



## Mock CAT – 10 2019

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VARC

DILR

QA

## Sec 1

**Direction for questions (1-5): Read the given passage and answer the questions that follow.**

[...] Michael Hulme says, it is only recently, and primarily in the West, that the cultural and physical meanings of climate have become so separated.

That separation has contributed to a narrative vacuum—and, like nature itself, people abhor a vacuum. We fill it with the narratives we have at hand, even if they are powerfully at odds with each other. This goes some way to understanding the vitriol of the climate debate. “The ideological freightage we load onto interpretations of climate and our interactions with it,” writes Hulme, “are an essential part of making sense of what is happening around us today in our climate change discourses.” Stories about the virtues and evils of capitalism, the role of divine control, nationalist values, and so on, are not so much maliciously inserted into what could be a sober conversation but are an inevitable response to a story that is incomplete without them.

Faced with an absence, we revert to old narratives, and there are few older than utopia and dystopia. The sceptic storyline of the rise of a dictatorial world government usurping American values must be considered not as a unique reply to climate change but as the latest instance of a well-established dystopic trope, stoked by the climate narrative vacuum. Something similar can be said for attacks on the capitalist enterprise from the left. The public, for its part, is served visions of an apocalyptic future, whether it’s from politicians or from Hollywood—and, simultaneously, the utopianism of far-distant science fiction, which as a category is consumed in greater quantity than science journalism and which reflects and encourages what sociologists call “optimism bias” or “techno-salvation.” These utopian instincts are strengthened by a historical data point obvious to all: Our species has survived every obstacle we’ve encountered, and we are still here.

The successful assimilation of broad narratives from astronomy and genetics reminds us how powerful science narrative can be. We think of ourselves today as genetic machines, carrying around an adaptive program, which we inherit and pass on, doing so on this one habitable planet among countless others in a universe with a finite age. These facts have become intuitions and a part of our identity. The goal of climate change coverage should be a similar creation of intuition from fact. Intuition that our planet is a dynamic thing, that its environment is highly interconnected, that it has been remade many times by things living and dead.

Are we getting that done? The media has communicated the basic facts behind climate change well enough: the famous line graph of rising carbon dioxide levels, the 300 parts per million line in the sand, the northward migration of adapting species, and the endangerment of those left behind. But the narrative around these facts is more obscure. In the words of social scientists Susanne Moser and Lisa Dilling, science communicators “often assume that a lack of information and understanding explains the lack of public concern and engagement, and that therefore more information and explanation is needed to move people to action.” Many of these facts are, by now, either uncontested or unsurprising. It is the narratives around them that are missing. [...]

**Q.1**

Which one of the following best describes what the passage is trying to do?

- 1  It describes the evils of the lack of a utopian science narrative regarding climate change.
- 2  It urges scientists to create a cultural narrative that helps people distinguish between utopian fantasies and dystopian realities.
- 3  It explores the possible consequences of a lack of understanding of the real reasons behind climate change.
- 4  It emphasises the need to create a stronger cultural narrative around the issue of climate change.



**Solution:**

**Correct Answer : 4**

**Your Answer : 4**

**Genre: Environmental Science / Science and Technology**

**Bookmark**

**Answer key/Solution**

**Word Count# 530**

The main aim of the author, in this passage, is to talk about the lack of focus on climate change when it comes to a cultural shift. The author states that we don't have a proper narrative that will help youngsters or others to understand the gravity of the situation. This has resulted in a narrative vacuum.

**Option 1 – 'Utopian science narrative' is misleading. The author doesn't endorse the propagation of positive narratives only. It is also a narrow option.**

**Option 2 – This option totally misses the point. It says that scientists should help people in understanding the concepts of fantasy and reality. This can't be the main idea of this passage.**

**Option 3 – It looks close. But the author doesn't focus on the reasons behind climate change. The author is focusing on climate change being part of the narrative culture of the society. So, this is an irrelevant or alien option.**

**Option 4 – This is the correct answer.**

**FeedBack**

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**Q.2**

With which of the following would Hulme, Moser, and Dilling agree the least?

- 1  The narrative vacuum around climate change has led to a distortion in people's perception of the issue.
- 2  With better exposure to information, people will be able to fight climate change more effectively.
- 3  Science fictions with utopian narratives should be made more mainstream if science communicators want effective messaging regarding climate change.
- 4  As people lack understanding of the reality of climate change, they are unable to comprehend the gravity of the issue.

**Solution:**

**Correct Answer : 3**

**Genre: Environmental Science / Science and Technology**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 530**

'Least' is the clue here. So, we need to choose an option that is outrightly wrong or contradicts the stance of the three scientists.

The clue is the sentence - "often assume that a lack of information and understanding explains the lack of public concern and engagement, and that therefore more information and explanation is needed to move people to action." This is mentioned with reference to Moser and Dilling. Hulme also laments the fact that climate change doesn't have a proper narrative around it.

So, they would all agree with options 1, 2, and 4.

Option 3 is irrelevant. The three people mentioned don't want climate change to become a utopian concept (positive or unreal). So, this is the correct answer.

**FeedBack**

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**Q.3**

As per the passage, how do people deal with a narrative vacuum?

- 1  They weave new narratives to fit the void.
- 2  They go back to old narratives to fill the void.
- 3  They create utopian and dystopian narratives to fit the void.
- 4  They make use of prevalent terms to make sense of the void.

**X**

**Solution:**

**Correct Answer : 2**

**Your Answer : 4**

**Genre: Environmental Science / Science and Technology**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 530**

This is an easy fact based question. Refer to the lines: "Stories about the virtues and evils of capitalism, the role of divine control, nationalist values, and so on, are not so much maliciously inserted into what could be a sober conversation but are an inevitable response to a story that is incomplete without them. Faced with an absence, we revert to old narratives, and there are few older than utopia and dystopia."

So, the author means that when we are challenged with the absence of a story, we fit in the existing stories to fill the void. Hence, option 2 is the correct answer.

**Option 1 – 'New narratives' is incorrect.**

**Options 3 and 4 – Both are irrelevant. "Prevalent terms" is misleading.**

**FeedBack**

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**Q.4**

Which of the following, if true, would weaken the author's main point in the passage?

- 1  In a survey conducted across North America, more than 85% participants were unaware of the basic terms associated with climate change.
- 2  In a survey conducted across Europe, more than 35% of the participants said that they had learnt about climate change from a textbook.
- 3  In a survey conducted across Australia, more than 40% participants stated that they agreed with the messages in science fictions.
- 4  In a survey conducted across Asia, more than 45% of the participants said that they prefer to learn about global issues from newspapers or journals.

**Solution:**

**Correct Answer : 4**

**Genre: Environmental Science / Science and Technology**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 530**

This is an easy to answer question if we notice the main idea of the passage. The author states that we don't have proper perspective of the issue of climate change as we don't have a proper narrative around the issue. So, we need to make it part of our stories or writings. It is also mentioned that "The public, for its part, is served visions of an apocalyptic future, whether it's from politicians or from Hollywood—and, simultaneously, the utopianism of far-distant science fiction, which as a category is consumed in greater quantity than science journalism and which reflects and encourages what sociologists call "optimism bias" or "techno-salvation."

Hence, the main point of the author is that the public is learning about the issue of climate change from popular fiction or films, and not from authentic sources like science journals.

**Options 1 and 3 will strengthen the author's point.**

**Options 2 and 4 will both weaken the author's contention. But option 4 is stronger. Option 2 says that the participants 'learnt' the 'term'. The issue here is not limited to being aware of the term called 'climate change'. It's about the issues related to it. Hence, option 4 will 'more strongly' challenge the author's contention.**

**Feedback**

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**Q.5**

From the passage, which of the following can be inferred about the issue of climate change?

- 1  Its reporting will benefit from a stronger and broader chronicle.
- 2  Its cultural and physical meanings are incompatible.
- 3  Its true meaning depends on intuitions and facts.
- 4  It has not been portrayed in a good light by the mainstream publications.



**Solution:**

**Correct Answer : 1**

**Your Answer : 1**

**Genre: Environmental Science / Science and Technology**

**Bookmark**

**Answer key/Solution**

**Word Count# 530**

It's a straightforward inference based question.

**Option 1 – It is correct. This is the main idea of the passage. If climate change becomes part of the broader narrative, then people will surely be more aware of it. Hence, its reporting will benefit.**

**Option 2 – ‘Incompatible’ will weaken the main point of the author.**

**Option 3 – This is a totally illogical option. The passage contradicts the use of intuitions in understanding climate change.**

**Option 4 – This can't be inferred. It is said that the mainstream publications have taken an unnecessarily utopian view of the issue. But ‘good light’ can't be defined in this context.**

**FeedBack**

**Direction for questions (6-10): Read the given passage and answer the questions that follow.**

[...] Within the framework of humoral medicine, medieval experts held worms and lice to be a product of the body. According to medieval understandings of the body, health was based on the equilibrium of the four humours (blood, phlegm, black bile and yellow bile), and illness was the result of humoral imbalance. In the humours system, the body produced parasites when its humours were out of balance. This meant that diet imbalances, among other things, caused infestations: eating the wrong food could bring all sorts of problems. Gilbert said that 'sweet meats engender watery blood, and that engenders worms and nourishes them', and fruit was also dangerous. Lice were often attributed to overindulgence in fruit, and especially figs. According to Albertus Magnus, this is because of 'the coarseness of their chyme' (his meaning of 'chyme' is probably the same as ours – i.e. the mix of partly digested food and digestive juices that passes from the stomach into the small intestine).

Depending on their individual humoral make-up, some people were more prone to parasitic infections than others. Children were thought to be particularly vulnerable to intestinal parasites because they were naturally warm and wet. Mothers were advised not to give under-sevens too many phlegmatic and viscous foods, such as fruit and oily fish. Convention held that these types of food impeded digestion and unbalanced infant humours, leaving them vulnerable to worms. The susceptibility of adults also depended on diet, among other things. According to Bernard of Gordon, professor of medicine at the University of Montpellier from 1285, gluttons were particularly prone to worms. When the barber of Thomas Cantilupe, bishop of Hereford, asked another servant why their master had so many lice, he replied that 'it happened naturally to some men more than others'.

Medieval people also faced a wider range of parasites than we do: because they were apparently generated by the body, it was believed that they could occur in virtually any part of it. Despite being non-existent, 'earworms' and 'toothworms' were particularly common, and no one was immune. [...] Worms and lice around the eyes also seem to have been a frequent problem. These were probably linked to the contemporary belief in the importance of removing nocturnal residues and excretions from around the eyes on waking. [...]

Medieval recipe collections are scattered with treatments for parasites – suggesting both the scale of the problem, and also a real desire to be rid of these pests. The nature and likely efficacy of these remedies varies considerably. Some were very straightforward but surely ineffective: sniffing lavender to kill lice, for example, or washing the hair in sea water to treat nits. Others were more effective, but also more unpleasant. Most worm remedies were based on bitter herbs, in particular wormwood and gentian. Such bitter herbs would have killed the parasites, but they would also have caused severe diarrhoea. In medieval terms, this unfortunate side-effect meant that the patient had been well-purged, and his humours rebalanced. Many medieval physicians seem to have understood treating worms as a two-step process: first they had to be killed, then they could be expelled from the body. [...]

#### Q.6

It can be inferred from the passage that the author considers medieval treatments of parasites as:

- 
- 1  barbaric and mostly ineffective due to a lack of fundamental understanding of the problem.
- 2  propelled by a genuine necessity but partly futile due to a lack of proper understanding of the phenomenon.
- 
- 3  unpleasant, ineffective, and, sometimes, outrightly hilarious.
- 
- 4  fuelled by the magnitude of the issue of infestations and aided by the patients' desire to be cured.

×

**Solution:**

**Correct Answer : 2**

**Your Answer : 3**

**Genre: Abstract / History**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 522**

This is a slightly tricky question. Keep in mind the main idea of the author.

**Option 1 – The author calls these treatments unpleasant. ‘Barbaric’ is too strong a term.**

**Option 2 – Refer to the last two paragraphs. The author says that the treatments were given in earnest as the problem was serious. But because they didn’t understand the concept of worms properly, these treatments were unpleasant and mostly ineffective. Hence, this is the correct answer.**

**Option 3 – The author never calls these treatments ‘hilarious’. This is a distortion of a sentence given in the passage.**

**Option 4 – ‘The patients’ desire’ has not been mentioned in the passage. So, this is not the author’s opinion.**

**FeedBack**

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#### Q.7

What was believed to be the cause of sickness in the medieval times?

- 1  A lack of proper diet which resulted in infestations

2  The production of parasites due to dietary imbalance

3  The eating of wrong food which led to the generation of parasites

4  A lack of equilibrium between the four humours



**Solution:**

**Correct Answer : 4**

**Your Answer : 4**

**Genre: Abstract / History**

**Bookmark**

**Answer key/Solution**

**Word Count# 522**

This is an easy question. Refer to the lines: "According to medieval understandings of the body, health was based on the equilibrium of the four humours (blood, phlegm, black bile and yellow bile), and illness was the result of humoral imbalance."

Hence, option 4 is the clear answer. The other options are either irrelevant or incomplete.

**FeedBack**

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Depending on their individual humoral make-up, some people were more prone to parasitic infections than others. Children were thought to be particularly vulnerable to intestinal parasites because they were naturally warm and wet. Mothers were advised not to give under-sevens too many phlegmatic and viscous foods, such as fruit and oily fish. Convention held that these types of food impeded digestion and unbalanced infant humours, leaving them vulnerable to worms. The susceptibility of adults also depended on diet, among other things. According to Bernard of Gordon, professor of medicine at the University of Montpellier from 1285, gluttons were particularly prone to worms. When the barber of Thomas Cantilupe, bishop of Hereford, asked another servant why their master had so many lice, he replied that 'it happened naturally to some men more than others'.

Medieval people also faced a wider range of parasites than we do: because they were apparently generated by the body, it was believed that they could occur in virtually any part of it. Despite being non-existent, 'earworms' and 'toothworms' were particularly common, and no one was immune. [...] Worms and lice around the eyes also seem to have been a frequent problem. These were probably linked to the contemporary belief in the importance of removing nocturnal residues and excretions from around the eyes on waking. [...]

Medieval recipe collections are scattered with treatments for parasites – suggesting both the scale of the problem, and also a real desire to be rid of these pests. The nature and likely efficacy of these remedies varies considerably. Some were very straightforward but surely ineffective: sniffing lavender to kill lice, for example, or washing the hair in sea water to treat nits. Others were more effective, but also more unpleasant. Most worm remedies were based on bitter herbs, in particular wormwood and gentian. Such bitter herbs would have killed the parasites, but they would also have caused severe diarrhoea. In medieval terms, this unfortunate side-effect meant that the patient had been well-purged, and his humours rebalanced. Many medieval physicians seem to have understood treating worms as a two-step process: first they had to be killed, then they could be expelled from the body. [...]

#### Q.8

**Why did the medieval people have to deal with a larger group of parasites than we do?**

- 1  Because of a lack of understanding of human physiology.

- 2  Because of the mistaken belief that earworms existed.
- 3  Because of the lack of proper hygiene like washing one's teeth and ears.
- 4  Because of the notion that our body, and every part of it, could produce parasites.



**Solution:**

**Correct Answer : 4**

**Your Answer : 4**

**Genre: Abstract / History**

**Bookmark**

**Answer key/Solution**

**Word Count# 522**

This is another easy factual question. Refer to the lines: "Medieval people also faced a wider range of parasites than we do: because they were apparently generated by the body, it was believed that they could occur in virtually any part of it."

So, option 4 is the clear answer.

**Option 1 – It is too broad.**

**Option 2 – It is partially correct. 'Earworms' and other such non-existent worms were the reason behind the 'wider range' asked in the question. But option 4 gives a more complete view of the issue.**

**Option 3 – This was the reason behind the large scale infestations. But this doesn't answer the given question.**

**FeedBack**

**Direction for questions (6-10): Read the given passage and answer the questions that follow.**

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#### Q.9

Which of the following best describes the nature of the given passage?

- 1  An impassioned description of a certain issue belonging to a bygone era

2  A subjective analysis of the cause and effect of a certain fallacious belief in the old ages

3  An objective overview of a persistent human problem

4  A satiric narrative on an obsolete era and its superstitious practices

**Solution:**

**Correct Answer : 1**

**Genre: Abstract / History**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 522**

The author is mildly sarcastic in this passage. S/he is also analytical in explaining the issue. So, we need to follow the method of elimination to answer this question.

**Option 1 – It is the correct answer.** The author describes the issue of ‘parasitic infestations and their treatment’ during a bygone era (the medieval times). The author’s tone is also impassioned or objective.

**Option 2 – It is not a subjective analysis.** Hence, this option is incorrect.

**Option 3 – ‘Parasitic infestations’ have not been mentioned as a ‘persistent human problem’ as their scope in the modern era has not been mentioned.**

**Option 4 – ‘Satiric’ is correct.** However, the author doesn’t consider the entire era to be ‘obsolete’ or ‘outdated’. The author also doesn’t focus on ‘superstitions’. The lack of understanding of human physiology can’t be deemed ‘superstitious’.

**FeedBack**

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[...] Within the framework of humoral medicine, medieval experts held worms and lice to be a product of the body. According to medieval understandings of the body, health was based on the equilibrium of the four humours (blood, phlegm, black bile and yellow bile), and illness was the result of humoral imbalance. In the humours system, the body produced parasites when its humours were out of balance. This meant that diet imbalances, among other things, caused infestations: eating the wrong food could bring all sorts of problems. Gilbert said that 'sweet meats engender watery blood, and that engenders worms and nourishes them', and fruit was also dangerous. Lice were often attributed to overindulgence in fruit, and especially figs. According to Albertus Magnus, this is because of 'the coarseness of their chyme' (his meaning of 'chyme' is probably the same as ours – i.e. the mix of partly digested food and digestive juices that passes from the stomach into the small intestine).

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#### **Q.10**

All of the following were used as treatments of parasites in the medieval era EXCEPT:

- 1  Sniffing lavender

2  Consumption of bitter herbs

3  Avoiding certain fruits and oily fish

4  Washing hair in sea water



**Solution:**

**Correct Answer : 3**

**Your Answer : 3**

**Genre: Abstract History**

**Bookmark**

**Answer key/Solution**

**Word Count# 522**

This is a tricky question. Options 1, 2, and 4 are clearly mentioned in the last paragraph as treatments of different parasites. Option 3 is mentioned as a preventive measure, not as part of the cure.

**FeedBack**

**Direction for questions (11-15): Read the given passage and answer the questions that follow.**

We've all been there. The thundering steps across the tarmac. The nervous glance over your shoulder. The hand reaching for you with a shout of "You're it!" Playing tag is a staple of most childhoods and, for me, rushing across the playground at break was the only time my imagination really came alive. It was a moment of freedom, when I could recreate the worlds I had read about in class.

But a recent BBC report found that not all schools in England value this free time. In fact, many are sacrificing playtimes and lunch to make the day shorter. This is happening for a variety of reasons; in some schools it's to reduce local congestion, while others have made the change to bring teaching time in line with Department for Education guidelines. Elsewhere, playtime is being reduced to make more time for lessons.

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In 2012, a review of more than 40 studies highlighted the relationship between play and creative problem-solving, cooperation and logical thinking. Research by Edward Fisher also found that play can enhance early development by anything from 33% to 67% by increasing adjustment, improving language skills and reducing social and emotional problems. This has

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Getting together outside of the classroom also enables young people to develop social skills. In fact, playtime may be the only opportunity some children get to interact with other young people in a safe environment. The government's Play Strategy, published in 2008, defines play as "children and young people following their own ideas and interests, in their own way and for their own reasons."

Children establish a sense of self through play which is particularly important at a time when "value" in primary education is increasingly being determined by test scores rather than personal development.

Too often young people choose to lose themselves in the instant gratification of gaming on a screen. But in computer games, as in SAT tests, they are scored on their performance, consolidating the idea of competitive hierarchies. Real-world play provides them with a space in which to entertain themselves using their own resources of mind and body, while nurturing a sense of self-worth.

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Play needs to be preserved in the school routine, so that children can appreciate it as part of the learning experience. Attempts to cut or treat it as an optional extra risk perpetuating the view that it is an indulgence, rather than essential. With defined times for play, students can look forward to finding themselves, even when they do not find lessons the easiest. Schools need to pay homage to the benefits of play, rather than playing with it – and fast.

#### **Q.11**

The author is in favour of preserving play time in schools for all of the following reasons EXCEPT:

- 1  Play helps the child develop a more wholesome self-esteem.
- 2  Play time helps children develop better social interaction.
- 3  Play helps a child score well in competitive exams.
- 4  Play time helps children become more well-adjusted.



**Solution:****Correct Answer : 3****Your Answer : 3****Genre: Education** **Bookmark** **Answer key/Solution****Word Count# 581**

This is an easy question. Options 1, 2, and 4 are directly mentioned in the passage.

Option 3 is misleading. The author mentions the point about SAT exams to highlight the importance of real life competitive situations. Doing or not doing well in 'competitive exams' (SAT can't be inferred to mean all or most competitive exams), is not part of the discussion. So, this is the correct answer.

 **FeedBack**

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**Direction for questions (11-15): Read the given passage and answer the questions that follow.**

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#### Q.12

In the context of the passage, which of the following best captures the significance of the first paragraph?

- 1  It helps the author in building a backstory in order to discuss the issue at hand.
- 2  It helps the author consolidate his position on the importance of social interactions.
- 3  It enables the author to start the narrative with a distraction before discussing the main point.
- 4  It provides the readers with a humorous anecdote before they face the more serious theme of the passage.



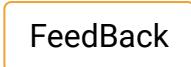
**Solution:****Correct Answer : 1****Your Answer : 1****Genre: Education** **Bookmark** **Answer key/Solution****Word Count# 581**

The first paragraph paints a vivid picture of a childhood memory. This helps the author build his case in favour of continuing this experience. The tone is also quite powerful. The author uses a personal narrative style to emphasise his point. Hence, option 1 is the correct choice.

Option 2 – ‘Consolidate’ is wrong as the author is yet to state his position comprehensively. ‘Social interactions’ is too broad.

Option 3 – This paragraph is anything but a distraction.

Option 4 – The anecdote is neither humorous nor is it irrelevant to the ‘more serious’ issue discussed later.

 **FeedBack**

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#### **Q.13**

**Which of the following can surely be inferred from the passage?**

- 1  Playing childhood games make people feel free of any constraint.
- 2  Dedicated play hours in schools can help curb the problem of childhood obesity.
- 3  Many schools over the world are becoming insensitive to the cognitive development of children.
- 4  Without dedicated play hours in school, children will be unable to interact with their peers in a secure space.



