2 + h^2)$$

$$= (28)^2 - 324$$

$$= 460 \text{ sq. cm.}$$

Ans: (460)

17. As t is an even integer,

$$f(f(f(t))) = f(f(t-1))$$

$$\text{As } t-1 \text{ is odd, } f(f(t-1)) = f\left(\frac{(t-1)+1}{2}\right) = f\left(\frac{t}{2}\right)$$

$$\text{If } \frac{t}{2} \text{ is even, } f\left(\frac{t}{2}\right) = \frac{t}{2} - 1 = 15$$

$$\Rightarrow t = 32.$$

$$\text{If } \frac{t}{2} \text{ is odd, } f\left(\frac{t}{2}\right) = \frac{\left(\frac{t}{2} + 1\right)}{2} = 15$$

$$\Rightarrow t = 58$$

Therefore, the sum of all the possible values of t is

$$58 + 32 = 90$$

Ans: (90)

18. As p_1 , p_2 and $(p_1 - p_2)$ are all prime numbers, if p_1 and p_2 are both odd, then $(p_1 - p_2)$ will be even. It can be a prime number only if it is 2. Thus p_1 and p_2 must be twin primes (i.e. prime numbers that differ by 2). For eg. 5, 3 and (5 - 3) or 13, 11 and (13 - 11)

Again, if $(p_1 - p_2)$ is odd, then p_1 must be odd and p_2 must be 2 and p_1 and $(p_1 - 2)$ must be twin primes.

Therefore p_1 is always the higher of the two twin primes.

As p_1 is less than 50, the possible values that p_1 can assume are 5, 7, 13, 19, 31 and 43, i.e., six values.

Ans: (6)

19. Let the cost price of the 236 pens be P

\Rightarrow Selling price of 200 pens = P

$$\text{Selling price of the remaining 36 pens} = 36 \frac{P}{200}$$

$$\text{Total selling price of the 236 pens} = P + \frac{36P}{200}$$

$$\text{Profit} = \text{SP} - \text{CP} = P + \frac{36P}{200} - P = \frac{36P}{200}$$

$$\text{Profit\%} = \frac{\left(\frac{36P}{200}\right)}{P} \times 100 = 18\%. \quad \text{Choice (A)}$$

$$20. (6561)^{-2^{-3}} = (6561)^{\frac{1}{(-2)^3}} = (6561)^{-\frac{1}{8}} = \frac{1}{(6561)^{\frac{1}{8}}}$$

$$= \frac{1}{\left(\frac{1}{(3^8)^{\frac{1}{8}}}\right)} = \frac{1}{\frac{1}{3}} = 3 \quad \text{Choice (B)}$$

21. It is given that, $t_{p+q} = t_p + t_q + pq$

Let $q = 1$,

$$\therefore t_{p+1} = t_p + t_1 + 1 \times p = t_p + (p + 1) (\because t_1 = 1)$$

In other terms, $t_n = t_{n-1} + (n)$, which is simply the sum of the first n natural numbers.

$$\Rightarrow t_p = \frac{p(p+1)}{2}$$

$$\therefore t_{2016} = \frac{2016(2016+1)}{2} = 2033136$$

Ans: (2033136)

22. It is given that, $\left|\frac{7-x}{3}\right| < 1$

$$\Rightarrow \frac{|7-x|}{|3|} < 1 \Rightarrow |7-x| < 3$$

$$\Rightarrow 4 < x < 10$$

i.e., $x \in (4, 10)$

$$\therefore a = 4 \text{ and } b = 10 \text{ and } a + b = 14.$$

Choice (A)

23. Equating y , we get $x^2 - 12 = 12 - 2x$

$$x^2 + 2x - 24 = 0$$

$$(x+6)(x-4) = 0$$

$$\therefore x = -6 \text{ or } x = 4$$

Substituting the values obtained for x in the second equation, we get $y = 12 - 2(-6) = 24$ and $y = 12 - 2(4) = 4$.

Therefore the points of intersection of the two curves are $(-6, 24)$ and $(4, 4)$ and distance between these two points

$$= \sqrt{(4+6)^2 + (4-24)^2}$$

$$= \sqrt{100 + 400}$$

$$= 10\sqrt{5} \text{ units}$$

Choice (A)

24. It is given that,

$$9p + 2r = 7q + 6 \text{ and } 2p - 9r = 6q - 7$$

Squaring both sides of the two equations, we get,

$$81p^2 + 36pr + 4r^2 = 49q^2 + 84q + 36 \text{ and}$$

$$4p^2 - 36pr + 81r^2 = 36q^2 - 84q + 49$$

Adding, we get

$$85p^2 + 85r^2 = 85q^2 + 85$$

$$\Rightarrow p^2 + r^2 = q^2 + 1$$

$$\therefore p^2 + r^2 - q^2 = 1$$

Ans: (1)

25. The graphs of $y = \log 9x$ and $y = 3 \log x$ will intersect when

$$\log 9x = 3 \log x$$

$$\Rightarrow \log 9x = \log x^3$$

$$\Rightarrow x^3 = 9x$$

$$\Rightarrow x^3 - 9x = 0$$

$$\Rightarrow x(x-3)(x+3) = 0$$

Now, x must be positive for y to be defined.

$$\therefore x = 3 \text{ is the only value possible.}$$

The corresponding value of y is $\log 27$.