**Solution:****Correct Answer : 2****Your Answer : 2****Genre: Education** **Bookmark** **Answer key/Solution****Word Count# 581****This can be answered by the method of elimination.****Option 1 – ‘Any constraint’ makes it an illogical conclusion.****Option 2 – This is one of the main points discussed in the passage. Refer to the study by Nicola D Ridgers at Deakin University in Australia.****Option 3 – The schools are cutting the play time. That can't be inferred to state that they are insensitive towards the broader issue of ‘cognitive development’. Playtime isn't the only way to improve a child's cognitive ability. So, it can't be inferred from this passage.****Option 4 – The passage mentions that playground is a place where children interact securely with their peers. However, it may not be the only place for children to do so. Hence, this can't be inferred with certainty.****FeedBack**

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#### **Q.14**

**As per the passage, which of the following can be determined to be the main reason behind the cutting of play hours by schools?**

- 
- 1  The need for convenience by adults**
  - 2  The desire to target higher academic excellence**
  - 3  Logistical problems or bureaucratic directives**
  - 4  Academic reasons or governmental interference**
-

**Solution:****Correct Answer : 3****Your Answer : 3****Genre: Education****Bookmark****Answer key/Solution****Word Count# 581**

The author mentions two main reasons for this action by schools: there is a government directive or other such obligation; there is a problem with traffic or other such issues. Hence, option 3 is the most comprehensive answer.

Option 1 is misleading. Option 2 is partially correct. Option 4 is partially correct. 'Interference' can't be the right term to describe this situation. So, option 3 is the best answer.

**FeedBack**

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**Direction for questions (11-15): Read the given passage and answer the questions that follow.**

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#### Q.15

Which of the following is the main conclusion of the 2012 study mentioned in the passage?

- 1  Regular play time makes children fitter.
- 2  If a child plays regularly, he/she will develop his/her non-cognitive qualities.
- 3  Interaction with one's peers can help a child develop a stronger sense of 'self-identity'.
- 4  There is a correlation between physical activity and mental development.



**Solution:****Correct Answer : 4****Your Answer : 1****Genre: Education** **Bookmark** **Answer key/Solution****Word Count# 581**

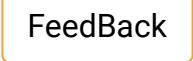
**Refer to the paragraph: "In 2012, a review of more than 40 studies highlighted the relationship between play and creative problem-solving, cooperation and logical thinking. Research by Edward Fisher also found that play can enhance early development by anything from 33% to 67% by increasing adjustment, improving language skills and reducing social and emotional problems. This has positive implications for both educational development and everyday intellectual life."**

**Option 1 – This is mentioned in the context of a different study. So, it is an irrelevant option.**

**Option 2 – The qualities mentioned in the study are 'cognitive', not 'non-cognitive'. So, this is an incorrect option.**

**Option 3 – This too is mentioned in a different context in the passage.**

**Option 4 – This is the only possible answer.**

 **FeedBack**

**Direction for questions (16-19): Read the given passage and answer the questions that follow.**

[...] The final hurdle in establishing an artwork's authenticity is forensic. An array of non-invasive scientific testing methods is available that can help assure an object's age, but these cannot guarantee authorship. Perhaps surprisingly, forensic testing is rarely turned to in the art trade, even with extremely expensive items. If an object looks good, and the provenance checks out, then it is usually accepted as genuine, and sold. Forensic testing usually takes place when some red flag is raised in the connoisseurship or provenance studies, or if someone who acquires it later grows suspicious. In this case, *Saint Sebastian* was likely tested at the Louvre in November 2016: since 'it was listed as a *tresor national*/by the Ministry of Culture shortly after, we can assume the results were positive,' says de Bayser. Besides, a government wishing to keep the work in France would have wanted to confirm its authenticity before committing tax-euros to purchasing it.

Forensic tests are best at spotting anachronisms, details that might give away an object's imposture, like some pigment or material found in an artwork that post-dates the period in which the work was supposedly created. The German forger Wolfgang Beltracchi, for instance, was caught when titanium white, a modern substance, was found in 2008 in a painting ostensibly created before titanium white was available. Testing can also date organic material (such as paper) to a certain period, often accurate to within a few years. What forensic testing almost never does is guarantee authorship. It is better at weeding out than honing in. Presumably, when this work was tested, no flags were raised – everything dated as it should to feasibly allow authorship by Leonardo. Effectively, science offered a double-negative to support the conclusions of the connoisseurship and provenance examinations.

But art history is pocked with compelling copies, often by members of an artist's studio, as well as forgeries, which can tax and strain even the most assured expert eye. This is why the double-negative assurance (the business of authenticating originals) is so important. The art historian Katy Blatt's 2011 book on Leonardo's painting *The Virgin of the Rocks* concerns two versions of it – both by Leonardo. 'Historically, the second *Virgin of the Rocks* at the National Gallery, London, has been seen by scholars as a lesser copy,' she said. Having the painting authenticated 'was helpful to maintain [the gallery's] standing as a global centre for art treasures; and it certainly boosted their ticket sales; the 2011 Leonardo exhibition attracted 323,897 visitors, more than six times the numbers normally admitted to exhibitions.' [...]

#### Q.16

As per the passage, the business of authenticating originals is crucial because:

- 1  it helps identify copies which even experts can't identify.
- 2  it provides conclusive evidence regarding the authorship of the work being tested.
- 3  it increases the commercial viability of the art work by increasing its value or by attracting more visitors towards it.

- 4  it helps the experts in weeding out fakes and honing in genuine buyers.

**Solution:**

**Correct Answer : 1**

**Genre: Art**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 426**

This is an easy question. Refer to the first paragraph. It clearly states that forensic testing is done when other methods fail. If experts don't raise a red flag, then forensic testing is not done. So, option 1 is the clear answer.

**Option 2 – It is clearly mentioned that forensic testing doesn't guarantee proof of authorship.**

**Option 3 – It is irrelevant as it has not been mentioned in the passage.**

**Option 4 – This is a distorted version of a line mentioned in some other part of the passage. So, it is a trap option and incorrect too.**

**FeedBack**

**Direction for questions (16-19): Read the given passage and answer the questions that follow.**

[...] The final hurdle in establishing an artwork's authenticity is forensic. An array of non-invasive scientific testing methods is available that can help assure an object's age, but these cannot guarantee authorship. Perhaps surprisingly, forensic testing is rarely turned to in the art trade, even with extremely expensive items. If an object looks good, and the provenance checks out, then it is usually accepted as genuine, and sold. Forensic testing usually takes place when some red flag is raised in the connoisseurship or provenance studies, or if someone who acquires it later grows suspicious. In this case, *Saint Sebastian* was likely tested at the Louvre in November 2016: since 'it was listed as a *tresor national*/by the Ministry of Culture shortly after, we can assume the results were positive,' says de Bayser. Besides, a government wishing to keep the work in France would have wanted to confirm its authenticity before committing tax-euros to purchasing it.

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#### Q.17

The author gives the example of Wolfgang Beltracchi to demonstrate that:

- 1  Forensic testing should logically always follow connoisseurship and provenance examinations.
- 2  Copies by expert forgers is a common occurrence in the modern world.
- 3  Forensic testing is done only if a red flag is raised by the connoisseur.

4  **Forensic examinations can test if the work was created at a particular period of time.**

**Solution:**

**Correct Answer : 4**

**Genre: Art**

 **Bookmark**

 **Answer key/Solution**

**Word Count# 426**

The author mentions this forger to show the importance of forensic testing. The method of this test is also mentioned. So, option 4 is the correct choice.

**Option 1 – This is an illogical inference as the author doesn't advocate the use of forensic testing for every artwork.**

**Option 2 – 'Common occurrence' can't be deduced from this example.**

**Option 3 – It is said that forensic testing is done for various reasons. One of them is the red flag raised by the connoisseur. Secondly, this option doesn't answer the question as to what the author intends to state via the example mentioned.**

**FeedBack**

**Direction for questions (16-19): Read the given passage and answer the questions that follow.**

[...] The final hurdle in establishing an artwork's authenticity is forensic. An array of non-invasive scientific testing methods is available that can help assure an object's age, but these cannot guarantee authorship. Perhaps surprisingly, forensic testing is rarely turned to in the art trade, even with extremely expensive items. If an object looks good, and the provenance checks out, then it is usually accepted as genuine, and sold. Forensic testing usually takes place when some red flag is raised in the connoisseurship or provenance studies, or if someone who acquires it later grows suspicious. In this case, *Saint Sebastian* was likely tested at the Louvre in November 2016: since 'it was listed as a *tresor national*/by the Ministry of Culture shortly after, we can assume the results were positive,' says de Bayser. Besides, a government wishing to keep the work in France would have wanted to confirm its authenticity before committing tax-euros to purchasing it.

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#### **Q.18**

**Which of the following is definitely true according to the passage?**

- 1  National treasures are seldom sold by world governments.
- 2  Forensic testing is not done on all expensive paintings.
- 3  Titanium white was not used in paintings that were created before 2008.
- 4  The Leonardo exhibition was the most successful art event of 2011.

**Solution:****Correct Answer : 2****Genre: Art** **Bookmark** **Answer key/Solution****Word Count# 426****This can be answered by the method of elimination.**

**Option 1 – The passage mentions one example with reference to the French government. From this, nothing can be said with certainty about world governments. The option is logically far-fetched.**

**Option 2 – This is certainly true. The author finds it surprising that forensic testing is not done more often. So, we can surely say that not all expensive paintings undergo this testing.**

**Option 3 – It can't be stated with certainty. The test was done in 2008. It was found that titanium white was not available during the time when the painting was supposed to be done. So, nothing can be stated with certainty regarding the date of the painting.**

**Option 4 – This is clearly not supported by the passage. The exhibition has been mentioned as a commercially successful event. Nothing has been said about its relative position with the other such events of 2011.**

 **FeedBack**

**Direction for questions (16-19): Read the given passage and answer the questions that follow.**

[...] The final hurdle in establishing an artwork's authenticity is forensic. An array of non-invasive scientific testing methods is available that can help assure an object's age, but these cannot guarantee authorship. Perhaps surprisingly, forensic testing is rarely turned to in the art trade, even with extremely expensive items. If an object looks good, and the provenance checks out, then it is usually accepted as genuine, and sold. Forensic testing usually takes place when some red flag is raised in the connoisseurship or provenance studies, or if someone who acquires it later grows suspicious. In this case, *Saint Sebastian* was likely tested at the Louvre in November 2016: since 'it was listed as a *tresor national*/by the Ministry of Culture shortly after, we can assume the results were positive,' says de Bayser. Besides, a government wishing to keep the work in France would have wanted to confirm its authenticity before committing tax-euros to purchasing it.

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#### Q.19

**The author in the passage:**

- 1  tries to build a case for mandatory forensic testing on expensive artworks.
- 2  subtly criticise the methods used by museums to boost the price of an artwork.
- 3  describes the reason why a certain procedure is adopted in the artworld.
- 4  helps explain the details involved in authenticating the ownership of a painting.

**Solution:****Correct Answer : 3****Genre: Art** **Bookmark** **Answer key/Solution****Word Count# 426**

This is a main idea based question. The author highlights the use of forensic testing and its necessity.

**Option 1 – The author doesn't advocate the use of forensic testing clearly. S/he just describes its utility.**

**Option 2 – The author doesn't criticise or adopt a negative tone in the passage.**

**Option 3 – It is the best choice. The author describes forensic testing to authenticate artwork under certain conditions. So, this is the best answer.**

**Option 4 – The author doesn't mention any technique that authenticates the ownership of a painting. So, this is wrong.**

**FeedBack**

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**Direction for questions (20-24): Read the given passage and answer the questions that follow.**

Psychopaths are fearless, confident, charismatic, ruthless, and focused. Yet, contrary to popular belief, not necessarily violent. It depends, on what else you've got lurking on the shelves of your personality cupboard. Far from being an open and shut case – you're either a psychopath or you're not – there are, instead, inner and outer zones of that disorder: a bit like the fare zones on an Underground map. There is a spectrum of psychopathy along which each of us has our place, with only a small minority of A-listers resident in the 'inner city'.

One individual, for example, may be ice-cool under pressure, and display about as much empathy as an avalanche and yet at the same time act neither violently, nor antisocially, nor without conscience. Scoring high on two psychopathic attributes, such an individual may rightly be considered further along the psychopathic spectrum than someone scoring lower on that dyad of traits, yet still not be anywhere near the danger zone of a person scoring high on all of them.

Just as there's no official dividing line between someone who plays recreational golf on the weekends and, say, a Tiger Woods for instance, so the boundary between a world-class, 'hole-in-one' super-psychopath and one who is merely 'psychopathises' is similarly blurred. Think of psychopathic traits as the dials and sliders on a studio mixing desk. Shunt all of them to max, and you'll have a soundtrack that's no use to anyone. But if the soundtrack is graded, and some are up higher than others – such as fearlessness, focus, lack of empathy,

and mental toughness, for example – you may well have a surgeon who's a cut above the rest.

Of course, surgery is just one instance where psychopathic 'talent' may prove advantageous. There are others. Take law enforcement, for example. In 2009, shortly after Angela Book published the results of her study, I decided to perform my own take on it. If, as she'd found, psychopaths really were better at decoding vulnerability, then there had to be applications. There had to be ways in which, rather than being a drain on society, this talent conferred some advantage. Enlightenment dawned when I met a friend at the airport. We all get a bit paranoid going through customs, I mused. Even when we're perfectly innocent. But imagine what it would feel like if we did have something to hide.

Thirty undergraduate students took part in my experiment: half of whom had scored high on the Self-Report Psychopathy Scale, and other half low. There were also five 'associates'. The students' job was easy. They had to sit in a classroom and observe the associates' movements as they entered through one door and exited through another, traversing, en route, a small, elevated stage. But there was a catch. The students also had to deduce who was 'guilty': which of the five was concealing a scarlet handkerchief.

To raise the stakes and give them something to 'go on', the 'guilty' associate was handed \$100. If the jury correctly identified the guilty party – if when the votes were counted, the person with the handkerchief came out on top – then they had to give the money back. If, on the other hand, they got away with it, and the finger of suspicion fell more heavily on one of the others, then the 'guilty associate' would stand to be rewarded. They would get to keep the \$100.

The results were extraordinary. Over 70 percent of those who score high on the Self-Report Psychopathy Scale correctly picked out the handkerchief-smuggling associate, compared to just 30 percent of the low scorers.

Zeroing in on weakness may well be part of a serial killer's toolkit. But it may also come in handy at the airport.

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#### Q.20

As per the passage, it can be inferred that psychopaths are better at decoding vulnerability because of:

- 
- 1  their ability to score high on the Self-Report Psychopathy Scale.
  - 2  their ability to spot fear.
  - 3  their hidden 'talents'.
  - 4  their hidden nature such as focus and ruthlessness.
-

**Solution:****Correct Answer : 2****Genre: Psychology** **Bookmark** **Answer key/Solution****Word Count# 621**

This is an interesting passage. This question is slightly tricky, and not too difficult. Refer to the fourth paragraph. The author says that we get nervous even when we have nothing to hide. So, the author implicitly hints that we would be even more nervous when we have something to hide. In the experiment, nerves were jingling. So, it can be inferred that psychopaths are good at detecting this aspect. So, option 2 is the correct choice.

**Option 1 – It is an irrelevant option. A score doesn't help anyone in the real life situation. At least, the author hasn't given any data to support this.**

**Option 3 – This is a vague option.**

**Option 4 – These two qualities may or may not help one in detecting the guilty. So, option 2 is still the best answer.**

 **FeedBack**

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**Direction for questions (20-24): Read the given passage and answer the questions that follow.**

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#### Q.21

With which of the following would the author of the passage most likely agree?

- 1  A focused psychopath can't be part of the inner zone of the spectrum.
  - 2  A psychopath need not always be a threat to the society.
  - 3  All psychopaths can be a boon for the society if trained well.
  - 4  Psychopaths make better surgeons and custom officers as compared to normal humans.
-

**Solution:****Correct Answer : 2****Genre: Psychology** **Bookmark** **Answer key/Solution****Word Count# 621****This can be answered with the process of elimination.**

**Option 1 –** The author mentions the inner zone to highlight that only a few psychopaths are actually beyond control and they are violent people. So, someone with excessive focus has a high chance of being on this list. So, this is a wrong option.

**Option 2 –** The author clearly states that not all psychopaths are violent. So, this is correct.

**Option 3 –** This is clearly untrue. The author clearly mentions that some psychopaths are evil and they can't be treated. So, this is an incorrect choice.

**Option 4 –** This is clearly illogical. The author says that some psychopaths can be competent surgeons and custom officers. However, such a far-fetched conclusion can't be supported by the passage.


**FeedBack**

**Direction for questions (20-24):** Read the given passage and answer the questions that follow.

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## Q.22

**What was the main purpose of the experiment conducted by the author?**

- 1  To ascertain if all psychopaths are drain on the society or not
- 2  To find the key qualities needed for one to become a better law enforcement professional
- 3  To study if psychopaths were really better at a certain skill
- 4  To understand how psychopaths are able to operate under pressure

**Solution:****Correct Answer : 3****Genre: Psychology** **Bookmark** **Answer key/Solution****Word Count# 621**

The answer can be found in the preceding paragraph. The author states that a study suggested that psychopaths were good at certain skills. So, the author is clearly curious to find out if psychopaths can be useful for the society due to these skills. So, option 3, though not comprehensive, is the best answer.

**Option 1 – This doesn't capture the tone of the author. S/he isn't trying to find flaws in psychopaths.**

**Option 2 – This is wrong. The custom officer example is just a metaphor. It can't be taken literally. It could have been any other job, not necessarily 'law enforcement'.**

**Option 4 – It is irrelevant.**

**Direction for questions (20-24): Read the given passage and answer the questions that follow.**

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Zeroing in on weakness may well be part of a serial killer's toolkit. But it may also come in handy at the airport.

### Q.23

As per the author, who, among the following, will be most likely to be a part of the A-listers residing in the 'inner city' of psychopathy?

- 1  A musician who shows no compassion for below-par singers, and who takes pleasure in deriding them in public
- 2  A pilot who loves performing risky manoeuvres, yet manages to always land the plane successfully
- 3  A sportsperson who has no qualms in using aggressive tactics which are illegal to win a match
- 4  A judge who likes to hand out strict physical punishments to the guilty even when it is considered immoral

**Solution:****Correct Answer : 4****Genre: Psychology** **Bookmark** **Answer key/Solution****Word Count# 621**

Refer to the line: “One individual, for example, may be ice-cool under pressure, and display about as much empathy as an avalanche and yet at the same time act neither violently, nor antisocially, nor without conscience.” So, the person has to show lack of ‘conscience’, and show some violence or antisocial behaviour.

So, this question can be answered by choosing the best option.

**Option 1 – This musician is insensitive. But ‘below par singers’ may actually deserve the criticism. So, this is not the best choice.**

**Option 2 – There is no antisocial or violent behaviour here. So, this person may be a risk taker or adrenaline junkie, but not necessarily an A lister psychopath.**

**Option 3 – ‘Illegal’ is not necessarily ‘lack of conscience’.**

**Option 4 – Of the four options given, this person is the only one who shows violent tendency (unnecessarily strict punishment) and lack of conscience. So, he is the most likely contender for the A-lister psychopaths category.**

**FeedBack**

**Direction for questions (20-24): Read the given passage and answer the questions that follow.**

Psychopaths are fearless, confident, charismatic, ruthless, and focused. Yet, contrary to popular belief, not necessarily violent. It depends, on what else you've got lurking on the shelves of your personality cupboard. Far from being an open and shut case – you're either a psychopath or you're not – there are, instead, inner and outer zones of that disorder: a bit like the fare zones on an Underground map. There is a spectrum of psychopathy along which each of us has our place, with only a small minority of A-listers resident in the ‘inner city’.

One individual, for example, may be ice-cool under pressure, and display about as much empathy as an avalanche and yet at the same time act neither violently, nor antisocially, nor without conscience. Scoring high on two psychopathic attributes, such an individual may rightly be considered further along the psychopathic spectrum than someone scoring lower on that dyad of traits, yet still not be anywhere near the danger zone of a person scoring high on all of them.

Just as there's no official dividing line between someone who plays recreational golf on the

weekends and, say, a Tiger Woods for instance, so the boundary between a world-class, 'hole-in-one' super-psychopath and one who is merely 'psychopathises' is similarly blurred. Think of psychopathic traits as the dials and sliders on a studio mixing desk. Shunt all of them to max, and you'll have a soundtrack that's no use to anyone. But if the soundtrack is graded, and some are up higher than others – such as fearlessness, focus, lack of empathy, and mental toughness, for example – you may well have a surgeon who's a cut above the rest.

Of course, surgery is just one instance where psychopathic 'talent' may prove advantageous. There are others. Take law enforcement, for example. In 2009, shortly after Angela Book published the results of her study, I decided to perform my own take on it. If, as she'd found, psychopaths really were better at decoding vulnerability, then there had to be applications. There had to be ways in which, rather than being a drain on society, this talent conferred some advantage. Enlightenment dawned when I met a friend at the airport. We all get a bit paranoid going through customs, I mused. Even when we're perfectly innocent. But imagine what it would feel like if we did have something to hide.

Thirty undergraduate students took part in my experiment: half of whom had scored high on the Self-Report Psychopathy Scale, and other half low. There were also five 'associates'. The students' job was easy. They had to sit in a classroom and observe the associates' movements as they entered through one door and exited through another, traversing, en route, a small, elevated stage. But there was a catch. The students also had to deduce who was 'guilty': which of the five was concealing a scarlet handkerchief.

To raise the stakes and give them something to 'go on', the 'guilty' associate was handed \$100. If the jury correctly identified the guilty party – if when the votes were counted, the person with the handkerchief came out on top – then they had to give the money back. If, on the other hand, they got away with it, and the finger of suspicion fell more heavily on one of the others, then the 'guilty associate' would stand to be rewarded. They would get to keep the \$100.

The results were extraordinary. Over 70 percent of those who score high on the Self-Report Psychopathy Scale correctly picked out the handkerchief-smuggling associate, compared to just 30 percent of the low scorers.

Zeroing in on weakness may well be part of a serial killer's toolkit. But it may also come in handy at the airport.

#### Q.24

The tone of the author in the passage is:

- 1  a combination of humour and sarcasm.
- 2  a mixture of derision and evaluation.
- 3  both humorous and judgemental.
- 4  both informative and explanatory.

**Solution:****Correct Answer : 4****Genre: Psychology** **Bookmark** **Answer key/Solution****Word Count# 621****The clear tone of the passage is objective and neutral.****Option 1 – There is no sarcasm in the passage.****Option 2 – The author doesn't use a derisive tone.****Option 3 – The author is anything but judgemental in the passage.****Option 4 – It is the best choice.** **FeedBack****Q.25**

**Directions for question (25): Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.**

1. On a 100 –point scale, the GI of peanuts is 14, and the GL of peanuts is one.
2. Sucrose and starch constitute the major while reducing sugars form the minor proportion of the peanut carbohydrates.
3. It is being speculated whether the peanut protein is necessary in conjunction with the probiotic or whether the latter is effective alone.
4. This may contribute to the fact that peanut have a low glycemic index (GI) and glycemic load (GL).
5. Peanuts are also a good source of fiber, according to the Food and Drug Administration.

**Solution:****Correct Answer : 3****Your Answer : 3**

**The correct order is 5241. The main idea of the paragraph is about peanuts and the test related to determine GL or GI level.**

**Bookmark** **Answer key/Solution**

**Statement 3 is about a different topic. ‘Peanut protein’ and its relationship with probiotic. So, this is clearly the odd sentence out. It doesn’t match the theme of the other sentences.**

**FeedBack**

**Q.26**

**Directions for question (26):** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.

1. It seems safe to say that the mutual difficulties between phonetics and phonology have waned considerably, even if they have not disappeared.
2. However, phonology can be done in a laboratory without phonetics.
3. Another direction for Laboratory Phonology is the modern study of sound change.
4. Most people take 'Laboratory Phonology' to refer to the interaction or interface of phonetics and phonology.
5. Take for example psycholinguistic phonology and computational phonology!