Therefore the two curves intersect at exactly one point, whose coordinates are $(3, \log 27)$

Choice (A)

26. To minimise the number of angles that are right or obtuse in the decagon, we must maximize the number of angles that are acute.

For every acute (interior) angle in the decagon, the corresponding exterior angle will be obtuse (i.e., $> 90^\circ$) and we know that the sum of all the exterior angles of any convex polygon is always equal to 360° .

Hence, if there are n acute (interior) angles, then the corresponding n exterior angles will all be obtuse and will themselves add upto at least $n \times 90^\circ$ (limiting case).

Hence, n can be at most $\frac{360^\circ}{90^\circ} = 4$. However, if $n = 4$,

then the sum of the other six exterior angles of the decagon must be equal to zero, which is not possible. Hence, n can be at most three and therefore, there must be at least $10 - 3 = 7$ angles that are right or obtuse in the decagon.

Ans: (7)

27. Let us consider the existing number of workers as n

The total work in man days = $12n$

Similarly, the total work = $(n + 20)10$

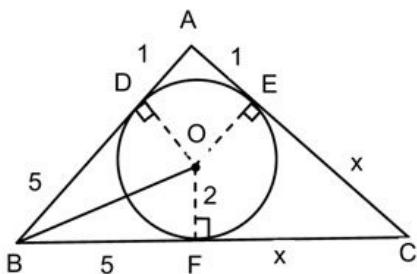
$$\Rightarrow 12n = (n + 20)10$$

$$\Rightarrow 2n = 200$$

$$\therefore n = 100$$

Therefore a single worker will take $12 \times 100 = 1200$ days to complete the work. Choice (D)

28. Let ABC be the triangle as shown in the figure below and let O be the centre of the incircle of the triangle ABC.



Let us denote the points of tangency of the incircle by D, E and F respectively.

Let side AB measure 6 cm, where AD = 1 cm and DB = 5 cm (as given in the problem)

$$\therefore AF = AD = 1, BD = BE = 5 \text{ and } CE = CF = x$$

[\because from an external point, tangents drawn to a circle are equal in length]

Now, area of the triangle = $rs = \sqrt{s(s-a)(s-b)(s-c)}$

$$\text{Where } s = \frac{6+5+x+1+x}{2} = 6+x,$$

$$r = 2 \text{ (given)}$$

$$a = 6,$$

$$b = 5+x, \text{ and}$$

$$c = 1+x$$

$$\therefore 2(6+x) = \sqrt{(6+x)(x)(1)5}$$

squaring both sides, we get

$$4(6+x)^2 = (6+x)5x$$

$$(6+x)(24+4x-5x) = 0$$

$$(6+x)(24-x) = 0$$

$$\therefore x = 24 [\because x \neq -6]$$

Therefore, the sides of the triangle ABC are 6 cm, 25 cm and 29 cm.

Therefore, the measure of the longest side of the triangle is 29 cm.

31. We can consider the six faces marked as 2, 3, 4, 0, 0 and 0.

Therefore, when the dice is thrown, the probability of getting a '2' or a '3' or a '4' is each $\frac{1}{6}$, whereas, the probability of

getting a 0 is $\frac{1}{2}$.

We can get a sum of 6 in four throws as follows:

(2, 2, 2, 0) OR (3, 3, 0, 0) OR (2, 4, 0, 0)

Alternative Solution:

The area of the triangle (i.e., $2(6+x)$) calculated using the formula $\text{area} = rs$ can also be compared/equated to that calculated using the approach where

$$\text{area of } \triangle ABC = \frac{1}{2} AB \times BC \times \sin \angle ABC, \text{ where } AB = 6$$

and $BC = (5+x)$ and $\sin \angle ABC$

$$= 2 \sin\left(\frac{\angle ABC}{2}\right) \cos\left(\frac{\angle ABC}{2}\right).$$

Now, in $\triangle BDO$; which is right angled at D, $\angle BDO$

$$= \frac{\angle ABC}{2} (\because BO \text{ is angle bisector of } \angle ABC)$$

$$\text{Also, } BO = \sqrt{BD^2 + DO^2} = \sqrt{5^2 + 2^2} = \sqrt{29}.$$

$$\Rightarrow \sin\left(\frac{\angle ABC}{2}\right) = \frac{2}{\sqrt{29}} \text{ and } \cos\left(\frac{\angle ABC}{2}\right) = \frac{5}{\sqrt{29}}.$$

\therefore we have

$$2(6+x) = \frac{1}{2} \left(2 \times \frac{2}{\sqrt{29}} \times \frac{5}{\sqrt{29}} \right) (6 \times (5+x))$$

$$\Rightarrow 12 + 2x = \frac{10}{29} \times (30 + 6x)$$

$$\Rightarrow 348 + 58x = 300 + 60x$$

$$\Rightarrow x = 24$$

$$\therefore \text{longest side} = 5 + x = 29 \text{ cm}$$

Ans: (29)

29. Let the cost price of the article be ₹100

$$\Rightarrow \text{Its marked price} = ₹160$$

$$\text{Its selling price} = \frac{3}{4}(160) = ₹120$$

\therefore Profit percentage on the article

$$= 100 \times \frac{(120-100)}{100} = 20\%$$

Choice (A)

30. $11a - 19b = 1$

$$\Rightarrow 11a - 19b + 1$$

$$\Rightarrow 11a = 11b + (8b + 1)$$

As LHS is divisible by 11, RHS must also be divisible by 11. Therefore $8b + 1$ must be divisible by 11.