**Solution:**

**Correct Answer : 1**

**Your Answer : 1**

The correct order is 4253. The main focus of the paragraph is that how laboratory phonology works. It's not focused on how the objection or difficulties have waned. There is no transitional sentence to go from 3 to 1. So, sentence 1 is the odd one out.

**Bookmark**

**Answer key/Solution**

**FeedBack**

**Q.27**

**Directions for question (27):** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.

1. Still some product managers are able to devise creative marketing programs for their products.
2. The profitability of established products is affected greatly by the extent to which they are meaningfully differentiated from competing alternatives.
3. Maintaining meaningful differentiation, in turn, is facilitated by ongoing development of creative marketing programs.
4. Unfortunately, marketing programs for many established products fall short in terms of creativity.
5. Marketplace observation reveals a general lack of creativity in the way established products are marketed.



**Solution:****Correct Answer : 4****Your Answer : 4**

The correct order is 2351. This is an easy question. The main theme of the paragraph is that product managers are able to use creative marketing programs. The overall tone of the paragraph is not negative. Sentence 4 is too negative. So, it is the odd sentence out.

**FeedBack****Bookmark****Answer key/Solution****Q.28**

**Directions for question (28): The passage given below is followed by four summaries. Choose the option that best captures the author's position.**

Fossils in ancient seafloor rocks display a thriving and diverse marine ecosystem, then a swath of corpses. Some 96 percent of marine species were wiped out during the 'Great Dying', followed by millions of years when life had to multiply and diversify once more. What has been debated until now is exactly what made the oceans inhospitable to life – the high acidity of the water, metal and sulfide poisoning, a complete lack of oxygen, or simply higher temperatures. New research from the University of Washington and Stanford University combines models of ocean conditions and animal metabolism with published lab data and paleoceanographic records to show that the Permian mass extinction in the oceans was caused by global warming that left animals unable to breathe. As temperatures rose and the metabolism of marine animals sped up, the warmer waters could not hold enough oxygen for them to survive.

- 1  Though the causes of the Permian mass extinction, which wiped out 96 percent of the earth's species, have been debated for long, a new study has shown that global warming possibly caused the 'Great Dying'.
- 2  A new research by a University shows that global warming could have caused the extinction of a large number of marine species, a catastrophe known as the Permian mass extinction
- 3  Traces of the Permian mass extinction which happened due to rising temperature can still be found on the ancient sea floor rocks in the marine ecosystem.
- 4  New research has shed lights on an alternate possible cause of the Permian mass extinction which till now has been attributed to factors like water acidity, water poisoning, lack of oxygen, and higher temperature.



**Solution:****Correct Answer : 2****Your Answer : 2**

This is a factual paragraph. The main points are: the debate surrounding the reason behind the oceans being inhospitable during the 'great dying'; what the new research reveals.

**Bookmark****Answer key/Solution**

**Option 1 – It is a tricky option. Most of the option is true. But the 'great dying' didn't wipe out 96% of the earth's species. It wiped out 96% of the marine species. So, this option becomes factually incorrect.**

**Option 2 – It is the correct answer as it mentions both the points.**

**Option 3 – It is a narrow option. It doesn't mention the two main points of the paragraph.**

**Option 4 – It's not an alternate cause. It is now established as the main cause. Secondly, it doesn't mention the first point. So, option 2 is the best choice.**

**FeedBack**

**Q.29**

**Directions for question (29): The passage given below is followed by four summaries. Choose the option that best captures the author's position.**

Some authors offer a guide for translation of cultural issues, speaking of 'backtranslation', a technique which implies the independent translation of the translated text back into the original language. Then, the original text is compared to the retranslated version, and, if necessary, the translation is reviewed. But this method seems to be too sophisticated and time consuming. There are many words for which there is no equivalent, especially when taken out of the context. Experts have remarked that translations obtained through this method are most of the time stilted.

- 1  Backtranslation, as a technique to evaluate the merit of a translated work, is too sophisticated and time consuming.
- 2  Backtranslation is a technique where the independent translation of the translated text back into the original language is done, which results in a stilted piece of work.
- 3  Backtranslation, despite being advocated by experts, results in a stiff or formal piece of end product which is both time consuming and contextually irrelevant.
- 4  Backtranslation is a problematic approach in evaluating translated works as it is too complex and time consuming, and the end result might involve out of context words and overformal undertones.

**Solution:****Correct Answer : 4****Your Answer : 4**

The main points of the paragraph are: backtranslation is a problematic approach; it is ineffective as the end result is not qualitative.

**Bookmark****Answer key/Solution**

**Option 1 – It is just a sentence taken from the paragraph. It is too narrow.**

**Option 2 – It mentions the nuances of the technique. It misses the main point of the paragraph.**

**Option 3 – It mentions the second point. However, it is not mentioned that experts actually advocate it.**

**Option 4 – It is the most comprehensive answer. It is the best choice.**

**FeedBack****Q.30**

**Directions for question (30): The passage given below is followed by four summaries. Choose the option that best captures the author's position.**

It is essential, prior to any discussion concerning modification of behaviours, to differentiate between 'praise' and 'positive reinforcement'. In the most classic definition, positive reinforcement is a method of identifying to children which behaviours are acceptable and appropriate and which are not. More specifically, the use of positive reinforcement is the act of identifying and encouraging a behaviour, with the hopes that the desired behaviour will increase in frequency. The theory is that any behaviour followed by a pleasant stimulus is likely to be repeated. Although, praise is one of many forms of positive reinforcement, it is by no means the only or even the best choice when working with young children.

- 1  When it comes to conditioning young children to follow a desired behavioural pattern, praise is not the best way of reinforcing positive stimulus.
- 2  Positive reinforcement is not limited to mere praise, as young children need a more stringent and intense form of positive stimulus to be able to repeat appropriate behaviours.
- 3  Positive reinforcement is the technique of teaching accepted and appropriate behaviours, via pleasant stimulus such as praise.
- 4  Positive reinforcement may or may not include praise; however, it is the technique of making young children behave appropriately with positive and pleasant stimulus.

**Solution:****Correct Answer : 3****Your Answer : 3**

The main points of this paragraph are: what is positive reinforcement, what are its benefits, what are pleasant stimulus in terms of praising.

**Bookmark****Answer key/Solution**

**Option 1 – It is too narrow. The option doesn't mention positive reinforcement.**

**Option 2 – It is a restatement of only one point. Secondly, it is also slightly distorted. 'More stringent' and 'intense' are not defined by the paragraph.**

**Option 3 – It is the most concise and correct choice.**

**Option 4 – It doesn't mention the second point. It is also not a technique that makes young children behave appropriately. It teaches young children to distinguish between accepted and unaccepted behaviours. So, this is a misleading option.**

**FeedBack****Q.31**

**Directions for question (31): The four sentences (labelled 1, 2, 3, and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of four numbers as your answer.**

1. The researchers suggest that pumping both food and blood with the same system may conserve metabolic energy.
2. Sea spiders are arthropods (but not true arachnids) that live in the ocean.
3. This study is the first to report this dual-mode circulation.
4. Their unusual digestive system extends down each of their eight legs, providing maximum surface area for taking up oxygen via diffusion.



**Solution:****Correct Answer : 2413****Your Answer : 2413****2 is clearly the opening sentence. It introduces the main topic – sea spiders.** **Bookmark** **Answer key/Solution****24 is a pair – 'Their' in 4 refers to the 'sea spiders' in 2.****13 is also a mandatory pair as 'the researchers' and 'this study' in 1 and 3 respectively make a thematic pair.****As 2 is the opening sentence, the correct sequence is 2413.** **FeedBack****Q.32****Directions for question (32): The four sentences (labelled 1, 2, 3, and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of four numbers as your answer.**

1. During the major warming period after 14,000 years ago, a new genetic component related to present-day Near Easterners appears in Europe.
2. A 35,000 year old individual from northwest Europe represents an early branch of this founder population which was then displaced across a broad region, before reappearing in southwest Europe during the Ice Age 19,000 years ago.
3. The earliest modern humans in Europe did not contribute substantially to present-day Europeans.
4. Though, all individuals between 37,000 and 14,000 years ago descended from a single founder population which forms part of the ancestry of present-day Europeans.



**Solution:****Correct Answer : 3421****Your Answer : 3421**

**1, 2, and 4 can't open the paragraph because of 'the major warming period', 'this founder population, and 'though' respectively.**

 **Bookmark** **Answer key/Solution**

**So, 3 is the opening sentence. It is followed by 4 as the latter explains the concept of ancestry further.**

**2 follows next. 'This founder population' refers to the people mentioned in both 3 and 4.**

**1 is the last sentence. It gives further data about the skeleton or example mentioned in 2. So, the correct sequence is 3421.**

 **FeedBack****Q.33**

**Directions for question (33): The four sentences (labelled 1, 2, 3, and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of four numbers as your answer.**

1. As highlighted by Feng Xia and his team, social media constitute an emerging approach to evaluating the impact of scholarly publications, and it is relevant to consider the influence of the journal, discipline, publication year and user type.
2. In fact, different studies address the relationship between the presence of articles on social networks and citations.
3. The authors revealed that people's concerns differ by discipline and observed more interest in papers related to everyday life, biology, and earth and environmental sciences.
4. In the field of biomedical sciences, Haustein analysed the dissemination of journal articles on Twitter to explore the correlations between tweets and citations and proposed a framework to evaluate social media-based metrics.

 **X**

**Solution:****Correct Answer : 1342****Your Answer : 3241****13 is a pair. 'The authors' in 3 refers to the people mentioned in 1.** **Bookmark** **Answer key/Solution****4 comes next. It shows some other utilities mentioned in 3.****2 comes last. It further emphasises on the ideas mentioned in 4 with 'in fact'.****So, if we keep in mind the scope of the sentences, 1342 will be the correct sequence.** **FeedBack****Q.34**

**Directions for question (34): The four sentences (labelled 1, 2, 3, and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of four numbers as your answer.**

1. An international conference on cultural heritage issues that took place at Willamette University sought to generate fresh ideas about these cultural heritage issues.
2. The legacy of conquest, colonialization, and commerce looms large in defining and explaining these threats.
3. It also tried to offer a good sense of their nuances and complexities; and reveal how culture, law, and ethics can interact, complement, diverge, and contradict one another.
4. The global community, dependent as always on the cooperation of nation states, is gradually learning to address the serious threats to the cultural heritage of our disparate but shared civilizations.

**Solution:****Correct Answer : 4213****Your Answer : 4213****42 is a pair. 'The legacy' and 'these threats' mention the points explained in 4.** **Bookmark** **Answer key/Solution****21 is a pair. 'These issues' refer to both 4 and 2.****3 comes next as 'it' in 3 refers to the conference mentioned in 1. So, 4213 is the correct sequence.** **FeedBack**

## Sec 2

**Directions for questions 35 to 38: Answer the questions on the basis of the information given below.**

**Youth For Seva (YFS) is an NGO involved in providing assistance to government schools and students suffering from lack of educational resources. Currently, the NGO has 37 volunteers and is involved in three educational projects: Teaching Assistance (TA) in Uttar Pradesh, Distribution of Educational Resources (DER) in Bihar, and Educational Evaluation (EE) in Tamil Nadu. Each volunteer working with YFS has to be involved in at least one of these three educational projects.**

- DER project has the highest number of involvement of volunteers. Among them, the number of volunteers involved only in DER project is equal to the number of volunteers having additional involvement in the EE project.
- The number of volunteers involved only in the EE project is two times the number of volunteers involved in all the three projects.
- 17 volunteers are involved in the TA project.
- The number of volunteers involved only in the TA project is one less than the number of volunteers involved only in EE project.
- Ten volunteers involved in the TA project are also involved in at least one more project.
- No two projects have same number of volunteers involved in it.

### Q.35

**The minimum possible number of volunteers involved in both DER and TA projects, but not in EE project is**

1  1

2  3

3  4

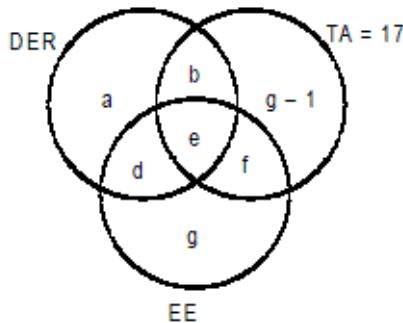
4  5

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**



From statement III and V,  $b + e + f = 10$ . So,  $g - 1 = 17 - 10 = 7$ .

$$\therefore g = 8.$$

From statement I,

$$\begin{aligned} a + b + e + d &> b + e + (g - 1) + f \\ \Rightarrow a + d &> f + g - 1 \end{aligned} \quad \dots \text{(i)}$$

Also

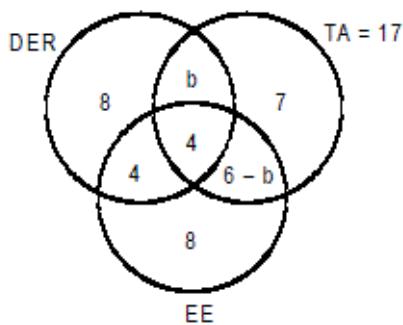
$$\begin{aligned} a + b + e + d &> g + f + d + e \\ \Rightarrow a + b &> g + f \end{aligned} \quad \dots \text{(ii)}$$

And from statement II,  $g = 2e$ . Since  $g = 8$ ,  $e = 4$ . So,  $b + f = 6$

Given that,

$$\begin{aligned} a + b + g - 1 + d + e + f + g &= 37 \\ \Rightarrow a + b + e + f + 2g + d &= 38 \\ \Rightarrow a + b + 4 + f + 16 + d &= 38 \\ \Rightarrow d + a + b + f &= 18 \\ \Rightarrow d + a + 6 &= 18 \\ \Rightarrow d + a &= 12 \end{aligned} \quad \dots \text{(iii)}$$

From statement I,  $a = d + e$ . Now, from (iii)  $d = 12 - a$ ,  
so,  $a = 12 - a + 4 \Rightarrow a = 8$ ,  $d = 4$ .



So the equation (i) and (ii) become

$$\begin{aligned} 12 &> (6 - b) + 7 \text{ and } 12 > 7 + 6 - b \\ \Rightarrow b &> 3.5 \end{aligned}$$

Hence,  $b > 3.5$  or  $b = 4, 5$  or  $6$ , but for  $b = 5$ , volunteers in TA and EE will be equal which contradicts the condition, so,  $b = 5$  is not possible.

Clearly the minimum possible number of volunteers involved in both DER and TA projects i.e. b is 4.

**FeedBack**

**Directions for questions 35 to 38: Answer the questions on the basis of the information given below.**

Youth For Seva (YFS) is an NGO involved in providing assistance to government schools and students suffering from lack of educational resources. Currently, the NGO has 37 volunteers and is involved in three educational projects: Teaching Assistance (TA) in Uttar Pradesh, Distribution of Educational Resources (DER) in Bihar, and Educational Evaluation (EE) in Tamil Nadu. Each volunteer working with YFS has to be involved in at least one of these three educational projects.

- DER project has the highest number of involvement of volunteers. Among them, the number of volunteers involved only in DER project is equal to the number of volunteers having additional involvement in the EE project.
- The number of volunteers involved only in the EE project is two times the number of volunteers involved in all the three projects.
- 17 volunteers are involved in the TA project.
- The number of volunteers involved only in the TA project is one less than the number of volunteers involved only in EE project.
- Ten volunteers involved in the TA project are also involved in at least one more project.
- No two projects have same number of volunteers involved in it.

#### **Q.36**

**Which of the following additional information would enable us to find the exact number of volunteers involved in all possible combination of projects?**

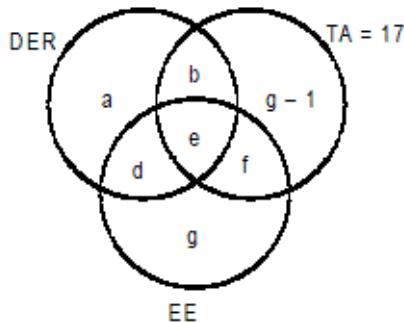
- 1  Twenty volunteers are involved in project DER.
- 2  Four volunteers are involved in all the three projects.
- 3  Twenty three volunteers are involved in exactly one project.
- 4  No need of any additional information.

**Solution:**

**Correct Answer : 1**

 **Bookmark**

 **Answer key/Solution**



From statement III and V,  $b + e + f = 10$ . So,  $g - 1 = 17 - 10 = 7$ .

$$\therefore g = 8.$$

From statement I,

$$\begin{aligned} a + b + e + d &> b + e + (g - 1) + f \\ \Rightarrow a + d &> f + g - 1 \end{aligned} \quad \dots \text{(i)}$$

Also

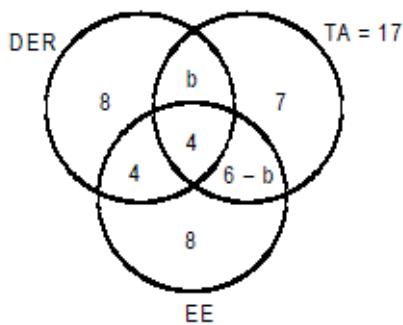
$$\begin{aligned} a + b + e + d &> g + f + d + e \\ \Rightarrow a + b &> g + f \end{aligned} \quad \dots \text{(ii)}$$

And from statement II,  $g = 2e$ . Since  $g = 8$ ,  $e = 4$ . So,  $b + f = 6$

Given that,

$$\begin{aligned} a + b + g - 1 + d + e + f + g &= 37 \\ \Rightarrow a + b + e + f + 2g + d &= 38 \\ \Rightarrow a + b + 4 + f + 16 + d &= 38 \\ \Rightarrow d + a + b + f &= 18 \\ \Rightarrow d + a + 6 &= 18 \\ \Rightarrow d + a &= 12 \end{aligned} \quad \dots \text{(iii)}$$

From statement I,  $a = d + e$ . Now, from (iii)  $d = 12 - a$ ,  
so,  $a = 12 - a + 4 \Rightarrow a = 8$ ,  $d = 4$ .



So the equation (i) and (ii) become

$$12 > (6 - b) + 7 \text{ and } 12 > 7 + 6 - b$$

$$\Rightarrow b > 3.5$$

Hence,  $b > 3.5$  or  $b = 4, 5$  or  $6$ , but for  $b = 5$ , volunteers in TA and EE will be equal which contradicts the condition, so,  $b = 5$  is not possible.

Since only one variable is remaining, any information that helps determine that variable will enable us to find the exact number of volunteers.

Option 1 gives the sum of volunteers in DER, hence the variable can be uniquely determined i.e.,  $b = 4$ .

Option 2 restates an already made inference.

Option 3 gives an already made inference.

So, option 1 is correct.

**FeedBack**

**Directions for questions 35 to 38: Answer the questions on the basis of the information given below.**

Youth For Seva (YFS) is an NGO involved in providing assistance to government schools and students suffering from lack of educational resources. Currently, the NGO has 37 volunteers and is involved in three educational projects: Teaching Assistance (TA) in Uttar Pradesh, Distribution of Educational Resources (DER) in Bihar, and Educational Evaluation (EE) in Tamil Nadu. Each volunteer working with YFS has to be involved in at least one of these three educational projects.

- DER project has the highest number of involvement of volunteers. Among them, the number of volunteers involved only in DER project is equal to the number of volunteers having additional involvement in the EE project.
- The number of volunteers involved only in the EE project is two times the number of volunteers involved in all the three projects.
- 17 volunteers are involved in the TA project.
- The number of volunteers involved only in the TA project is one less than the number of volunteers involved only in EE project.
- Ten volunteers involved in the TA project are also involved in at least one more project.
- No two projects have same number of volunteers involved in it.

### Q.37

After some time, the volunteers who were involved in all the three projects were asked to withdraw from any one project. As a result, one of the volunteers opted out of the TA project, and one opted out of the EE project, while the remaining ones involved in all the three projects opted out of the DER project. Which of the following statements, then, necessarily follows?

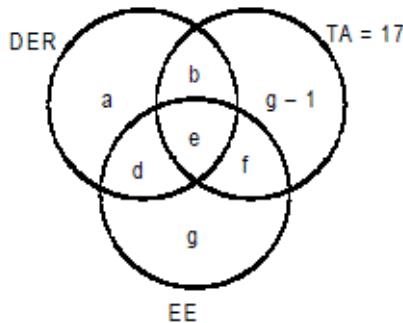
- 1  The lowest number of volunteers is now in TA project.
- 2  More volunteers are now in DER project as compared to EE project.
- 3  More volunteers are now in TA project as compared to EE project.
- 4  None of the above.

**Solution:**

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**



From statement III and V,  $b + e + f = 10$ . So,  $g - 1 = 17 - 10 = 7$ .

$$\therefore g = 8.$$

From statement I,

$$\begin{aligned} a + b + e + d &> b + e + (g - 1) + f \\ \Rightarrow a + d &> f + g - 1 \end{aligned} \quad \dots \text{(i)}$$

Also

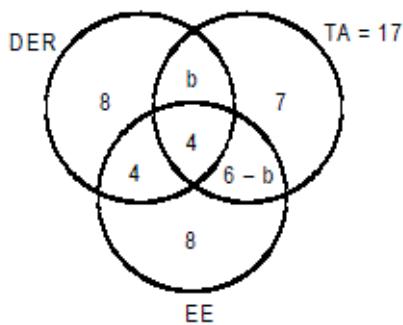
$$\begin{aligned} a + b + e + d &> g + f + d + e \\ \Rightarrow a + b &> g + f \end{aligned} \quad \dots \text{(ii)}$$

And from statement II,  $g = 2e$ . Since  $g = 8$ ,  $e = 4$ . So,  $b + f = 6$

Given that,

$$\begin{aligned} a + b + g - 1 + d + e + f + g &= 37 \\ \Rightarrow a + b + e + f + 2g + d &= 38 \\ \Rightarrow a + b + 4 + f + 16 + d &= 38 \\ \Rightarrow d + a + b + f &= 18 \\ \Rightarrow d + a + 6 &= 18 \\ \Rightarrow d + a &= 12 \end{aligned} \quad \dots \text{(iii)}$$

From statement I,  $a = d + e$ . Now, from (iii)  $d = 12 - a$ ,  
so,  $a = 12 - a + 4 \Rightarrow a = 8$ ,  $d = 4$ .



So the equation (i) and (ii) become

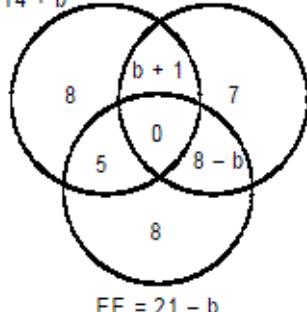
$$\begin{aligned} 12 &> (6 - b) + 7 \text{ and } 12 > 7 + 6 - b \\ \Rightarrow b &> 3.5 \end{aligned}$$

Hence,  $b > 3.5$  or  $b = 4, 5$  or  $6$ , but for  $b = 5$ , volunteers in TA and EE will be equal which contradicts the condition, so,  $b = 5$  is not possible.