The minimum value of b such that $8b + 1$ is divisible by 11 is 4

Now, successive values of b will change as per the coefficient of a , i.e., by increments of 11.

Let the number of solutions be n

$$\therefore 4 + (n-1)11 \leq 500$$

$$(n-1) \leq 496$$

$$n-1 \leq 45 \frac{1}{11}$$

$$n-1 \leq 46 \frac{1}{11}$$

therefore, there are 46 solutions

Choice (C)

31. We can consider the six faces marked as 2, 3, 4, 0, 0 and 0.

Therefore, when the dice is thrown, the probability of getting a '2' or a '3' or a '4' is each $\frac{1}{6}$, whereas, the probability of

getting a 0 is $\frac{1}{2}$.

We can get a sum of 6 in four throws as follows:

(2, 2, 2, 0) OR (3, 3, 0, 0) OR (2, 4, 0, 0)

We find the probability of each of the above cases:

| Case | Required probability | |
|------------------------|---|---|
| Case I: (2, 2, 2, 0) | $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \times \frac{1}{2}$ (4) | [\because The blank face may appear in any one of the four throws] |
| Case II: (3, 3, 0, 0) | $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{2} \times \frac{1}{2} \left(\frac{4!}{2!2!} \right)$ | [The four values have 2 identical 3's and 2 identical blanks] |
| Case III: (2, 4, 0, 0) | $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{2} \times \frac{1}{2} \left(\frac{4!}{2!} \right)$ | [The four values have 2 identical 4's] |

Thus, the probability of getting a sum of 6 in four successive throws

$$= \frac{1}{108} + \frac{1}{24} + \frac{1}{12} = \frac{2+9+18}{216} = \frac{29}{216}$$

Choice (D)

32. AM of x and $y = \frac{x+y}{2}$

GM of x and $y = \sqrt{xy}$

It is given that $\left(\frac{x+y}{2}\right) \frac{1}{3} = \sqrt{xy}$

$\Rightarrow x+y = 6\sqrt{xy}$

squaring both sides, we get,

$$x^2 + y^2 + 2xy = 36xy$$

$$\Rightarrow x^2 - 34xy + y^2 = 0$$

$$\Rightarrow x = \frac{34y \pm \sqrt{1156y^2 - 4y^2}}{2}$$

$$\Rightarrow x = \frac{34y \pm \sqrt{1152y^2}}{2}$$

$$\Rightarrow \frac{x}{y} = 17 \pm \sqrt{288}$$

As $x > y$, $\frac{x}{y} > 1$

$$\therefore \frac{x}{y} \approx 17 + 17 \approx 34$$

Ans: (34)

$$\Rightarrow (21 - 3r) = 0 \Rightarrow r = 7$$

Therefore, the coefficient of the term independent of x is $9C_6 \cdot 2^{21-21} \cdot 3^{21-21} \cdot x^{21-21} = 9C_6 = 84$.

Ans: (84)

34. It is given that $50 - x$, $80 - x$ and $(130 - x)$ are in geometric progression.

$$\therefore (80 - x)^2 = (50 - x)(130 - x)$$

$$6400 - 160x + x^2 = 6500 - 180x + x^2$$

$$\Rightarrow 20x = 100$$

$$\therefore x = 5$$

Therefore, the numbers in geometric progression are 45, 75 and 125 and the common ratio is $\frac{75}{45} = \frac{5}{3}$

Alternative Solution:

$$\text{Let the common ratio } r = \frac{(80 - x)}{(50 - x)} = \frac{(130 - x)}{(80 - x)}$$

By subtracting 1 from both sides of the equation (i.e., performing componendo) we get

$$\frac{(80 - x) - (50 - x)}{(50 - x)} = \frac{(130 - x) - (80 - x)}{(80 - x)}, \text{ i.e.,}$$

$$\frac{80 - x}{50 - x} = \frac{5}{3}. \text{ Hence, } r = \frac{5}{3}$$

Choice (B)

33. Let r^{th} term in the given expansion be independent of x

The r^{th} term in the expansion of $\left(\frac{4x^2}{9} - \frac{3}{2x}\right)^9$

$$\text{is } 9C_{(r-1)} \times \left(\frac{4x^2}{9}\right)^{(9-(r-1))} \times \left(\frac{3}{2x}\right)^{(r-1)}$$

$$= 9C_{(r-1)} \times 2^{(21-3r)} \times 3^{(3r-21)} \times x^{(21-3r)}$$

As the term is independent of x , the power of x in that term must be zero.

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