There are 4 volunteers involved in all three projects. One opted out of TA, one opted out of EE and two opted out of DER project.

Now total:-

$$\text{DER} = 14 + b$$



$$\text{EE} = 21 - b$$

Now, for various values of  $b$  i.e., 4 or 6, DER always has more volunteers than EE. So, option 2 is correct.

**FeedBack**

**Directions for questions 35 to 38: Answer the questions on the basis of the information given below.**

Youth For Seva (YFS) is an NGO involved in providing assistance to government schools and students suffering from lack of educational resources. Currently, the NGO has 37 volunteers and is involved in three educational projects: Teaching Assistance (TA) in Uttar Pradesh, Distribution of Educational Resources (DER) in Bihar, and Educational Evaluation (EE) in Tamil Nadu. Each volunteer working with YFS has to be involved in at least one of these three educational projects.

- DER project has the highest number of involvement of volunteers. Among them, the number of volunteers involved only in DER project is equal to the number of volunteers having additional involvement in the EE project.
- The number of volunteers involved only in the EE project is two times the number of volunteers involved in all the three projects.
- 17 volunteers are involved in the TA project.
- The number of volunteers involved only in the TA project is one less than the number of volunteers involved only in EE project.
- Ten volunteers involved in the TA project are also involved in at least one more project.
- No two projects have same number of volunteers involved in it.

### Q.38

After the withdrawal of volunteers, as given in the previous question, some new volunteers joined the NGO. Each one of them was allowed to involve in only one project in a manner such that, the number of volunteers working in one project alone for each of the three projects became same identical. At that point, it was also found that the number of volunteers involved in DER and EE projects was equal to the number of volunteers involved in TA and DER projects. Which of the given three projects has the highest number of volunteers now?

1  EE

2  DER

3  TA

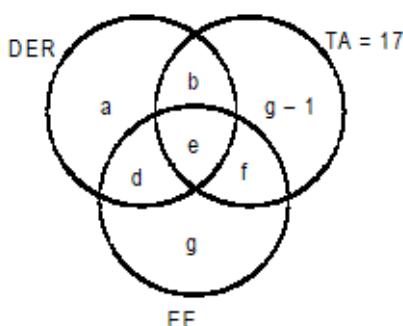
4  Cannot be determined

**Solution:**

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**



From statement III and V,  $b + e + f = 10$ . So,  $g - 1 = 17 - 10 = 7$ .

$$\therefore g = 8.$$

From statement I,

$$a + b + e + d > b + e + (g - 1) + f$$

$$\Rightarrow a + d > f + g - 1 \quad \dots (i)$$

Also

$$a + b + e + d > g + f + d + e$$

$$\Rightarrow a + b > g + f \quad \dots (ii)$$

And from statement II,  $g = 2e$ . Since  $g = 8$ ,  $e = 4$ . So,  $b + f = 6$

Given that,

$$a + b + g - 1 + d + e + f + g = 37$$

$$\Rightarrow a + b + e + f + 2g + d = 38$$

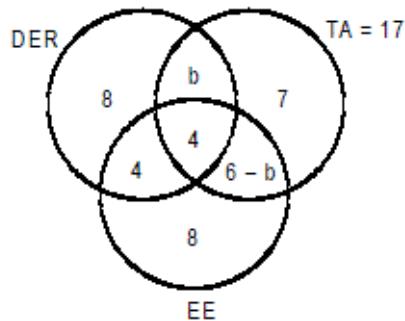
$$\Rightarrow a + b + 4 + f + 16 + d = 38$$

$$\Rightarrow d + a + b + f = 18$$

$$\Rightarrow d + a + 6 = 18$$

$$\Rightarrow d + a = 12 \quad \dots (iii)$$

From statement I,  $a = d + e$ . Now, from (iii)  $d = 12 - a$ , so,  $a = 12 - a + 4 \Rightarrow a = 8$ ,  $d = 4$ .



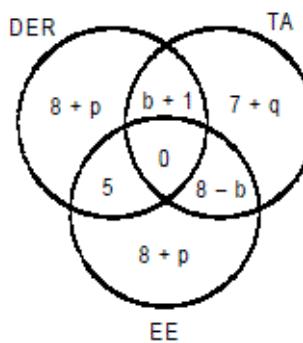
So the equation (i) and (ii) become

$$12 > (6 - b) + 7 \text{ and } 12 > 7 + 6 - b$$

$$\Rightarrow b > 3.5$$

Hence,  $b > 3.5$  or  $b = 4, 5$  or  $6$ , but for  $b = 5$ , volunteers in TA and EE will be equal which contradicts the condition, so,  $b = 5$  is not possible.

When new volunteers join, let the number of new volunteers be  $p$  for DER and EE and  $q$  for TA.



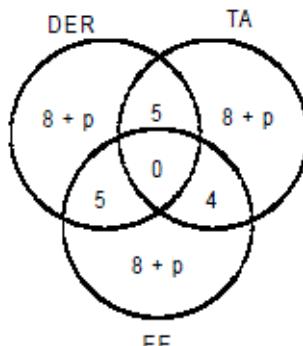
$$\text{Now, } 8 + p = 7 + q$$

$$\Rightarrow p + 1 = q$$

Also, the number of volunteers of DER and TA is equal to the number of volunteers of DER and EE

$$\Rightarrow b + 1 = 5 \Rightarrow b = 4.$$

So,



It can be seen DER has the highest number of volunteers. So the answer is 2.

**FeedBack**

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**Directions for questions 39 to 42: Answer the questions on the basis of the information given below.**

Five friends - Suraj, Siddharth, Sarthak, Suman, and Supriya - from Psychology department, each wrote mid-semester exams of three subjects - Qualitative Analysis (QA), Attention and Perception (AP), and Intelligence and Creativity (IC). They got different ranks according to their performances in the respective subjects. Rank 1 in any subject is the best rank followed by rank 2, then rank 3 and so on. No two friends got the same rank in the same subject. Also, each of them got different ranks in different subjects. Further, the following information is also known:

- (A) Sarthak got better rank than Suman and Suraj in QA and IC respectively.
- (B) Supriya didn't get the best rank in any of the three subjects while she got third rank in QA.
- (C) Friend who got rank 5 in IC, got rank 2 in AP.
- (D) Siddharth got rank 5 in AP and his best possible rank in any subject is 3.
- (E) Suman got the best rank in AP but her rank is lower than that of Siddharth in IC.
- (F) Suman and Suraj both got the best rank and the worst rank each, in any subject.
- (G) Suraj got rank 1 in QA.

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**Q.39**

**Who got rank 3 in AP?**

1  Suman

2  Siddharth

3  Sarthak

4  Supriya



**Solution:****Correct Answer : 3****Your Answer : 3****Bookmark****Answer key/Solution**

According to the given information, Suraj and Suman got best ranks in QA and AP respectively. It is also known that Siddharth got the worst rank in AP and his best rank is 3. Since Supriya is rank 3 in QA, Siddharth must be rank 3 in IC and rank 4 in QA. Suman got rank 4 in IC and 5 in QA. Sarthak is ranked 2 in QA. The entire information can be tabulated as :-

	AP	QA	IC
Suraj	2	1	5
Siddharth	5	4	3
Sarthak	3	2	1
Suman	1	5	4
Supriya	4	3	2

Sarthak got rank 3 in AP.

**FeedBack**

**Directions for questions 39 to 42: Answer the questions on the basis of the information given below.**

Five friends - Suraj, Siddharth, Sarthak, Suman, and Supriya - from Psychology department, each wrote mid-semester exams of three subjects - Qualitative Analysis (QA), Attention and Perception (AP), and Intelligence and Creativity (IC). They got different ranks according to their performances in the respective subjects. Rank 1 in any subject is the best rank followed by rank 2, then rank 3 and so on. No two friends got the same rank in the same subject. Also, each of them got different ranks in different subjects. Further, the following information is also known:

- (A) Sarthak got better rank than Suman and Suraj in QA and IC respectively.
- (B) Supriya didn't get the best rank in any of the three subjects while she got third rank in QA.
- (C) Friend who got rank 5 in IC, got rank 2 in AP.
- (D) Siddharth got rank 5 in AP and his best possible rank in any subject is 3.
- (E) Suman got the best rank in AP but her rank is lower than that of Siddharth in IC.
- (F) Suman and Suraj both got the best rank and the worst rank each, in any subject.
- (G) Suraj got rank 1 in QA.

**Q.40****Who got the best rank in IC?**1  Suman2  Sarthak3  Siddharth4  Supriya

**Solution:****Correct Answer : 2****Your Answer : 2****Bookmark****Answer key/Solution**

According to the given information, Suraj and Suman got best ranks in QA and AP respectively. It is also known that Siddharth got the worst rank in AP and his best rank is 3. Since Supriya is rank 3 in QA, Siddharth must be rank 3 in IC and rank 4 in QA. Suman got rank 4 in IC and 5 in QA. Sarthak is ranked 2 in QA. The entire information can be tabulated as :-

	AP	QA	IC
Suraj	2	1	5
Siddharth	5	4	3
Sarthak	3	2	1
Suman	1	5	4
Supriya	4	3	2

Sarthak got best rank in IC.

**FeedBack**

**Directions for questions 39 to 42: Answer the questions on the basis of the information given below.**

Five friends - Suraj, Siddharth, Sarthak, Suman, and Supriya - from Psychology department, each wrote mid-semester exams of three subjects - Qualitative Analysis (QA), Attention and Perception (AP), and Intelligence and Creativity (IC). They got different ranks according to their performances in the respective subjects. Rank 1 in any subject is the best rank followed by rank 2, then rank 3 and so on. No two friends got the same rank in the same subject. Also, each of them got different ranks in different subjects. Further, the following information is also known:

- (A) Sarthak got better rank than Suman and Suraj in QA and IC respectively.
- (B) Supriya didn't get the best rank in any of the three subjects while she got third rank in QA.
- (C) Friend who got rank 5 in IC, got rank 2 in AP.
- (D) Siddharth got rank 5 in AP and his best possible rank in any subject is 3.
- (E) Suman got the best rank in AP but her rank is lower than that of Siddharth in IC.
- (F) Suman and Suraj both got the best rank and the worst rank each, in any subject.
- (G) Suraj got rank 1 in QA.

**Q.41****Who got rank 2 in AP?**1  **Suman**2  **Siddharth**3  **Suraj**

4  Sarthak**Solution:****Correct Answer : 3****Your Answer : 3** **Bookmark** **Answer key/Solution**

According to the given information, Suraj and Suman got best ranks in QA and AP respectively. It is also known that Siddharth got the worst rank in AP and his best rank is 3. Since Supriya is rank 3 in QA, Siddharth must be rank 3 in IC and rank 4 in QA. Suman got rank 4 in IC and 5 in QA. Sarthak is ranked 2 in QA. The entire information can be tabulated as :-

	AP	QA	IC
Suraj	2	1	5
Siddharth	5	4	3
Sarthak	3	2	1
Suman	1	5	4
Supriya	4	3	2

Suraj got rank 2 in AP.

FeedBack

**Directions for questions 39 to 42: Answer the questions on the basis of the information given below.**

Five friends - Suraj, Siddharth, Sarthak, Suman, and Supriya - from Psychology department, each wrote mid-semester exams of three subjects - Qualitative Analysis (QA), Attention and Perception (AP), and Intelligence and Creativity (IC). They got different ranks according to their performances in the respective subjects. Rank 1 in any subject is the best rank followed by rank 2, then rank 3 and so on. No two friends got the same rank in the same subject. Also, each of them got different ranks in different subjects. Further, the following information is also known:

- (A) Sarthak got better rank than Suman and Suraj in QA and IC respectively.
- (B) Supriya didn't get the best rank in any of the three subjects while she got third rank in QA.
- (C) Friend who got rank 5 in IC, got rank 2 in AP.
- (D) Siddharth got rank 5 in AP and his best possible rank in any subject is 3.
- (E) Suman got the best rank in AP but her rank is lower than that of Siddharth in IC.
- (F) Suman and Suraj both got the best rank and the worst rank each, in any subject.
- (G) Suraj got rank 1 in QA.

**Q.42****Who got lowest rank in QA?**1  Suman2  Sarthak

3  **Supriya**

4  **Cannot be determined**

**Solution:****Correct Answer : 1****Your Answer : 1****Answer key/Solution**

According to the given information, Suraj and Suman got best ranks in QA and AP respectively. It is also known that Siddharth got the worst rank in AP and his best rank is 3. Since Supriya is rank 3 in QA, Siddharth must be rank 3 in IC and rank 4 in QA. Suman got rank 4 in IC and 5 in QA. Sarthak is ranked 2 in QA. The entire information can be tabulated as :-

	AP	QA	IC
Suraj	2	1	5
Siddharth	5	4	3
Sarthak	3	2	1
Suman	1	5	4
Supriya	4	3	2

Suman got lowest rank in QA.

**FeedBack**

**Directions for questions 43 to 46: Answer the questions on the basis of the information given below.**

Eight players, wearing Jerseys numbered from 1 to 8, travel in two trains, four players in each train, moving in opposite directions one starting from New Delhi (source) to Mumbai (destination) and other from Mumbai to New Delhi. They board train at any station among Mathura, Agra, Morena, Gwalior, Jhansi, Bhopal, Khandwa and Kalyan which are in between New Delhi and Mumbai in that order. After travelling for at least two stations, they can deboard the train at any aforementioned eight stations except at Gwalior station e.g, if a player boards the train at Morena station moving towards Mumbai, then he can deboard earliest at the station Bhopal. Each of these players like one distinct snacks item among omelette, bread pakora, bread roll, batata vada, rabri, aloo tikki, choley bhature and poha. No two or more players travelling in the same train either board or deboard at the same station. i.e., if a player boards from a station then other players cannot board but can deboard at that station. Same holds true for deboarding. The additional information is also known which is given as below.

- (i) Player who likes poha boards train at Jhansi station and player who likes rabri deboards at Mathura station.
- (ii) Player who likes omelette boards at the station which was exactly in the middle of the stations at which players who like batata vada and aloo tikki boards the train in that order.
- (iii) Player wearing jersey number 1 likes choley bhature and player wearing jersey number 6 boards the train at Bhopal station.
- (iv) The sum of jersey number of all players who board or deboard at each station, except Bhopal station, is a perfect square. There were five players for which the number of stations between their boarding and deboarding stations was at least three.
- (v) Players wearing jersey number 2 and 4 deboard at station Agra and Morena, in any order and they like bread pakora and bread roll, not necessarily in that order.

#### Q.43

Jersey number of the player who likes poha is

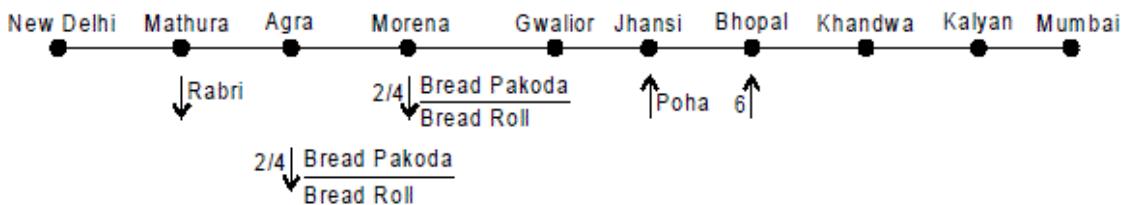
**Solution:**

**Correct Answer : 8**

**Bookmark**

**Answer key/Solution**

Let us represent stations and other given information as below.



[↑ represents boarding and ↓ represents deboarding.]

Instruction given in question says that each players travels for atleast two station. So, we may conclude that player wearing jersey number 6 must travel in the train going from Mumbai to New Delhi and deboards at Mathura Station and he/she must like Rabri. Since players wearing jersey number 2/4 deboard at Agra / Morena.

It may also be concluded that the player who likes Poha must travel in the train going from New Delhi to Mumbai and will get off at Kalyan Station.

As Gwalior station is closed for exit, so remaining one player travelling from Mumbai to New Delhi must board at Kalyan station and get off at Jhansi station.

It is also concluded that player who deboard at Agra and Morena must board at Jhansi and Khandwa respectively. From statement II: It may be concluded that players who like Batata Vada, Omelette and Aloo Tikki must board train at stations which

From statement II, it may be concluded that players who like Batata Vada, Omelette and Aloo tikki must board train at stations which one in that order and will be travelling from New Delhi to Mumbai.

These three players board trains at Mathura, Agra and Morena respectively or Agra, Morena and Gwalior respectively So, Player who board at Kalyan and get off at Jhansi Station must like Cholley Bhature and would be wearing jersey number 1 that is given in statement number (iii).

From statement (iv); there were five players for which the number of stations between their boarding and deboarding was atleast 3.

We can see from above discussion that there are two such players traveling from Mumbai to New Delhi.

Remaining three such players must travel from New Delhi to Mumbai and will have atleast 3 stations between their boarding and deboarding stations.

One player who is travelling from New Delhi to Mumbai, boards at Jhansi and gets off at Kalyan station; therefore remaining all three players must have atleast 3 stations between their boarding and deboarding. To fulfill this condition, player who like Batata Vada, Omelette and Aloo tikki must board at Mathura, Agra and Morena respectively and deboard at Jhansi, Bhopal and Khandwa respectively.

Now, we have the following table:

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada	X	X	Rabri (6)
Agra	Omelette	X	X	Bread Pakora/Bread Roll (2/4)
Morena	Aloo tikki	X	X	Bread Roll / Bread Pakora (4/2)
Gwalior	X	X	X	X
Jhansi	Poha	Bread Pakora/Bread Roll (2/4)	Batata Vada	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette	X
Khandwa	X	Bread Roll / Bread Pakora (4/2)	Aloo tikki	X
Kalyan	X	Chholley Bhature (1)	Poha	X

From statement IV; The player who like Poha must wear either 3 or 8 numbered jersey.

If Poha → 3; then you will find that statement IV is not satisfied.

So, we may conclude that player wearing jersey number 8 must like Poha.

In this case; player who like Batata Vada must wear jersey number 3.

We can conclude that player travelling from Mumbai to New Delhi who board at Jhansi must wear jersey number 4 and deboard at Agra station.

Similarly, to fulfill the the condition given in statement IV, the player who like omelette and Aloo tikki must wear jersey number 5 and 7 respectively.

Final table is as below:-

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada(3)	X	X	Rabri (6)
Agra	Omelette (5)	X	X	Bread Pakora/Bread Roll (4)
Morena	Aloo tikki (7)	X	X	Bread Roll / Bread Pakora (2)
Gwalior	X	X	X	X
Jhansi	Poha (8)	Bread Pakora/Bread Roll (4)	Batata Vada (3)	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette (5)	X
Khandwa	X	Bread Roll / Bread Pakora (2)	Aloo tikki (7)	X
Kalyan	X	Chholley Bhature (1)	Poha (8)	X

Player wearing jersey number 8 likes Poha.

[FeedBack](#)

**Directions for questions 43 to 46: Answer the questions on the basis of the information given below.**

Eight players, wearing Jerseys numbered from 1 to 8, travel in two trains, four players in each train, moving in opposite directions one starting from New Delhi (source) to Mumbai (destination) and other from Mumbai to New Delhi. They board train at any station among Mathura, Agra, Morena, Gwalior, Jhansi, Bhopal, Khandwa and Kalyan which are in between New Delhi and Mumbai in that order. After travelling for at least two stations, they can deboard the train at any aforementioned eight stations except at Gwalior station e.g, if a player boards the train at Morena station moving towards Mumbai, then he can deboard earliest at the station Bhopal. Each of these players like one distinct snacks item among omelette, bread pakora, bread roll, batata vada, rabri, aloo tikki, choley bhature and poha. No two or more players travelling in the same train either board or deboard at the same station. i.e., if a player boards from a station then other players cannot board but can deboard at that station. Same holds true for deboarding. The additional information is also known which is given as below.

- (i) Player who likes poha boards train at Jhansi station and player who likes rabri deboards at Mathura station.
- (ii) Player who likes omelette boards at the station which was exactly in the middle of the stations at which players who like batata vada and aloo tikki boards the train in that order.
- (iii) Player wearing jersey number 1 likes choley bhature and player wearing jersey number 6 boards the train at Bhopal station.
- (iv) The sum of jersey number of all players who board or deboard at each station, except Bhopal station, is a perfect square. There were five players for which the number of stations between their boarding and deboarding stations was at least three.
- (v) Players wearing jersey number 2 and 4 deboard at station Agra and Morena, in any order and they like bread pakora and bread roll, not necessarily in that order.

#### Q.44

If the player who likes bread roll gets off at Morena station, then the players who board and deboard at Jhansi station, like

- 1  Batata vada, choley bhature and bread pakora.
- 2  Batata vada, choley bhature, poha and bread pakora.
- 3  Omelette, choley bhature, poha and bread pakora.
- 4  Omelette, choley bhature and bread pakora.

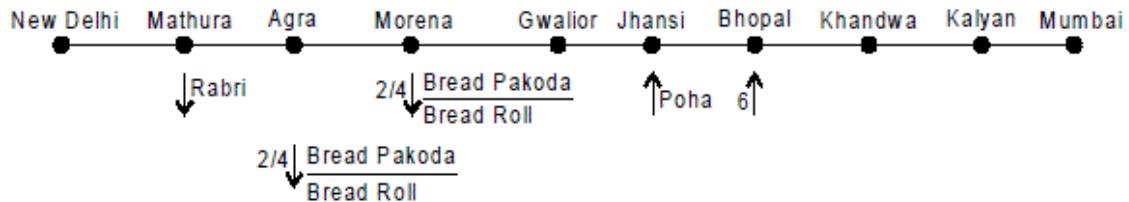
**Solution:**

**Correct Answer : 2**

 [Bookmark](#)

 [Answer key/Solution](#)

Let us represent stations and other given information as below.



[↑ represents boarding and ↓ represents deboarding.]

Instruction given in question says that each player travels for atleast two station. So, we may conclude that player wearing jersey number 6 must travel in the train going from Mumbai to New Delhi and deboards at Mathura Station and he/she must like Rabri. Since players wearing jersey number 2/4 deboard at Agra / Morena.

It may also be concluded that the player who likes Poha must travel in the train going from New Delhi to Mumbai and will get off at Kalyan Station.

As Gwalior station is closed for exit, so remaining one player travelling from Mumbai to New Delhi must board at Kalyan station and get off at Jhansi station.

It is also concluded that player who deboard at Agra and Morena must board at Jhansi and Khandwa respectively. From statement II; It may be concluded that players who like Batata Vada, Omelette and Aloo Tikki must board train at stations which one in that order and will be travelling from New Delhi to Mumbai.

These three players board trains at Mathura, Agra and Morena respectively or Agra, Morena and Gwalior respectively So, Player who board at Kalyan and get off at Jhansi Station must like Cholley Bhature and would be wearing jersey number 1 that is given in statement number (iii).

From statement (iv); there were five players for which the number of stations between their boarding and deboarding was atleast 3.

We can see from above discussion that there are two such players traveling from Mumbai to New Delhi.

Remaining three such players must travel from New Delhi to Mumbai and will have atleast 3 stations between their boarding and deboarding stations.

One player who is travelling from New Delhi to Mumbai, boards at Jhansi and gets off at Kalyan station; therefore remaining all three players must have atleast 3 stations between their boarding and deboarding. To fulfill this condition, player who like Batata Vada, Omelette and Aloo tikki must board at Mathura, Agra and Morena respectively and deboard at Jhansi, Bhopal and Khandwa respectively.

Now, we have the following table:

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada	X	X	Rabri (6)
Agra	Omelette	X	X	Bread Pakora/ Bread Roll (2/4)
Morena	Aloo tikki	X	X	Bread Roll / Bread Pakora (4/2)
Gwalior	X	X	X	X
Jhansi	Poha	Bread Pakora/ Bread Roll (2/4)	Batata Vada	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette	X
Khandwa	X	Bread Roll / Bread Pakora (4/2)	Aloo tikki	X
Kalyan	X	Chholley Bhature (1)	Poha	X

From statement IV; The player who like Poha must wear either 3 or 8 numbered jersey.

If Poha → 3; then you will find that statement IV is not satisfied.

So, we may conclude that player wearing jersey number 8 must like Poha.

In this case; player who like Batata Vada must wear jersey number 3.

We can conclude that player travelling from Mumbai to New Delhi who board at Jhansi must wear jersey number 4 and deboard at Agra station.

Similarly, to fulfill the the condition given in statement IV, the player who like omelette and Aloo tikki must wear jersey number 5 and 7 respectively.

Final table is as below:-

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada(3)	X	X	Rabri (6)
Agra	Omelette (5)	X	X	Bread Pakora/ Bread Roll (4)

				Bread Roll (4)
Morena	Aloo tikki (7)	X	X	Bread Roll / Bread Pakora (2)
Gwalior	X	X	X	X
Jhansi	Poha (8)	Bread Pakora/ Bread Roll (4)	Batata Vada (3)	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette (5)	X
Khandwa	X	Bread Roll / Bread Pakora (2)	Aloo tikki (7)	X
Kalyan	X	Chholley Bhature (1)	Poha (8)	X

If the player who likes bread roll gets off at Morena station, then the players who board and deboard at Jhansi station will be Batata Vada, Choley Bhature, Poha and Bread Pakora.

FeedBack

**Directions for questions 43 to 46: Answer the questions on the basis of the information given below.**

Eight players, wearing Jerseys numbered from 1 to 8, travel in two trains, four players in each train, moving in opposite directions one starting from New Delhi (source) to Mumbai (destination) and other from Mumbai to New Delhi. They board train at any station among Mathura, Agra, Morena, Gwalior, Jhansi, Bhopal, Khandwa and Kalyan which are in between New Delhi and Mumbai in that order. After travelling for at least two stations, they can deboard the train at any aforementioned eight stations except at Gwalior station e.g, if a player boards the train at Morena station moving towards Mumbai, then he can deboard earliest at the station Bhopal. Each of these players like one distinct snacks item among omelette, bread pakora, bread roll, batata vada, rabri, aloo tikki, choley bhature and poha. No two or more players travelling in the same train either board or deboard at the same station. i.e., if a player boards from a station then other players cannot board but can deboard at that station. Same holds true for deboarding. The additional information is also known which is given as below.

- (i) Player who likes poha boards train at Jhansi station and player who likes rabri deboards at Mathura station.
- (ii) Player who likes omelette boards at the station which was exactly in the middle of the stations at which players who like batata vada and aloo tikki boards the train in that order.
- (iii) Player wearing jersey number 1 likes choley bhature and player wearing jersey number 6 boards the train at Bhopal station.
- (iv) The sum of jersey number of all players who board or deboard at each station, except Bhopal station, is a perfect square. There were five players for which the number of stations between their boarding and deboarding stations was at least three.
- (v) Players wearing jersey number 2 and 4 deboard at station Agra and Morena, in any order and they like bread pakora and bread roll, not necessarily in that order.

#### Q.45

**Who travelled for maximum distance? (It is assumed that there was same distance between every two consecutive stations)**

1  Player wearing jersey number 7.

2  Player who likes batata vada.

3  Player wearing jersey number 1.

4  Player who likes rabri.

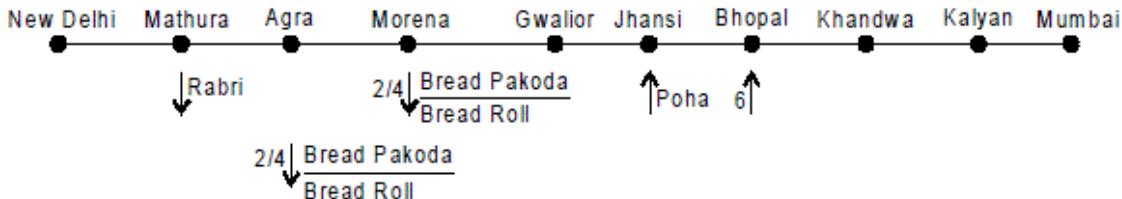
**Solution:**

**Correct Answer : 4**

 **Bookmark**

 **Answer key/Solution**

Let us represent stations and other given information as below.



[↑ represents boarding and ↓ represents deboarding.]

Instruction given in question says that each players travels for atleast two station. So, we may conclude that player wearing jersey number 6 must travel in the train going from Mumbai to New Delhi and deboards at Mathura Station and he/she must like Rabri. Since players wearing jersey number 2/4 deboard at Agra / Morena.

It may also be concluded that the player who likes Poha must travel in the train going from New Delhi to Mumbai and will get off at Kalyan Station.

As Gwalior station is closed for exit, so remaining one player travelling from Mumbai to New Delhi must board at Kalyan station and get off at Jhansi station.

It is also concluded that player who deboard at Agra and Morena must board at Jhansi and Khandwa respectively. From statement II; It may be concluded that players who like Batata Vada, Omelette and Aloo Tikki must board train at stations which one in that order and will be travelling from New Delhi to Mumbai.

These three players board trains at Mathura, Agra and Morena respectively or Agra, Morena and Gwalior respectively So, Player who board at Kalyan and get off at Jhansi Station must like Cholley Bhature and would be wearing jersey number 1 that is given in statement number (iii).

From statement (iv); there were five players for which the number of stations between their boarding and deboarding was atleast 3.

We can see from above discussion that there are two such players traveling from Mumbai to New Delhi.

Remaining three such players must travel from New Delhi to Mumbai and will have atleast 3 stations between their boarding and deboarding stations.

One player who is travelling from New Delhi to Mumbai, boards at Jhansi and gets off at Kalyan station; therefore remaining all three players must have atleast 3 stations between their boarding and deboarding. To fulfill this condition, player who like Batata Vada, Omelette and Aloo tikki must board at Mathura, Agra and Morena respectively and deboard at Jhansi, Bhopal and Khandwa respectively.

Now, we have the following table:

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada	X	X	Rabri (6)
Agra	Omelette	X	X	Bread Pakora/ Bread Roll (2/4)
Morena	Aloo tikki	X	X	Bread Roll / Bread Pakora (4/2)
Gwalior	X	X	X	X
Jhansi	Poha	Bread Pakora/ Bread Roll (2/4)	Batata Vada	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette	X
Khandwa	X	Bread Roll / Bread Pakora (4/2)	Aloo tikki	X

Kalyan	X	Chholley Bhature (1)	Poha	X
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From statement IV; The player who like Poha must wear either 3 or 8 numbered jersey.

If Poha → 3; then you will find that statement IV is not satisfied.

So, we may conclude that player wearing jersey number 8 must like Poha.

In this case; player who like Batata Vada must wear jersey number 3.

We can conclude that player travelling from Mumbai to New Delhi who board at Jhansi must wear jersey number 4 and deboard at Agra station.

Similarly, to fulfill the condition given in statement IV, the player who like omelette and Aloo tikki must wear jersey number 5 and 7 respectively.

Final table is as below:-

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhit to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada(3)	X	X	Rabri (6)
Agra	Omelette (5)	X	X	Bread Pakora/ Bread Roll (4)
Morena	Aloo tikki (7)	X	X	Bread Roll / Bread Pakora (2)
Gwalior	X	X	X	X
Jhansi	Poha (8)	Bread Pakora/ Bread Roll (4)	Batata Vada (3)	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette (5)	X
Khandwa	X	Bread Roll / Bread Pakora (2)	Aloo tikki (7)	X
Kalyan	X	Chholley Bhature (1)	Poha (8)	X

There are 4 stations between boarding and deboarding station of the player who likes Rabri. So, maximum distance is travelled by player who likes Rabri.

FeedBack

**Directions for questions 43 to 46: Answer the questions on the basis of the information given below.**

Eight players, wearing Jerseys numbered from 1 to 8, travel in two trains, four players in each train, moving in opposite directions one starting from New Delhi (source) to Mumbai (destination) and other from Mumbai to New Delhi. They board train at any station among Mathura, Agra, Morena, Gwalior, Jhansi, Bhopal, Khandwa and Kalyan which are in between New Delhi and Mumbai in that order. After travelling for at least two stations, they can deboard the train at any aforementioned eight stations except at Gwalior station e.g, if a player boards the train at Morena station moving towards Mumbai, then he can deboard earliest at the station Bhopal. Each of these players like one distinct snacks item among omelette, bread pakora, bread roll, batata vada, rabri, aloo tikki, choley bhature and poha. No two or more players travelling in the same train either board or deboard at the same station. i.e., if a player boards from a station then other players cannot board but can deboard at that station. Same holds true for deboarding. The additional information is also known which is given as below.

- (i) Player who likes poha boards train at Jhansi station and player who likes rabri deboards at Mathura station.
- (ii) Player who likes omelette boards at the station which was exactly in the middle of the stations at which players who like batata vada and aloo tikki boards the train in that order.
- (iii) Player wearing jersey number 1 likes choley bhature and player wearing jersey number 6 boards the train at Bhopal station.
- (iv) The sum of jersey number of all players who board or deboard at each station, except Bhopal station, is a perfect square. There were five players for which the number of stations between their boarding and deboarding stations was at least three.
- (v) Players wearing jersey number 2 and 4 deboard at station Agra and Morena, in any order and they like bread pakora and bread roll, not necessarily in that order.

#### Q.46

How many of the following statements is/are true?

- (i) No player boards the train at Gwalior station.
- (ii) Player wearing jersey number 5 likes omelette.
- (iii) Player wearing jersey number 7 likes aloo tikki

1  0

2  1

3  2

4  3

**Solution:**

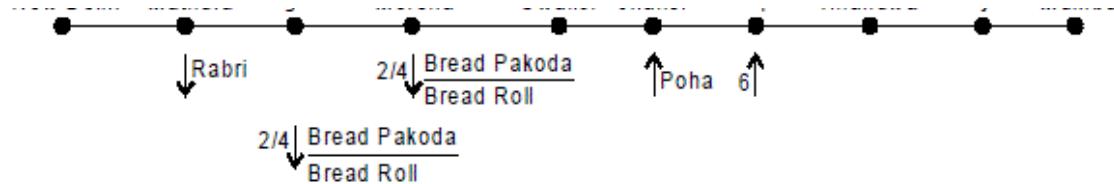
**Correct Answer : 4**

 **Bookmark**

 **Answer key/Solution**

Let us represent stations and other given information as below.

New Delhi   Mathura   Agra   Morena   Gwalior   Jhansi   Bhopal   Khandwa   Kalyan   Mumbai



[↑ represents boarding and ↓ represents deboarding.]

Instruction given in question says that each player travels for atleast two station. So, we may conclude that player wearing jersey number 6 must travel in the train going from Mumbai to New Delhi and deboards at Mathura Station and he/she must like Rabri. Since players wearing jersey number 2/4 deboard at Agra / Morena.

It may also be concluded that the player who likes Poha must travel in the train going from New Delhi to Mumbai and will get off at Kalyan Station.

As Gwalior station is closed for exit, so remaining one player travelling from Mumbai to New Delhi must board at Kalyan station and get off at Jhansi station.

It is also concluded that player who deboard at Agra and Morena must board at Jhansi and Khandwa respectively. From statement II; It may be concluded that players who like Batata Vada, Omelette and Aloo Tikki must board train at stations which one in that order and will be travelling from New Delhi to Mumbai.

These three players board trains at Mathura, Agra and Morena respectively or Agra, Morena and Gwalior respectively So, Player who board at Kalyan and get off at Jhansi Station must like Cholley Bhature and would be wearing jersey number 1 that is given in statement number (iii).

From statement (iv); there were five players for which the number of stations between their boarding and deboarding was atleast 3.

We can see from above discussion that there are two such players traveling from Mumbai to New Delhi.

Remaining three such players must travel from New Delhi to Mumbai and will have atleast 3 stations between their boarding and deboarding stations.

One player who is travelling from New Delhi to Mumbai, boards at Jhansi and gets off at Kalyan station; therefore remaining all three players must have atleast 3 stations between their boarding and deboarding. To fulfill this condition, player who like Batata Vada, Omelette and Aloo tikki must board at Mathura, Agra and Morena respectively and deboard at Jhansi, Bhopal and Khandwa respectively.

Now, we have the following table:

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhi to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada	X	X	Rabri (6)
Agra	Omelette	X	X	Bread Pakora/ Bread Roll (2/4)
Morena	Aloo tikki	X	X	Bread Roll / Bread Pakora (4/2)
Gwalior	X	X	X	X
Jhansi	Poha	Bread Pakora/ Bread Roll (2/4)	Batata Vada	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette	X
Khandwa	X	Bread Roll / Bread Pakora (4/2)	Aloo tikki	X
Kalyan	X	Chholley Bhature (1)	Poha	X

From statement IV; The player who like Poha must wear either 3 or 8 numbered jersey.

If Poha → 3; then you will find that statement IV is not satisfied.

So, we may conclude that player wearing jersey number 8 must like Poha.

In this case; player who like Batata Vada must wear jersey number 3.

We can conclude that player travelling from Mumbai to New Delhi who board at Jhansi must wear jersey number 4 and deboard at Agra station.

Similarly, to fulfill the the condition given in statement IV, the player who like omelette and Aloo tikki must wear jersey number 5 and 7 respectively.

Final table is as below:-

Station	Boarding		Deboarding	
	New Delhi to Mumbai	Mumbai to New Delhi	New Delhit to Mumbai	Mumbai to New Delhi
Mathura	Batata Vada(3)	X	X	Rabri (6)
Agra	Omelette (5)	X	X	Bread Pakora/ Bread Roll (4)
Morena	Aloo tikki (7)	X	X	Bread Roll / Bread Pakora (2)

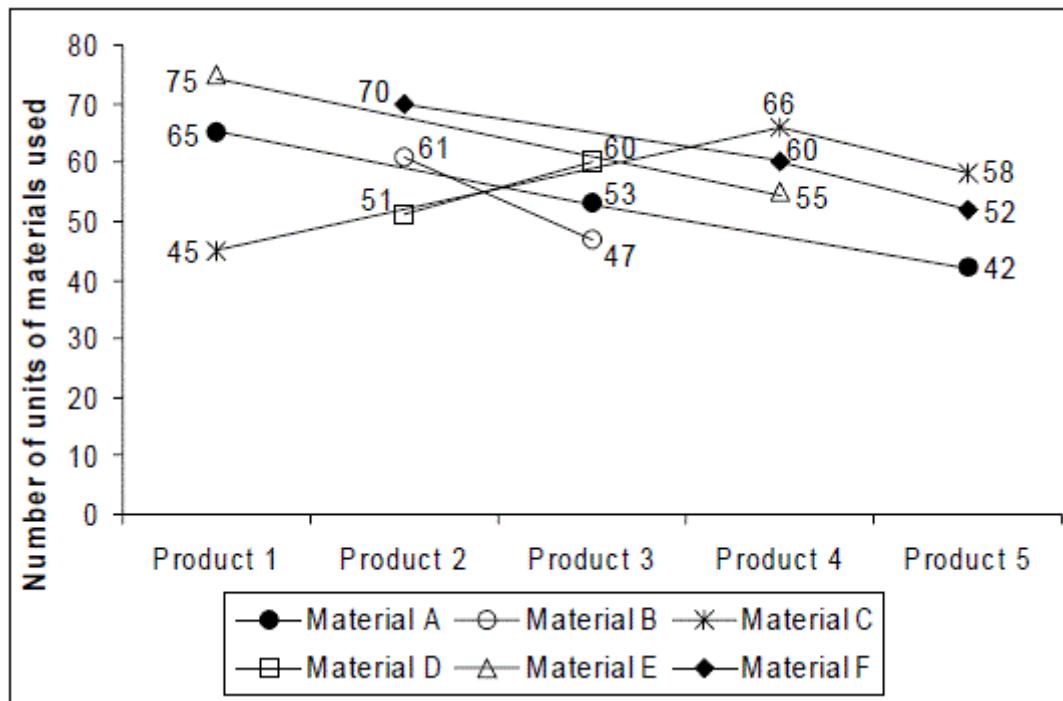
Gwalior	X	X	X	X
Jhansi	Poha (8)	Bread Pakora/ Bread Roll (4)	Batata Vada (3)	Chholley Bhature (1)
Bhopal	X	Rabri (6)	Omelette (5)	X
Khandwa	X	Bread Roll / Bread Pakora (2)	Aloo tikki (7)	X
Kalyan	X	Chholley Bhature (1)	Poha (8)	X

All these statements are true.

FeedBack

**Directions for questions 47 to 50:** Answer the questions on the basis of the information given below.

Each of the five products – product 1, product 2, product 3, product 4 and product 5 – are made up of six different materials – A, B, C, D, E and F – having different combinations in each product. The price (per unit) of these six materials are Rs.70, Rs.60, Rs. 72, Rs.65, Rs.58 and Rs.86 respectively. The partial information about the number of units of these six materials used to produce required number of pieces of each product is depicted below:



Some other information about the products and materials used, for producing each product, is as given below:

- Total number of units of materials used in product 5 was equal to the number of units of material B used in making all the products. The sum of units of materials B and D used in product 4 was 53 more than that of material A used in product 2.
- Total cost of making product 4 was equal to that of product 5.
- Number of units of material B used in product 1 and product 4 was equal. Total amount spent on using material B in making of these 5 products was Rs.21,000.
- The sum of units of material C used in product 2 and that of material E used in product 3 was 100.
- Total units of material E used was equal to that of total of all six materials used in product 2.
- Equal number of units of material D and E were used in product 5. The number of units of material E used in product 5 was neither more than 65 nor less than 60. The number of units of material D used in product 4 was more than 50.
- Two out of the five products, except product 2, each were made by using a total of 288 units of these six materials.
- Material C used in product 3 was 39 units more than the material E used in product 2.

[Note: Zero unit of a material may be used in any particular product and the number of units of any material of all products are integers.]

**Q.47**

Total units of these six materials used in product 2 was

**Solution:**

**Correct Answer : 282**

**Bookmark**

**Answer key/Solution**

The information given in the line graph may be tabulated as below.

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	h	45	k	75	n
Product 2	d	61	i	51	l	70
Product 3	53	47	j	60	m	p
Product 4	a	b	66	c	55	60
Product 5	42	e	58	f	g	52

Fill the blank spaces with a, b, c, d, ... as above.

From statement II;

Expenses in product 4 = Expenses in product 5

$$\begin{aligned} \Rightarrow (a \times 70) + (b \times 60) + (66 \times 72) + (c \times 65) + (55 \times 58) + (60 \times 86) \\ = (42 \times 70) + (e \times 60) + (58 \times 72) + (f \times 65) + (g \times 58) + (52 \times 86) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = 72(66 - 58) + 86(60 - 52) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = (72 + 86) \times 8 = 158 \times 8 = 1264 \quad \dots(i) \end{aligned}$$

In order to make unit digit on RHS equal to 4,

58(g - 55) must give unit digit equal to 4.

From statement V;  $60 \leq g \leq 65$  and  $f = g$

Therefore, g and f must be equal to 63.

Putting g = 63 in the above equation;

$$\begin{aligned} 70(42 - a) + 60(e - b) + 65(63 - c) = 1264 - 58(63 - 55) = 1264 - 58 \times 8 = 800 \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(63 - c) = 800 \quad \dots(ii) \end{aligned}$$

From statement I,

$$b + c = d + 53$$

$$\text{and } 42 + e + 58 + f + g + 52 = h + 61 + 47 + b + e$$

$$\Rightarrow 152 + f + g = 108 + b + h$$

$$\Rightarrow 152 + 63 + 63 = 108 + b + h$$

$$\Rightarrow b + h = 170$$

From statement III,  $b = h$

$$\therefore b = h = \frac{170}{2} = 85.$$

It is given that:

Total expenditure on material B = Rs.21,000

$$(h + 61 + 47 + b + e) 60 = 21000$$

$$\Rightarrow (85 + 61 + 47 + 85 + e) = 350$$

$$\Rightarrow e = 350 - 278 = 72.$$

Putting e = 72 and b = 85 in equation (ii),

$$70(42 - a) + 60(72 - 85) + 65(63 - c) = 800$$

$$\Rightarrow 70(42 - a) + 65(63 - c) = 800 + 780 = 1580$$

Let  $42 - a = x$  and  $63 - c = y$ .

$$\Rightarrow 70x + 65y = 1580.$$

Two integral values of y are possible.

$$y = 6 \text{ and } 20$$

If  $y = 6$  then  $63 - c = 6$

$$\Rightarrow c = 57$$

If  $y = 20$  then  $63 - c = 20$

$$\Rightarrow c = 43$$

But as per statement V,  $c > 50$

$\therefore$  Only possible value of  $c = 57$ .

$$\text{If } c = 57; \text{ then } 70(42 - a) + 65(63 - 57) = 1580$$

$$\Rightarrow 70(42 - a) = 1580 - 390 = 1190$$

$$\Rightarrow 42 - a = 17 \Rightarrow a = 25.$$

From statement IV,

$$m + i = 100.$$

$$d + 61 + i + 51 + l + 70 = 75 + l + m + 55 + g$$

$$\Rightarrow 89 + 61 + i + 51 + 70 = 75 + m + 55 + 63$$

$$\Rightarrow 271 + i = m + 193$$

$$\Rightarrow m - i = 78$$

$$\therefore m + i = 100$$

$$\therefore m = 89 \text{ and } i = 11.$$

From statement VI,

The sum of number of units of materials used in two of the five products must be 288.

Number of units of materials used in product 5 =  $42 + 72 + 58 + 63 + 63 + 52 = 350 \neq 288$

Number of units of materials used in product 4 =  $25 + 85 + 66 + 57 + 55 + 60 = 348 \neq 288$

We can conclude that,

Number of units of materials used in product 1 = Number of units of materials used in product 3 = 288.

$$\Rightarrow 65 + 85 + 45 + k + 75 + n = 270 + k + n = 288$$

$$\Rightarrow k + n = 18.$$

And,  $53 + 47 + j + 60 + 89 + p = 288$

$$\Rightarrow 249 + j + p = 288$$

From statement VII;  $j = l + 39$

$$\Rightarrow 249 + l + 39 + p = 288$$

$$\Rightarrow 288 + l + p = 288$$

$$\therefore l = p = 0 \text{ and } j = l + 39 = 39$$

Now, we have found out every values except k and n and  $k + n = 18$ .

Now, the final table is as below:

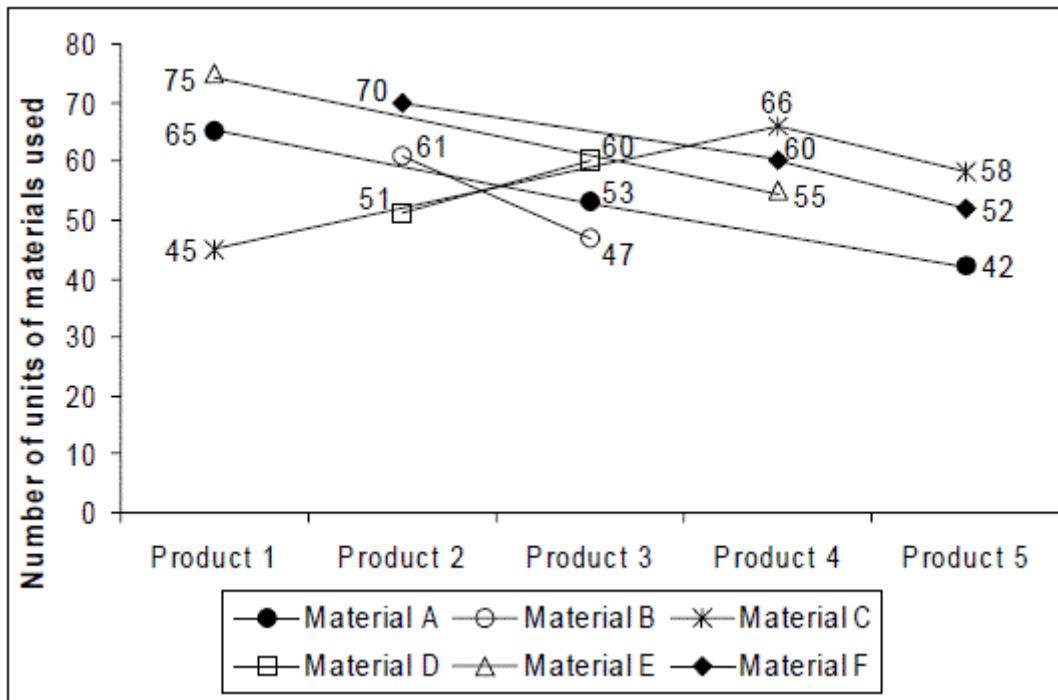
	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	85	45	<u>k</u>	75	<u>n</u>
Product 2	89	61	11	51	0	70
Product 3	53	47	39	60	89	0
Product 4	25	85	66	57	55	60
Product 5	42	72	58	63	63	52

Required answer =  $89 + 61 + 11 + 51 + 0 + 70 = 282$  units.

FeedBack

**Directions for questions 47 to 50: Answer the questions on the basis of the information given below.**

**Each of the five products – product 1, product 2, product 3, product 4 and product 5 – are made up of six different materials – A, B, C, D, E and F – having different combinations in each product. The price (per unit) of these six materials are Rs.70, Rs.60, Rs. 72, Rs.65, Rs.58 and Rs.86 respectively. The partial information about the number of units of these six materials used to produce required number of pieces of each product is depicted below:**



Some other information about the products and materials used, for producing each product, is as given below:

- I. Total number of units of materials used in product 5 was equal to the number of units of material B used in making all the products. The sum of units of materials B and D used in product 4 was 53 more than that of material A used in product 2.
- II. Total cost of making product 4 was equal to that of product 5.
- III. Number of units of material B used in product 1 and product 4 was equal. Total amount spent on using material B in making of these 5 products was Rs.21,000.
- IV. The sum of units of material C used in product 2 and that of material E used in product 3 was 100.

Total units of material E used was equal to that of total of all six materials used in product 2.

V. Equal number of units of material D and E were used in product 5. The number of units of material E used in product 5 was neither more than 65 nor less than 60. The number of units of material D used in product 4 was more than 50.

VI. Two out of the five products, except product 2, each were made by using a total of 288 units of these six materials.

VII. Material C used in product 3 was 39 units more than the material E used in product 2.

**[Note: Zero unit of a material may be used in any particular product and the number of units of any material of all products are integers.]**

#### Q.48

The maximum number of units of all six materials used in any product was what percentage more than the minimum number of units of all six materials used in any product?

1  24.11%

2  25.97%

3  22.39%

4 ● 29.57%

**Solution:****Correct Answer : 1****Bookmark****Answer key/Solution**

The information given in the line graph may be tabulated as below.

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	h	45	k	75	n
Product 2	d	61	i	51	l	70
Product 3	53	47	j	60	m	p
Product 4	a	b	66	c	55	60
Product 5	42	e	58	f	g	52

Fill the blank spaces with a, b, c, d, ... as above.

From statement II;

Expenses in product 4 = Expenses in product 5

$$\begin{aligned} \Rightarrow (a \times 70) + (b \times 60) + (66 \times 72) + (c \times 65) + (55 \times 58) + (60 \times 86) \\ = (42 \times 70) + (e \times 60) + (58 \times 72) + (f \times 65) + (g \times 58) + (52 \times 86) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = 72(66 - 58) + 86(60 - 52) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = (72 + 86) \times 8 = 158 \times 8 = 1264 \quad \dots(i) \end{aligned}$$

In order to make unit digit on RHS equal to 4,

58(g - 55) must give unit digit equal to 4.

From statement V;  $60 \leq g \leq 65$  and  $f = g$

Therefore, g and f must be equal to 63.

Putting g = 63 in the above equation;

$$70(42 - a) + 60(e - b) + 65(63 - c) = 1264 - 58(63 - 55) = 1264 - 58 \times 8 = 800$$

$$\Rightarrow 70(42 - a) + 60(e - b) + 65(63 - c) = 800 \quad \dots(ii)$$

From statement I,

$$b + c = d + 53$$

$$\text{and } 42 + e + 58 + f + g + 52 = h + 61 + 47 + b + e$$

$$\Rightarrow 152 + f + g = 108 + b + h$$

$$\Rightarrow 152 + 63 + 63 = 108 + b + h$$

$$\Rightarrow b + h = 170$$

From statement III,  $b = h$

$$\therefore b = h = \frac{170}{2} = 85.$$

It is given that:

Total expenditure on material B = Rs.21,000

$$(h + 61 + 47 + b + e) 60 = 21000$$

$$\Rightarrow (85 + 61 + 47 + 85 + e) = 350$$

$$\Rightarrow e = 350 - 278 = 72.$$

Putting e = 72 and b = 85 in equation (ii),

$$70(42 - a) + 60(72 - 85) + 65(63 - c) = 800$$

$$\Rightarrow 70(42 - a) + 65(63 - c) = 800 + 780 = 1580$$

Let  $42 - a = x$  and  $63 - c = y$ .

$$\Rightarrow 70x + 65y = 1580.$$

Two integral values of y are possible.

$$y = 6 \text{ and } 20$$

$$\text{If } y = 6 \text{ then } 63 - c = 6$$

$$\Rightarrow c = 57$$

$$\text{If } y = 20 \text{ then } 63 - c = 20$$

$$\Rightarrow c = 43$$

But as per statement V,  $c > 50$

$\therefore$  Only possible value of c = 57.

$$\text{If } c = 57; \text{ then } 70(42 - a) + 65(63 - 57) = 1580$$

$$\Rightarrow 70(42 - a) = 1580 - 390 = 1190$$

$$\Rightarrow 42 - a = 17 \Rightarrow a = 25.$$

From statement IV,

$$m + i = 100.$$

$$d + 61 + i + 51 + l + 70 = 75 + l + m + 55 + a$$

$$\Rightarrow 89 + 61 + i + 51 + 70 = 75 + m + 55 + 63$$

$$\Rightarrow 271 + i = m + 193$$

$$\Rightarrow m - i = 78$$

$$\therefore m + i = 100$$

$$\therefore m = 89 \text{ and } i = 11.$$

From statement VI,

The sum of number of units of materials used in two of the five products must be 288.

Number of units of materials used in product 5 =  $42 + 72 + 58 + 63 + 63 + 52 = 350 \neq 288$

Number of units of materials used in product 4 =  $25 + 85 + 66 + 57 + 55 + 60 = 348 \neq 288$

We can conclude that,

Number of units of materials used in product 1 = Number of units of materials used in product 3 = 288.

$$\Rightarrow 65 + 85 + 45 + k + 75 + n = 270 + k + n = 288$$

$$\Rightarrow k + n = 18.$$

And,  $53 + 47 + j + 60 + 89 + p = 288$

$$\Rightarrow 249 + j + p = 288$$

From statement VII;  $j = l + 39$

$$\Rightarrow 249 + l + 39 + p = 288$$

$$\Rightarrow 288 + l + p = 288$$

$$\therefore l = p = 0 \text{ and } j = l + 39 = 39$$

Now, we have found out every values except k and n and  $k + n = 18$ .

Now, the final table is as below:

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	85	45	(k)	75	(n)
Product 2	89	61	11	51	0	70
Product 3	53	47	39	60	89	0
Product 4	25	85	66	57	55	60
Product 5	42	72	58	63	63	52

Number of units of materials used in product 5 = 350 i.e., maximum

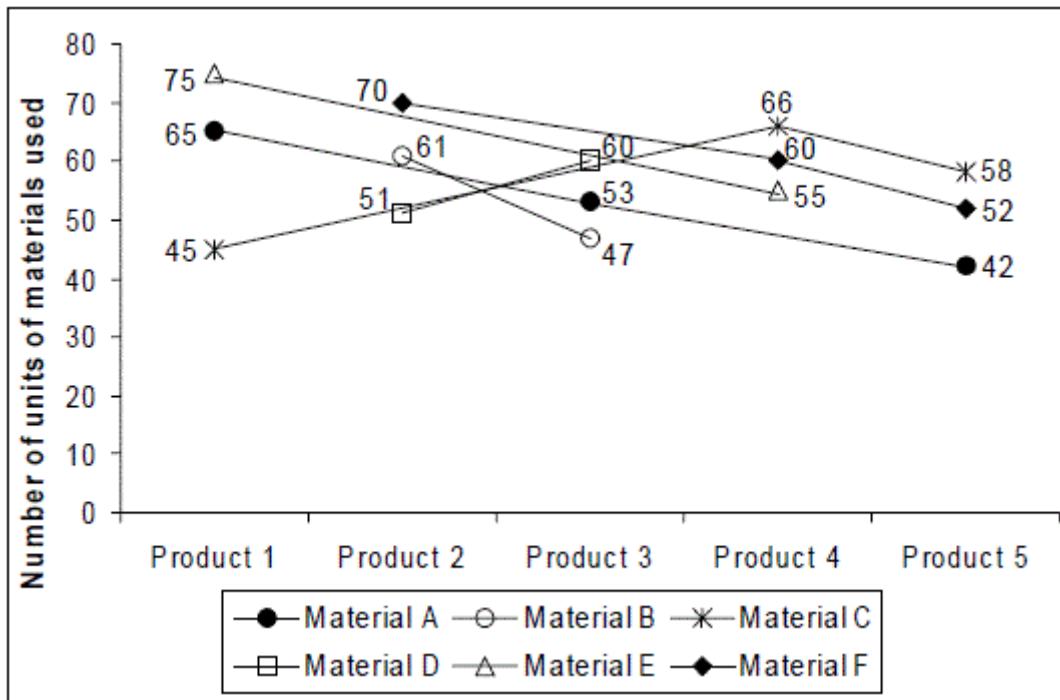
Number of units of materials used in product 2 = 282 i.e., minimum

$$\therefore \text{Required percentage} = \frac{350 - 282}{282} \times 100 = \frac{68}{282} \times 100 = 24.11\%.$$

FeedBack

**Directions for questions 47 to 50: Answer the questions on the basis of the information given below.**

**Each of the five products – product 1, product 2, product 3, product 4 and product 5 – are made up of six different materials – A, B, C, D, E and F – having different combinations in each product. The price (per unit) of these six materials are Rs.70, Rs.60, Rs. 72, Rs.65, Rs.58 and Rs.86 respectively. The partial information about the number of units of these six materials used to produce required number of pieces of each product is depicted below:**



Some other information about the products and materials used, for producing each product, is as given below:

- Total number of units of materials used in product 5 was equal to the number of units of material B used in making all the products. The sum of units of materials B and D used in product 4 was 53 more than that of material A used in product 2.
- Total cost of making product 4 was equal to that of product 5.
- Number of units of material B used in product 1 and product 4 was equal. Total amount spent on using material B in making of these 5 products was Rs.21,000.
- The sum of units of material C used in product 2 and that of material E used in product 3 was 100.

Total units of material E used was equal to that of total of all six materials used in product 2.

V. Equal number of units of material D and E were used in product 5. The number of units of material E used in product 5 was neither more than 65 nor less than 60. The number of units of material D used in product 4 was more than 50.

VI. Two out of the five products, except product 2, each were made by using a total of 288 units of these six materials.

VII. Material C used in product 3 was 39 units more than the material E used in product 2.

**[Note: Zero unit of a material may be used in any particular product and the number of units of any material of all products are integers.]**

#### Q.49

If the number of units of material D used in product 1 was 8, then the number of units of material F used in that product was

**Solution:**

**Correct Answer : 10**

**Bookmark**

**Answer key/Solution**

The information given in the line graph may be tabulated as below.

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	h	45	k	75	n
Product 2	d	61	i	51	j	70
Product 3	53	47	l	60	m	p
Product 4	a	b	66	c	55	60
Product 5	42	e	58	f	g	52

Fill the blank spaces with a, b, c, d, ... as above.

From statement II;

Expenses in product 4 = Expenses in product 5

$$\begin{aligned} \Rightarrow (a \times 70) + (b \times 60) + (66 \times 72) + (c \times 65) + (55 \times 58) + (60 \times 86) \\ = (42 \times 70) + (e \times 60) + (58 \times 72) + (f \times 65) + (g \times 58) + (52 \times 86) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = 72(66 - 58) + 86(60 - 52) \\ \Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = (72 + 86) \times 8 = 158 \times 8 = 1264 \quad \dots(i) \end{aligned}$$

In order to make unit digit on RHS equal to 4,

58(g - 55) must give unit digit equal to 4.

From statement V;  $60 \leq g \leq 65$  and  $f = g$

Therefore, g and f must be equal to 63.

Putting g = 63 in the above equation;

$$70(42 - a) + 60(e - b) + 65(63 - c) = 1264 - 58(63 - 55) = 1264 - 58 \times 8 = 800$$

$$\Rightarrow 70(42 - a) + 60(e - b) + 65(63 - c) = 800 \quad \dots(ii)$$

From statement I,

$$b + c = d + 53$$

$$\text{and } 42 + e + 58 + f + g + 52 = h + 61 + 47 + b + e$$

$$\Rightarrow 152 + f + g = 108 + b + h$$

$$\Rightarrow 152 + 63 + 63 = 108 + b + h$$

$$\Rightarrow b + h = 170$$

From statement III,  $b = h$

$$\therefore b = h = \frac{170}{2} = 85.$$

It is given that:

Total expenditure on material B = Rs.21,000

$$(h + 61 + 47 + b + e) 60 = 21000$$

$$\Rightarrow (85 + 61 + 47 + 85 + e) = 350$$

$$\Rightarrow e = 350 - 278 = 72.$$

Putting e = 72 and b = 85 in equation (ii),

$$70(42 - a) + 60(72 - 85) + 65(63 - c) = 800$$

$$\Rightarrow 70(42 - a) + 65(63 - c) = 800 + 780 = 1580$$

Let  $42 - a = x$  and  $63 - c = y$ .

$$\Rightarrow 70x + 65y = 1580.$$

Two integral values of y are possible.

$$y = 6 \text{ and } 20$$

If  $y = 6$  then  $63 - c = 6$

$$\Rightarrow c = 57$$

If  $y = 20$  then  $63 - c = 20$

$$\Rightarrow c = 43$$

But as per statement V,  $c > 50$

$\therefore$  Only possible value of  $c = 57$ .

$$\text{If } c = 57; \text{ then } 70(42 - a) + 65(63 - 57) = 1580$$

$$\Rightarrow 70(42 - a) = 1580 - 390 = 1190$$

$$\Rightarrow 42 - a = 17 \Rightarrow a = 25.$$

From statement IV,

$$m + i = 100.$$

$$d + 61 + i + 51 + l + 70 = 75 + l + m + 55 + g$$

$$\Rightarrow 89 + 61 + i + 51 + 70 = 75 + m + 55 + 63$$

$$\Rightarrow 271 + i = m + 193$$

$$\Rightarrow m - i = 78$$

$$\therefore m + i = 100$$

$$\therefore m = 89 \text{ and } i = 11.$$

From statement VI,

The sum of number of units of materials used in two of the five products must be 288.

Number of units of materials used in product 5 =  $42 + 72 + 58 + 63 + 63 + 52 = 350 \neq 288$

Number of units of materials used in product 4 =  $25 + 85 + 66 + 57 + 55 + 60 = 348 \neq 288$

We can conclude that,

Number of units of materials used in product 1 = Number of units of materials used in product 3 = 288.

$$\Rightarrow 65 + 85 + 45 + k + 75 + n = 270 + k + n = 288$$

$$\Rightarrow k + n = 18.$$

$$\text{And, } 53 + 47 + j + 60 + 89 + p = 288$$

$$\Rightarrow 249 + j + p = 288$$

From statement VII;  $j = l + 39$

$$\Rightarrow 249 + l + 39 + p = 288$$

$$\Rightarrow 288 + l + p = 288$$

$$\therefore l + p = 0 \text{ and } j = l + 39 = 39$$

Now, we have found out every values except k and n and  $k + n = 18$ .

Now, the final table is as below:

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	85	45	<u>k</u>	75	<u>n</u>
Product 2	89	61	11	51	0	70
Product 3	53	47	39	60	89	0
Product 4	25	85	66	57	55	60
Product 5	42	72	58	63	63	52

As,  $k + n = 18$

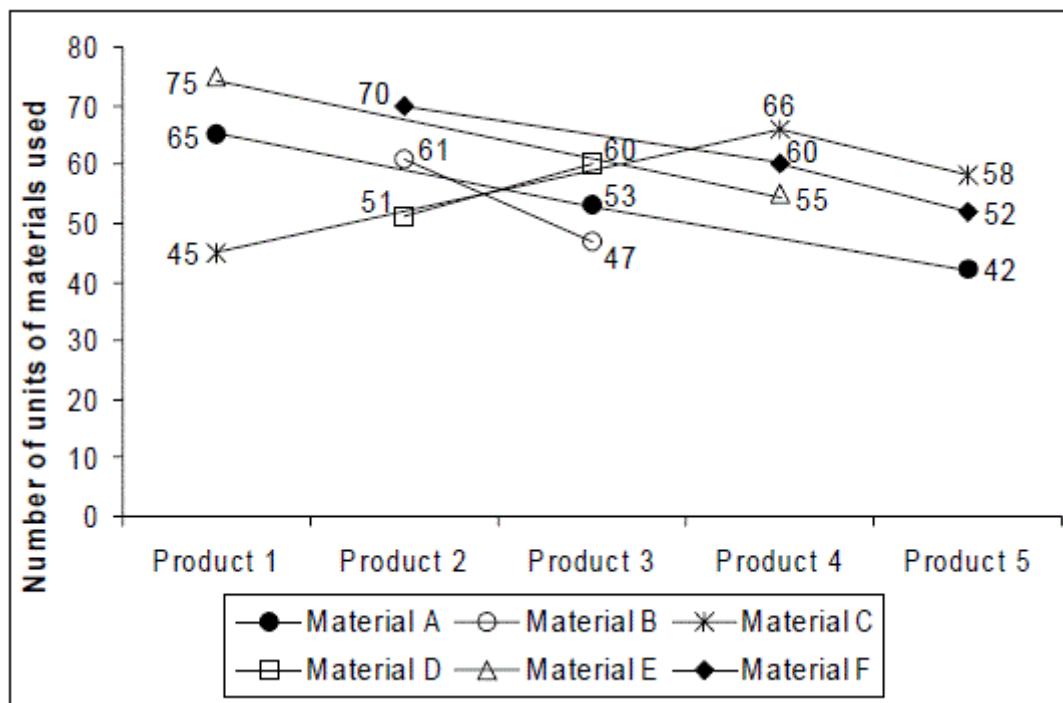
$$\therefore k = 8$$

$$\therefore n = 18 - 8 = 10.$$

FeedBack

**Directions for questions 47 to 50:** Answer the questions on the basis of the information given below.

Each of the five products – product 1, product 2, product 3, product 4 and product 5 – are made up of six different materials – A, B, C, D, E and F – having different combinations in each product. The price (per unit) of these six materials are Rs.70, Rs.60, Rs. 72, Rs.65, Rs.58 and Rs.86 respectively. The partial information about the number of units of these six materials used to produce required number of pieces of each product is depicted below:



Some other information about the products and materials used, for producing each product, is as given below:

- Total number of units of materials used in product 5 was equal to the number of units of material B used in making all the products. The sum of units of materials B and D used in product 4 was 53 more than that of material A used in product 2.
- Total cost of making product 4 was equal to that of product 5.
- Number of units of material B used in product 1 and product 4 was equal. Total amount spent on using material B in making of these 5 products was Rs.21,000.
- The sum of units of material C used in product 2 and that of material E used in product 3 was 100.
- Total units of material E used was equal to that of total of all six materials used in product 2.
- Equal number of units of material D and E were used in product 5. The number of units of material E used in product 5 was neither more than 65 nor less than 60. The number of units of material D used in product 4 was more than 50.
- Two out of the five products, except product 2, each were made by using a total of 288 units of these six materials.
- Material C used in product 3 was 39 units more than the material E used in product 2.

[Note: Zero unit of a material may be used in any particular product and the number of units of any material of all products are integers.]

**Q.50**

**Total expenses on using material D for making these five products taken together can be**

- I. Less than Rs.15,500.
- II. More than Rs.16,180.
- III. More than Rs.16,500.

1  only I

2  only II

3  both I and II

4  either I or III



**Solution:**

**Correct Answer : 3**

**Your Answer : 3**

**Bookmark**

**Answer key/Solution**

The information given in the line graph may be tabulated as below.

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	h	45	k	75	n
Product 2	d	61	i	51	l	70
Product 3	53	47	j	60	m	p
Product 4	a	b	66	c	55	60
Product 5	42	e	58	f	g	52

Fill the blank spaces with a, b, c, d, ... as above.

From statement II;

Expenses in product 4 = Expenses in product 5

$$\Rightarrow (a \times 70) + (b \times 60) + (66 \times 72) + (c \times 65) + (55 \times 58) + (60 \times 86)$$

$$= (42 \times 70) + (e \times 60) + (58 \times 72) + (f \times 65) + (g \times 58) + (52 \times 86)$$

$$\Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = 72(66 - 58) + 86(60 - 52)$$

$$\Rightarrow 70(42 - a) + 60(e - b) + 65(f - c) + 58(g - 55) = (72 + 86) \times 8 = 158 \times 8 = 1264 \quad \dots(i)$$

In order to make unit digit on RHS equal to 4,

58(g - 55) must give unit digit equal to 4.

From statement V;  $60 \leq g \leq 65$  and  $f = g$

Therefore, g and f must be equal to 63.

Putting g = 63 in the above equation;

$$70(42 - a) + 60(e - b) + 65(63 - c) = 1264 - 58(63 - 55) = 1264 - 58 \times 8 = 800$$

$$\Rightarrow 70(42 - a) + 60(e - b) + 65(63 - c) = 800 \quad \dots(ii)$$

From statement I,

$$b + c = d + 53$$

$$\text{and } 42 + e + 58 + f + g + 52 = h + 61 + 47 + b + e$$

$$\Rightarrow 152 + f + g = 108 + b + h$$

$$\Rightarrow 152 + 63 + 63 = 108 + b + h$$

$$\Rightarrow b + h = 170$$

From statement III,  $b = h$

$$\therefore b = h = \frac{170}{2} = 85.$$

It is given that:

Total expenditure on material B = Rs.21,000

$$(h + 61 + 47 + b + e) 60 = 21000$$

$$\Rightarrow (85 + 61 + 47 + 85 + 63) \times 60 = 21000$$

$$\Rightarrow (50 + 61 + 47 + 60 + 8) = 300$$

$$\Rightarrow e = 350 - 278 = 72.$$

Putting  $e = 72$  and  $b = 85$  in equation (ii),

$$70(42 - a) + 60(72 - 85) + 65(63 - c) = 800$$

$$\Rightarrow 70(42 - a) + 65(63 - c) = 800 + 780 = 1580$$

Let  $42 - a = x$  and  $63 - c = y$ .

$$\Rightarrow 70x + 65y = 1580.$$

Two integral values of  $y$  are possible.

$$y = 6 \text{ and } 20$$

$$\text{If } y = 6 \text{ then } 63 - c = 6$$

$$\Rightarrow c = 57$$

$$\text{If } y = 20 \text{ then } 63 - c = 20$$

$$\Rightarrow c = 43$$

But as per statement V,  $c > 50$

$\therefore$  Only possible value of  $c = 57$ .

$$\text{If } c = 57; \text{ then } 70(42 - a) + 65(63 - 57) = 1580$$

$$\Rightarrow 70(42 - a) = 1580 - 390 = 1190$$

$$\Rightarrow 42 - a = 17 \Rightarrow a = 25.$$

From statement IV,

$$m + i = 100.$$

$$d + 61 + i + 51 + l + 70 = 75 + l + m + 55 + g$$

$$\Rightarrow 89 + 61 + i + 51 + 70 = 75 + m + 55 + 63$$

$$\Rightarrow 271 + i = m + 193$$

$$\Rightarrow m - i = 78$$

$$\therefore m + i = 100$$

$$\therefore m = 89 \text{ and } i = 11.$$

From statement VI,

The sum of number of units of materials used in two of the five products must be 288.

Number of units of materials used in product 5 =  $42 + 72 + 58 + 63 + 63 + 52 = 350 \neq 288$

Number of units of materials used in product 4 =  $25 + 85 + 66 + 57 + 55 + 60 = 348 \neq 288$

We can conclude that,

Number of units of materials used in product 1 = Number of units of materials used in product 3 = 288.

$$\Rightarrow 65 + 85 + 45 + k + 75 + n = 270 + k + n = 288$$

$$\Rightarrow k + n = 18.$$

And,  $53 + 47 + j + 60 + 89 + p = 288$

$$\Rightarrow 249 + j + p = 288$$

From statement VII;  $j = l + 39$

$$\Rightarrow 249 + l + 39 + p = 288$$

$$\Rightarrow 288 + l + p = 288$$

$$\therefore l = p = 0 \text{ and } j = l + 39 = 39$$

Now, we have found out every values except  $k$  and  $n$  and  $k + n = 18$ .

Now, the final table is as below:

	Material A	Material B	Material C	Material D	Material E	Material F
Product 1	65	85	45	(k)	75	(n)
Product 2	89	61	11	51	0	70
Product 3	53	47	39	60	89	0
Product 4	25	85	66	57	55	60
Product 5	42	72	58	63	63	52

Minimum possible expenditure on material D =  $(0 + 51 + 60 + 57 + 63) \times 65 = 15015$ .

Maximum possible expenditure on material D =  $(18 + 51 + 60 + 57 + 63) \times 65 = 16185$ .

$\therefore$  Both cases I and II are possible.

FeedBack

**Directions for question 51 to 54: Answer the questions on the basis of the information given below.**

Twenty stalls numbered as ST1, ST2, ST3, ..., ST19, ST20 are opened in a fair. They all are arranged consecutively, as per their number, along the circumference of a circle. Based on the material and things these stalls sell, they are divided into three categories. Nine stalls numbered from ST1- ST9 fall under Retail Shop Category, 6 stalls numbered from ST10 - ST15 are under Art and Craft Category, and 5 stalls from ST16 - ST20 are under Eatery Outlets Category.

Additional information about these stalls, known to us, is as follows:

- (i) Each of these 20 stalls are marked as either Priority Stall (PS) or Super Priority Stall (SPS) but not both.
- (ii) No two stalls, marked as SPS, are adjacent to each other.
- (iii) At least 4 stalls, under Retail Shop Category, are marked as SPS; at least 2, under Art and craft category, are marked as SPS; and at least 3, under Eatery Outlets Category, are marked as SPS.

#### Q.51

If stall ST9 is marked as Super Priority Stall, then which of the following statements can be true?

- A. Both stalls ST12 and ST13 are marked as Priority Stalls.
- B. In stalls numbered as ST6, ST7, ..., ST13, there are exactly 3 Super Priority Stalls.
- C. If ST7 and ST17 are marked as Priority Stalls, then ST5 and ST12 are marked as Super Priority Stall.

1  Only A and C

2  Only B and C

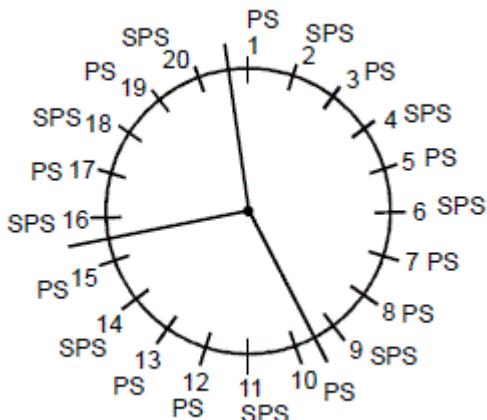
3  Only A and B

4  All the statements can be true.



**Solution:****Correct Answer : 3****Your Answer : 3**

Stall ST9 is marked as super priority stall then following case is possible:-

**Bookmark****Answer key/Solution**

By observing the above possibilities only A and B are possible.

**FeedBack**

**Directions for question 51 to 54: Answer the questions on the basis of the information given below.**

Twenty stalls numbered as ST1, ST2, ST3, ..., ST19, ST20 are opened in a fair. They all are arranged consecutively, as per their number, along the circumference of a circle. Based on the material and things these stalls sell, they are divided into three categories. Nine stalls numbered from ST1 - ST9 fall under Retail Shop Category, 6 stalls numbered from ST10 - ST15 are under Art and Craft Category, and 5 stalls from ST16 - ST20 are under Eatery Outlets Category.

Additional information about these stalls, known to us, is as follows:

- (i) Each of these 20 stalls are marked as either Priority Stall (PS) or Super Priority Stall (SPS) but not both.
- (ii) No two stalls, marked as SPS, are adjacent to each other.
- (iii) At least 4 stalls, under Retail Shop Category, are marked as SPS; at least 2, under Art and craft category, are marked as SPS; and at least 3, under Eatery Outlets Category, are marked as SPS.

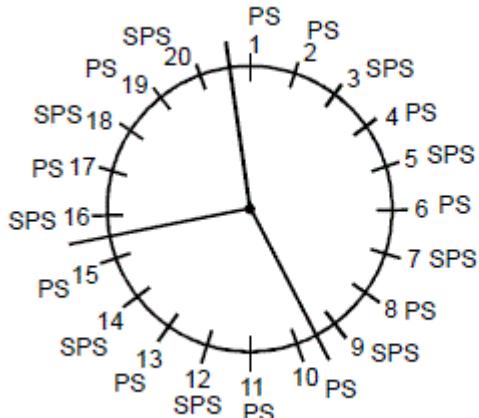
**Q.52**

If ST2 is marked as Priority Stall and ST12 is marked as Super Priority Stall, then how many different combinations of PS and SPS marked stalls are possible?



**Solution:****Correct Answer : 1****Your Answer : 1****Bookmark****Answer key/Solution**

If ST2 is marked as priority stall and ST12 is marked as super priority stall, then following case can be observed:



Only 1 case is possible here.

[FeedBack](#)

**Directions for question 51 to 54: Answer the questions on the basis of the information given below.**

Twenty stalls numbered as ST1, ST2, ST3, ..., ST19, ST20 are opened in a fair. They all are arranged consecutively, as per their number, along the circumference of a circle. Based on the material and things these stalls sell, they are divided into three categories. Nine stalls numbered from ST1- ST9 fall under Retail Shop Category, 6 stalls numbered from ST10 - ST15 are under Art and Craft Category, and 5 stalls from ST16 - ST20 are under Eatery Outlets Category.

Additional information about these stalls, known to us, is as follows:

- (i) Each of these 20 stalls are marked as either Priority Stall (PS) or Super Priority Stall (SPS) but not both.
- (ii) No two stalls, marked as SPS, are adjacent to each other.
- (iii) At least 4 stalls, under Retail Shop Category, are marked as SPS; at least 2, under Art and craft category, are marked as SPS; and at least 3, under Eatery Outlets Category, are marked as SPS.

**Q.53**

If except Eatery Outlets Category stalls, other category stalls can have adjacent Super Priority Stalls, then how many different combinations of PS and SPS marked stalls are possible?

**Solution:****Correct Answer : 4238** **Bookmark** **Answer key/Solution**

From stall ST1 to ST9, ST1 is priority stall since ST20 is super priority stall and similarly ST15 is priority stall.  
 $\therefore$  there can be maximum 8 super priority stalls in ST2-ST9 and maximum 5 super priority stalls in ST10 – ST14.  
 Total possibilities are:-

$$(^8C_4 + ^8C_5 + ^8C_6 + ^8C_7 + ^8C_8) \times (^5C_1 + ^5C_2 + ^5C_3 + ^5C_4 + ^5C_5) = 163 \times 26 = 4238.$$

**FeedBack**

**Directions for question 51 to 54: Answer the questions on the basis of the information given below.**

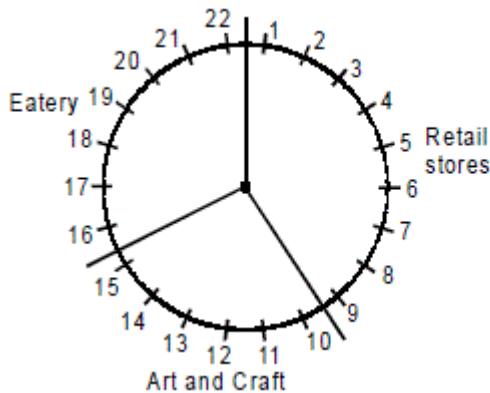
Twenty stalls numbered as ST1, ST2, ST3, ..., ST19, ST20 are opened in a fair. They all are arranged consecutively, as per their number, along the circumference of a circle. Based on the material and things these stalls sell, they are divided into three categories. Nine stalls numbered from ST1- ST9 fall under Retail Shop Category, 6 stalls numbered from ST10 - ST15 are under Art and Craft Category, and 5 stalls from ST16 - ST20 are under Eatery Outlets Category.

**Additional information about these stalls, known to us, is as follows:**

- (i) Each of these 20 stalls are marked as either Priority Stall (PS) or Super Priority Stall (SPS) but not both.
- (ii) No two stalls, marked as SPS, are adjacent to each other.
- (iii) At least 4 stalls, under Retail Shop Category, are marked as SPS; at least 2, under Art and craft category, are marked as SPS; and at least 3, under Eatery Outlets Category, are marked as SPS.

**Q.54**

If two more stalls are added in Eatery Outlets Category i.e., ST21 and ST22, next to ST20, satisfying all the conditions given above and also ST22 is marked as Super Priority Stall, then how many different combinations of PS and SPS marked stalls are possible?

**Solution:****Correct Answer : 202** **Bookmark** **Answer key/Solution**

Different combinations of SPS that are possible:-

Eatery → ST(22, 20, 18); (22, 20, 17); (22, 20, 16); (22, 19, 17); (22, 19, 16); (22, 18, 16) (22, 20, 18, 16)

Retail → ST(2, 4, 6, 8); (2, 4, 6, 9); (2, 4, 7, 9) (2, 5, 7, 9); (3, 5, 7, 9)

Arts → ST(10, 12), (10, 13); (10, 14); (10, 15); (11, 13) (11, 14); (11, 15); (12, 14); (12, 15); (13, 15) (10, 12, 14); (10, 12, 15); (10, 13, 15); (11, 13, 15).

Total combinations that are possible according to the criterion given:

$$ST(22, 20, 18) \rightarrow 1 \times 1 \times 14 + 1 \times 4 \times 7 = 42$$

$$ST(22, 20, 17) \rightarrow 1 \times 1 \times 14 + 1 \times 4 \times 7 = 42$$

$$ST(22, 20, 16) \rightarrow 1 \times 1 \times 7 + 1 \times 4 \times 3 = 19$$

$$ST(22, 19, 17) \rightarrow 14 + 4 \times 7 = 42$$

$$ST(22, 19, 16) \rightarrow 7 + 4 \times 3 = 19$$

$$ST(22, 18, 16) \rightarrow 7 + 4 \times 3 = 19$$

Total = 202.

**FeedBack**

**Directions for questions 55 to 58: Answer the questions on the basis of the information given below.**

The table given below depicts the partial information about the electric power consumption (in units) by six home appliances – Air conditioner (AC), Fan, Bulb, Washing Machine, Refrigerator and TV – used by five families – F1, F2, F3, F4 and F5 – in a particular month.

Appliances Family \	AC	Fan	Bulb	Washing Machine	Refrigerator	TV
Family	870		80	169		
F1	870		80	169		
F2	1125	536			470	
F3		570	96	235		120
F4	781		72		160	113
F5		319		144	152	145

(Note:- All values given in the above table must be integers only.)

**The additional information is as follows:-**

- (i) Total power consumption by these families altogether for that month was 10,000 units.
- (ii) Power consumed by any family is represented by  $P(F)$ . And  $P(F1) : P(F2) = 2 : 3$ ,  $P(F2) : P(F3) = 54 : 47$ ,  $P(F3) : P(F4) = 235 : 163$  and  $P(F4) : P(F5) = 163 : 152$ .
- (iii) Power consumed by AC, fan, bulb, washing machine, refrigerator and TV for all five families taken together were 4398 units, 2202 units, 491 units, 954 units, 1310 units and 645 units respectively.
- (iv) The electricity board charges the bill at Rs. 3/unit for first 200 units and thereafter, Rs. 5/unit. Each family gets electricity bill for each appliance separately and has to pay the bill equal to the sum of the bills for each appliances used by them.
- (v) The sum of  $P(F5)$  for AC and  $P(F3)$  for refrigerator was 971 units. The bill paid by F4 for fan and washing machine together was Rs. 1,868.

### Q.55

By what percentage was the total bills paid by F1, F2 and F3 taken together more than that paid by F3, F4 and F5 taken together?

- 1  28.68%
- 2  23.57%
- 3  29.32%
- 4  25.82%

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	c	80	169	i	k	1800
F2	1125	536	e	g	470	l	2700
F3	a	570	96	235	j	120	2350
F4	781	d	72	h	160	113	1630
F5	b	319	f	144	152	145	1520
Total	4398	2202	491	954	1310	645	10000

From statement II,  $P(F1) : P(F2) : P(F3) : P(F4) : P(F5) = 180 : 270 : 235 : 163 : 152$

As per the question:

$$\Rightarrow 180x + 270x + 235x + 163x + 152x = 10,000$$

$$\Rightarrow 1000x = 10,000 \Rightarrow x = 10$$

$$\therefore P(F1) = 1800 \text{ units}$$

$$P(F2) = 2700 \text{ units}$$

$$P(F3) = 2350 \text{ units}$$

$$P(F4) = 1630 \text{ units}$$

$$P(F5) = 1520 \text{ units}$$

Let the blank spaces in the above table is filled by a, b, c, ... k and l

From the above table, we have,

$$a + b = 4398 - (870 + 1125 + 781) = 4398 - 2776 = 1622 \quad \dots (i)$$

$$a + j = 2350 - (570 + 96 + 235 + 120) = 2350 - 1021 = 1329 \quad \dots (ii)$$

From equation (i) and (ii),

$$(a + b) - (a + j) = 1622 - 1329 = 293$$

$$\Rightarrow b - j = 293 \quad \dots (iii)$$

From statement (v), we have

$$b + j = 971 \quad \dots (iv)$$

From equation (iii) and (iv) on adding equation (iii) and (iv), we get

$$b - j + b + j = 293 + 971$$

$$\Rightarrow 2b = 1264$$

$$\Rightarrow b = 632 \text{ and } j = 971 - 632 = 339$$

Also,  $a = 1622 - 632 = 990$  and  $f = 1520 - (b + 319 + 144 + 152 + 145) = 1520 - (632 + 319 + 144 + 152 + 145)$

$$= 1520 - 1392 = 128.$$

$$i = 1310 - (470 + j + 160 + 152) = 1310 - 782 - 339 = 189.$$

Similarly; we can get  $e = 491 - (80 + 96 + 72 + 128) = 115$ .

From statement (iv); bill rate is Rs. 3/unit upto 200 units. and Rs. 5 for above from 200 units.

From statement (v); bill paid by F4 for fan and washing machine together is Rs. 1868.

**Case I:** If both d and h are less than or equal to 200 units, maximum bills may be  $Rs. 200 \times 3 + 200 \times 3 = Rs. 1,250$  which is not our case.

**Case II:** Let  $h > 200$  and  $d > 200$

$$\text{then; bills} = [200 \times 3 + 5(h - 200)] + [200 \times 3 + 5(d - 200)] = 1200 - 2000 + 5(d + h)$$

We can observe that in this case, bills must be a multiple of 5. But, bills as per statement v is Rs. 1,868. So, case cannot possible.

**Case III:** Let  $h > 200$  and  $d < 200$

In this case, you will find that power consumption does not satisfy the data given in the question.

So, we conclude that  $d > 200$  and  $h < 200$

$$\text{bills} = 600 + 5(d - 200) + 3h = 1868$$

$$\Rightarrow 3h + 5d = 1868 - 600 + 1000 = 2268$$

and from table; we have  $h + d = 1630 - (781 + 72 + 160 + 113) = 1630 - 1126 = 504$ .

From above two equations, we get  $d = 378$  and  $h = 126$

$$\text{We can also find that; } c = 2202 - (536 + 570 + 378 + 319) = 2202 - 1803 = 399.$$

$$\text{Similarly; } g = 280, k = 93 \& l = 174$$

Now, we can make complete table for power consumption as well as for bills:-

Power consumption:

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	399	80	169	189	93	1800
F2	1125	536	115	280	470	174	2700
F3	990	570	96	235	339	120	2350
F4	781	378	72	126	160	113	1630
F5	632	319	128	144	152	145	1520

Bills:-Calculated as per rate given in the instruction.

Appliances	AC	Fan	Bulb	Washin	Refrigerator	TV	Total

Family	AC	Fan	Bulb	Machine	Washing Machine	Refrigerator	TV
F1	3950	1595	240	507	567	279	7138
F2	5225	2280	345	1000	1950	522	11322
F3	4550	2450	288	775	1295	360	9718
F4	3505	1490	216	378	480	339	6408
F5	2760	1195	384	432	456	435	5662
Total	19990	9010	1473	3092	4748	1935	40248

$$\text{Required percentage} = \left[ \frac{(7138 + 11322 + 9718) - (9718 + 6408 + 5662)}{(9718 + 6408 + 5662)} \right] \times 100 = 29.32\%$$

FeedBack

**Directions for questions 55 to 58:** Answer the questions on the basis of the information given below.

The table given below depicts the partial information about the electric power consumption (in units) by six home appliances – Air conditioner (AC), Fan, Bulb, Washing Machine, Refrigerator and TV – used by five families – F1, F2, F3, F4 and F5 – in a particular month.

Appliances Family	AC	Fan	Bulb	Washing Machine	Refrigerator	TV
F1	870		80	169		
F2	1125	536			470	
F3		570	96	235		120
F4	781		72		160	113
F5		319		144	152	145

(Note:- All values given in the above table must be integers only.)

The additional information is as follows:-

- (i) Total power consumption by these families altogether for that month was 10,000 units.
- (ii) Power consumed by any family is represented by P(F). And P(F1) : P(F2) = 2 : 3, P(F2) : P(F3) = 54 : 47, P(F3) : P(F4) = 235 : 163 and P(F4) : P(F5) = 163 : 152.
- (iii) Power consumed by AC, fan, bulb, washing machine, refrigerator and TV for all five families taken together were 4398 units, 2202 units, 491 units, 954 units, 1310 units and 645 units respectively.
- (iv) The electricity board charges the bill at Rs. 3/unit for first 200 units and thereafter, Rs. 5/unit. Each family gets electricity bill for each appliance separately and has to pay the bill equal to the sum of the bills for each appliances used by them.
- (v) The sum of P(F5) for AC and P(F3) for refrigerator was 971 units. The bill paid by F4 for fan and washing machine together was Rs. 1,868.

**Q.56**

**Total bill paid for bulbs by all the five families taken together was less than that paid for TV by F1, F2, F3 and F5 taken together by**

1  **7.70%**

2  **7.50%**

3  **6.98%**

4  **6.89%**

**Solution:**

**Correct Answer : 1**

 **Bookmark**

 **Answer key/Solution**

Appliances \ Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	c	80	169	i	k	1800
F2	1125	536	e	g	470	l	2700
F3	a	570	96	235	j	120	2350
F4	781	d	72	h	160	113	1630
F5	b	319	f	144	152	145	1520
Total	4398	2202	491	954	1310	645	10000

From statement II,  $P(F1) : P(F2) : P(F3) : P(F4) : P(F5) = 180 : 270 : 235 : 163 : 152$

As per the question:

$$\Rightarrow 180x + 270x + 235x + 163x + 152x = 10,000$$

$$\Rightarrow 1000x = 10,000 \Rightarrow x = 10$$

$$\therefore P(F1) = 1800 \text{ units}$$

$$P(F2) = 2700 \text{ units}$$

$$P(F3) = 2350 \text{ units}$$

$$P(F4) = 1630 \text{ units}$$

$$P(F5) = 1520 \text{ units}$$

Let the blank spaces in the above table is filled by a, b, c, ... k and l

From the above table, we have,

$$a + b = 4398 - (870 + 1125 + 781) = 4398 - 2776 = 1622 \quad \dots (\text{i})$$

$$a + j = 2350 - (570 + 96 + 235 + 120) = 2350 - 1021 = 1329 \quad \dots (\text{ii})$$

From equation (i) and (ii),

$$(a + b) - (a + j) = 1622 - 1329 = 293$$

$$\Rightarrow b - j = 293 \quad \dots (\text{iii})$$

From statement (v), we have

$$b + j = 971 \quad \dots (\text{iv})$$

From equation (iii) and (iv) on adding equation (iii) and (iv), we get

$$b - j + b + j = 293 + 971$$

$$\Rightarrow 2b = 1264$$

$$\Rightarrow b = 632 \text{ and } j = 971 - 632 = 339$$

Also,  $a = 1622 - 632 = 990$  and  $f = 1520 - (b + 319 + 144 + 152 + 145) = 1520 - (632 + 319 + 144 + 152 + 145) = 1520 - 1392 = 128$ .

$$i = 1310 - (470 + j + 160 + 152) = 1310 - 782 - 339 = 189.$$

Similarly; we can get  $e = 491 - (80 + 96 + 72 + 128) = 115$ .

From statement (iv); bill rate is Rs. 3/unit upto 200 units. and Rs. 5 for above from 200 units.

From statement (v); bill paid by F4 for fan and washing machine together is Rs. 1868.

**Case I:** If both d and h are less than or equal to 200 units, maximum bills may be  $Rs. 200 \times 3 + 200 \times 3 = Rs. 1,250$  which is not our case.

**Case II:** Let  $h > 200$  and  $d > 200$

$$\text{then; bills} = [200 \times 3 + 5(h - 200)] + [200 \times 3 + 5(d - 200)] = 1200 - 2000 + 5(d + h)$$

We can observe that in this case, bills must be a multiple of 5. But, bills as per statement v is Rs. 1,868. So, case cannot possible.

**Case III:** Let  $h > 200$  and  $d < 200$

In this case, you will find that power consumption does not satisfy the data given in the question.

So, we conclude that  $d > 200$  and  $h < 200$

So, we conclude that  $d = 200$  and  $h = 200$

$$\text{bills} = 600 + 5(d - 200) + 3h = 1868$$

$$\Rightarrow 3h + 5d = 1868 - 600 + 1000 = 2268$$

and from table; we have  $h + d = 1630 - (781 + 72 + 160 + 113) = 1630 - 1126 = 504$ .

From above two equations, we get  $d = 378$  and  $h = 126$

We can also find that;  $c = 2202 - (536 + 570 + 378 + 319) = 2202 - 1803 = 399$ .

Similarly;  $g = 280$ ,  $k = 93$  &  $l = 174$

Now, we can make complete table for power consumption as well as for bills:-

Power consumption:

Appliances Family \ Appliances	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
Family							
F1	870	399	80	169	189	93	1800
F2	1125	536	115	280	470	174	2700
F3	990	570	96	235	339	120	2350
F4	781	378	72	126	160	113	1630
F5	632	319	128	144	152	145	1520

Bills:-Calculated as per rate given in the instruction.

Appliances Family \ Appliances	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
Family							
F1	3950	1595	240	507	567	279	7138
F2	5225	2280	345	1000	1950	522	11322
F3	4550	2450	288	775	1295	360	9718
F4	3505	1490	216	378	480	339	6408
F5	2760	1195	384	432	456	435	5662
Total	19990	9010	1473	3092	4748	1935	40248

$$\text{Required percentage} = \left[ \frac{(279 + 522 + 360 + 435) - 1473}{279 + 522 + 360 + 345} \right] \times 100 = \frac{(1596 - 1473)}{1596} \times 100 = 7.71\%.$$

FeedBack

**Directions for questions 55 to 58: Answer the questions on the basis of the information given below.**

The table given below depicts the partial information about the electric power consumption (in units) by six home appliances – Air conditioner (AC), Fan, Bulb, Washing Machine, Refrigerator and TV – used by five families – F1, F2, F3, F4 and F5 – in a particular month.

Appliances Family \	AC	Fan	Bulb	Washing Machine	Refrigerator	TV
Family						
F1	870		80	169		
F2	1125	536			470	
F3		570	96	235		120
F4	781		72		160	113
F5		319		144	152	145

(Note:- All values given in the above table must be integers only.)

The additional information is as follows:-

- (i) Total power consumption by these families altogether for that month was 10,000 units.
- (ii) Power consumed by any family is represented by P(F). And  $P(F1) : P(F2) = 2 : 3$ ,  $P(F2) : P(F3) = 54 : 47$ ,  $P(F3) : P(F4) = 235 : 163$  and  $P(F4) : P(F5) = 163 : 152$ .
- (iii) Power consumed by AC, fan, bulb, washing machine, refrigerator and TV for all five families taken together were 4398 units, 2202 units, 491 units, 954 units, 1310 units and 645 units respectively.
- (iv) The electricity board charges the bill at Rs. 3/unit for first 200 units and thereafter, Rs. 5/unit. Each family gets electricity bill for each appliance separately and has to pay the bill equal to the sum of the bills for each appliances used by them.
- (v) The sum of  $P(F5)$  for AC and  $P(F3)$  for refrigerator was 971 units. The bill paid by F4 for fan and washing machine together was Rs. 1,868.

### Q.57

Due to some technical error in billing system, the bill for each family was calculated for all the appliances together, but with the same rate as per actual. Which family would have to pay minimum additional amount?

1  F1

2  F3

3  F4

4  F5

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	c	80	169	i	k	1800
F2	1125	536	e	g	470	l	2700
F3	a	570	96	235	j	120	2350
F4	781	d	72	h	160	113	1630
F5	b	319	f	144	152	145	1520
Total	4398	2202	491	954	1310	645	10000

From statement II,  $P(F1) : P(F2) : P(F3) : P(F4) : P(F5) = 180 : 270 : 235 : 163 : 152$

As per the question:

$$\Rightarrow 180x + 270x + 235x + 163x + 152x = 10,000$$

$$\Rightarrow 1000x = 10,000 \Rightarrow x = 10$$

$$\therefore P(F1) = 1800 \text{ units}$$

$$P(F2) = 2700 \text{ units}$$

$$P(F3) = 2350 \text{ units}$$

$$P(F4) = 1630 \text{ units}$$

$$P(F5) = 1520 \text{ units}$$

Let the blank spaces in the above table is filled by a, b, c, ... k and l

From the above table, we have,

$$a + b = 4398 - (870 + 1125 + 781) = 4398 - 2776 = 1622 \quad \dots (i)$$

$$a + j = 2350 - (570 + 96 + 235 + 120) = 2350 - 1021 = 1329 \quad \dots (ii)$$

From equation (i) and (ii),

$$(a + b) - (a + j) = 1622 - 1329 = 293$$

$$\Rightarrow b - j = 293 \quad \dots (iii)$$

From statement (v), we have

$$b + j = 971 \quad \dots (iv)$$

From equation (iii) and (iv) on adding equation (iii) and (iv), we get

$$b - j + b + j = 293 + 971$$

$$\Rightarrow 2b = 1264$$

$$\Rightarrow b = 632 \text{ and } j = 971 - 632 = 339$$

$$\text{Also, } a = 1622 - 632 = 990 \text{ and } f = 1520 - (b + 319 + 144 + 152 + 145) = 1520 - (632 + 319 + 144 + 152 + 145) = 1520 - 1392 = 128.$$

$$i = 1310 - (470 + j + 160 + 152) = 1310 - 782 - 339 = 189.$$

$$\text{Similarly; we can get } e = 491 - (80 + 96 + 72 + 128) = 115.$$

From statement (iv); bill rate is Rs. 3/unit upto 200 units. and Rs. 5 for above from 200 units.

From statement (v); bill paid by F4 for fan and washing machine together is Rs. 1868.

**Case I:** If both d and h are less than or equal to 200 units, maximum bills may be  $Rs. 200 \times 3 + 200 \times 3 = Rs. 1,250$  which is not our case.

**Case II:** Let  $h > 200$  and  $d > 200$

$$\text{then; bills} = [200 \times 3 + 5(h - 200)] + [200 \times 3 + 5(d - 200)] = 1200 - 2000 + 5(d + h)$$

We can observe that in this case, bills must be a multiple of 5. But, bills as per statement v is Rs. 1,868. So, case cannot possible.

**Case III:** Let  $h > 200$  and  $d < 200$

In this case, you will find that power consumption does not satisfy the data given in the question.

So, we conclude that  $d > 200$  and  $h < 200$

$$\text{bills} = 600 + 5(d - 200) + 3h = 1868$$

$$\Rightarrow 3h + 5d = 1868 - 600 + 1000 = 2268$$

$$\text{and from table; we have } h + d = 1630 - (781 + 72 + 160 + 113) = 1630 - 1126 = 504.$$

$$\text{From above two equations, we get } d = 378 \text{ and } h = 126$$

$$\text{We can also find that; } c = 2202 - (536 + 570 + 378 + 319) = 2202 - 1803 = 399.$$

$$\text{Similarly; } g = 280, k = 93 \& l = 174$$

Now, we can make complete table for power consumption as well as for bills:-

Power consumption:

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	399	80	169	189	93	1800
F2	1125	536	115	280	470	174	2700
F3	990	570	96	235	339	120	2350
F4	781	378	72	126	160	113	1630
F5	632	319	128	144	152	145	1520

Bills:-Calculated as per rate given in the instruction.

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	3950	1595	240	507	567	279	7138
F2	5225	2280	345	1000	1950	522	11322
F3	4550	2450	288	775	1295	360	9718
F4	3505	1490	216	378	480	339	6408
F5	2760	1195	384	432	456	435	5662
Total	19990	9010	1473	3092	4748	1935	40248

Due to technical error bills for

$$F1 = (200 \times 3) + 5(1800 - 200) = \text{Rs. } 8,600$$

$$F2 = 600 + 5 \times 2500 = \text{Rs. } 13,100$$

$$F3 = 600 + 5 \times 2150 = \text{Rs. } 11,350$$

$$F4 = 600 + 5 \times 1430 = \text{Rs. } 7,750$$

$$F5 = 600 + 5 \times 1320 = \text{Rs. } 7,200$$

$$\text{Additional amount for F1} = 8600 - 7138 = \text{Rs. } 1,462$$

$$\text{Additional amount for F2} = 13100 - 11322 = \text{Rs. } 1,778$$

$$\text{Additional amount for F3} = 11350 - 9718 = \text{Rs. } 1,630$$

$$\text{Additional amount for F4} = 7750 - 6408 = \text{Rs. } 1,342$$

$$\text{Additional amount for F5} = 7200 - 5662 = \text{Rs. } 1,538$$

Clearly, we can observe that the additional amount is minimum for F4.

FeedBack

**Directions for questions 55 to 58: Answer the questions on the basis of the information given below.**

The table given below depicts the partial information about the electric power consumption (in units) by six home appliances – Air conditioner (AC), Fan, Bulb, Washing Machine, Refrigerator and TV – used by five families – F1, F2, F3, F4 and F5 – in a particular month.

Appliances Family \ Appliances	AC	Fan	Bulb	Washing Machine	Refrigerator	TV
Family						
F1	870		80	169		
F2	1125	536			470	
F3		570	96	235		120
F4	781		72		160	113
F5		319		144	152	145

(Note:- All values given in the above table must be integers only.)

The additional information is as follows:-

- (i) Total power consumption by these families altogether for that month was 10,000 units.
- (ii) Power consumed by any family is represented by P(F). And  $P(F1) : P(F2) = 2 : 3$ ,  $P(F2) : P(F3) = 54 : 47$ ,  $P(F3) : P(F4) = 235 : 163$  and  $P(F4) : P(F5) = 163 : 152$ .
- (iii) Power consumed by AC, fan, bulb, washing machine, refrigerator and TV for all five families taken together were 4398 units, 2202 units, 491 units, 954 units, 1310 units and 645 units respectively.
- (iv) The electricity board charges the bill at Rs. 3/unit for first 200 units and thereafter, Rs. 5/unit. Each family gets electricity bill for each appliance separately and has to pay the bill equal to the sum of the bills for each appliances used by them.
- (v) The sum of  $P(F5)$  for AC and  $P(F3)$  for refrigerator was 971 units. The bill paid by F4 for fan and washing machine together was Rs. 1,868.

### Q.58

What was the average value of bills paid per unit by all families together for all appliances?

- 1  Rs. 3.75
- 2  Rs. 3.25
- 3  Rs. 4.00
- 4  Rs. 4.25

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**

Appliances	AC	Fan	Bulb	Washin	Refrigerator	TV	Total

Family	AC	Fan	Bulb	Machine	Refrigerator	TV	Total
F1	870	c	80	169	i	k	1800
F2	1125	536	e	g	470	l	2700
F3	a	570	96	235	j	120	2350
F4	781	d	72	h	160	113	1630
F5	b	319	f	144	152	145	1520
Total	4398	2202	491	954	1310	645	10000

From statement II,  $P(F1) : P(F2) : P(F3) : P(F4) : P(F5) = 180 : 270 : 235 : 163 : 152$

As per the question:

$$\Rightarrow 180x + 270x + 235x + 163x + 152x = 10,000$$

$$\Rightarrow 1000x = 10,000 \Rightarrow x = 10$$

$$\therefore P(F1) = 1800 \text{ units}$$

$$P(F2) = 2700 \text{ units}$$

$$P(F3) = 2350 \text{ units}$$

$$P(F4) = 1630 \text{ units}$$

$$P(F5) = 1520 \text{ units}$$

Let the blank spaces in the above table is filled by a, b, c, ... k and l

From the above table, we have,

$$a + b = 4398 - (870 + 1125 + 781) = 4398 - 2776 = 1622 \quad \dots (i)$$

$$a + j = 2350 - (570 + 96 + 235 + 120) = 2350 - 1021 = 1329 \quad \dots (ii)$$

From equation (i) and (ii),

$$(a + b) - (a + j) = 1622 - 1329 = 293$$

$$\Rightarrow b - j = 293 \quad \dots (iii)$$

From statement (v), we have

$$b + j = 971 \quad \dots (iv)$$

From equation (iii) and (iv) on adding equation (iii) and (iv), we get

$$b - j + b + j = 293 + 971$$

$$\Rightarrow 2b = 1264$$

$$\Rightarrow b = 632 \text{ and } j = 971 - 632 = 339$$

Also,  $a = 1622 - 632 = 990$  and  $f = 1520 - (b + 319 + 144 + 152 + 145) = 1520 - (632 + 319 + 144 + 152 + 145)$

$$= 1520 - 1392 = 128.$$

$$i = 1310 - (470 + j + 160 + 152) = 1310 - 782 - 339 = 189.$$

Similarly; we can get  $e = 491 - (80 + 96 + 72 + 128) = 115$ .

From statement (iv); bill rate is Rs. 3/unit upto 200 units. and Rs. 5 for above from 200 units.

From statement (v); bill paid by F4 for fan and washing machine together is Rs. 1868.

**Case I:** If both d and h are less than or equal to 200 units, maximum bills may be  $Rs. 200 \times 3 + 200 \times 3 = Rs. 1,250$  which is not our case.

**Case II:** Let  $h > 200$  and  $d > 200$

$$\text{then; bills} = [200 \times 3 + 5(h - 200)] + [200 \times 3 + 5(d - 200)] = 1200 - 2000 + 5(d + h)$$

We can observe that in this case, bills must be a multiple of 5. But, bills as per statement v is Rs. 1,868. So, case cannot possible.

**Case III:** Let  $h > 200$  and  $d < 200$

In this case, you will find that power consumption does not satisfy the data given in the question.

So, we conclude that  $d > 200$  and  $h < 200$

$$\text{bills} = 600 + 5(d - 200) + 3h = 1868$$

$$\Rightarrow 3h + 5d = 1868 - 600 + 1000 = 2268$$

and from table; we have  $h + d = 1630 - (781 + 72 + 160 + 113) = 1630 - 1126 = 504$ .

From above two equations, we get  $d = 378$  and  $h = 126$

$$\text{We can also find that; } c = 2202 - (536 + 570 + 378 + 319) = 2202 - 1803 = 399.$$

$$\text{Similarly; } g = 280, k = 93 \& l = 174$$

Now, we can make complete table for power consumption as well as for bills:-

Power consumption:

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total
F1	870	399	80	169	189	93	1800
F2	1125	536	115	280	470	174	2700
F3	990	570	96	235	339	120	2350
F4	781	378	72	126	160	113	1630
F5	632	319	128	144	152	145	1520

Bills:-Calculated as per rate given in the instruction.

Appliances Family	AC	Fan	Bulb	Washin Machine	Refrigerator	TV	Total

F1	3950	1595	240	507	567	279	7138
F2	5225	2280	345	1000	1950	522	11322
F3	4550	2450	288	775	1295	360	9718
F4	3505	1490	216	378	480	339	6408
F5	2760	1195	384	432	456	435	5662
Total	19990	9010	1473	3092	4748	1935	40248

$$\text{Average value} = \frac{40248}{10000} \approx 4.02.$$

FeedBack

**Directions for questions 59 to 62:** Answer the questions on the basis of the information given below.

An organisation named HobbyLobby received a large order for handicraft items from the two companies – Sun Empires and Shiksha International – as a gift for their employees.

HobbyLobby has two cutters who will cut the wood, five tailors who will do the stitching, and two assistants to decorate the wood and do the pasting. Each of these 9 people works for 10 hours in a day (though their working hours may not be the same). Each of the handicrafts of Sun Empires requires 20 minutes for cutting the wood, 1 hour for stitching, and 15 minutes for decorating the wood and pasting, whereas each handicraft of Shiksha International requires 30 minutes, 1 hour, and 30 minutes respectively for these activities.

Following steps are followed, to complete the work:

Step I: Cutter will cut the wood.

Step II: Tailor will do the stitching.

Step III: Assistant will decorate the wood and do the pasting.

### Q.59

Find the maximum number of handicrafts of Sun Empires that HobbyLobby can complete in a day.

1  50

2  20

3  40

4  60



**Solution:****Correct Answer : 1****Your Answer : 1****Bookmark****Answer key/Solution**

Number of cutters : 2

Number of tailors : 5

Number of assistants : 2

Number of hours of work for each : 10

Number of man hours available in a day :-

Cutters :  $2 \times 10 = 20$

Tailors :  $5 \times 10 = 50$

Assistants :  $2 \times 10 = 20$

When all ten hours are devoted to handicrafts of sun empires (for maximum number) -

Number of handicrafts which can be cut by 2 cutters in a day =  $20 + \frac{1}{3} = 60$  (@ 1 per 20 min)

Number of handicrafts which can be stitched by 5 tailors in a day =  $50 + 1 = 50$  (@ 1 per hr.)

Number of handicrafts for which decoration of wood and pasting can be done by 2 assistants =  $20 + \frac{1}{4} = 80$  (@ 1 per 15 min.)

From the data it is clear that maximum number of sun empire handicrafts that can be completed in a day = 50.

**FeedBack**

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

An organisation named HobbyLobby received a large order for handicraft items from the two companies – Sun Empires and Shiksha International – as a gift for their employees.

HobbyLobby has two cutters who will cut the wood, five tailors who will do the stitching, and two assistants to decorate the wood and do the pasting. Each of these 9 people works for 10 hours in a day (though their working hours may not be the same). Each of the handicrafts of Sun empires requires 20 minutes for cutting the wood, 1 hour for stitching, and 15 minutes for decorating the wood and pasting, whereas each handicraft of Shiksha International requires 30 minutes, 1 hour, and 30 minutes respectively for these activities.

Following steps are followed, to complete the work:

**Step I: Cutter will cut the wood.**

**Step II: Tailor will do the stitching.**

**Step III: Assistant will decorate the wood and do the pasting.**

**Q.60**

On a particular day, HobbyLobby decided to complete 20 handicrafts of Shiksha International. How many handicrafts of Sun Empires can it complete on that day?

**Solution:****Correct Answer : 30** **Bookmark** **Answer key/Solution**

For completing 20 Shiksha International handicrafts, man-hours required of each category of employee :-

Cutters : 10, tailors : 20, assistant : 10

Man-hours available after completing 20 Shiksha interview handicrafts :-

Cutters 10, tailors 30, assistants 10.

Number of Sun empire handicrafts that can be handled within the man hours available after completing 20 Shiksha International handicrafts :-

$$\text{Cutters : } 10 \div \frac{1}{3} = 30 \quad \text{Tailors : } 30 \div 1 = 30$$

$$\text{Assistant : } 10 \div \frac{1}{4} = 40$$

From the above it is obvious that 30 Sun empire handicrafts can be completed.

**FeedBack**

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

An organisation named HobbyLobby received a large order for handicraft items from the two companies – Sun Empires and Shiksha International – as a gift for their employees.

HobbyLobby has two cutters who will cut the wood, five tailors who will do the stitching, and two assistants to decorate the wood and do the pasting. Each of these 9 people works for 10 hours in a day (though their working hours may not be the same). Each of the handicrafts of Sun empires requires 20 minutes for cutting the wood, 1 hour for stitching, and 15 minutes for decorating the wood and pasting, whereas each handicraft of Shiksha International requires 30 minutes, 1 hour, and 30 minutes respectively for these activities.

Following steps are followed, to complete the work:

**Step I: Cutter will cut the wood.**

**Step II: Tailor will do the stitching.**

**Step III: Assistant will decorate the wood and do the pasting.**

### Q.61

If HobbyLobby decides to complete 30 handicrafts of Shiksha International only and no other handicraft on a particular day, then how many total man-hours will remain un-utilized?  
(Man-hours for a task = number of men who can do the task × number of hours for task)

1  20

2  30

3  5

4  25

**X****Solution:****Correct Answer : 2****Your Answer : 3**

Man hours required to complete 30 Shiksha international handicrafts :-

$$\text{Cutters} : 30 \times \frac{1}{2} = 15$$

$$\text{Tailors} : 30 \times 1 = 30$$

$$\text{Assistants} : 30 \times \frac{1}{2} = 15$$

Man hours that will be idle :-

$$\text{Cutters} : 20 - 15 = 5$$

$$\text{Tailors} : 50 - 30 = 20$$

$$\text{Assistants} : 20 - 15 = 5$$

$$\text{Total} = 30.$$

**Bookmark****Answer key/Solution****FeedBack**

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

An organisation named HobbyLobby received a large order for handicraft items from the two companies – Sun Empires and Shiksha International – as a gift for their employees.

HobbyLobby has two cutters who will cut the wood, five tailors who will do the stitching, and two assistants to decorate the wood and do the pasting. Each of these 9 people works for 10 hours in a day (though their working hours may not be the same). Each of the handicrafts of Sun empires requires 20 minutes for cutting the wood, 1 hour for stitching, and 15 minutes for decorating the wood and pasting, whereas each handicraft of Shiksha International requires 30 minutes, 1 hour, and 30 minutes respectively for these activities.

Following steps are followed, to complete the work:

**Step I: Cutter will cut the wood.**

**Step II: Tailor will do the stitching.**

**Step III: Assistant will decorate the wood and do the pasting.**

**Q.62**

**What is the maximum total number of handicrafts HobbyLobby can complete in a day, if he has to deliver at least 15 handicrafts to both the companies every day?**

1  **80**2  **40**3  **60**4  **50**

**Solution:****Correct Answer : 4****Your Answer : 3****Bookmark****Answer key/Solution**

Obviously Shiksha International handicrafts take more time to complete. To finish 15 handicrafts of Shiksha International following are man hours required by each category of the employee

Cutters - 7.5, Tailors - 15, Assistants 7.5

Man hours available after completing 15 Shiksha International handicrafts :-

Cutters - 12.5, Tailors - 35, Assistants - 12.5

Number of Sun empires handicrafts that can be made within the man hours available after completing 15 Shiksha International handicrafts:-

$$\text{Cutters} - 12.5 + \frac{1}{3} = 37.5 \quad \text{Tailors} - 35 + 1 = 35$$

$$\text{Assistants} - 12.5 + \frac{1}{4} = 50$$

Obviously only 35 sun empire handicrafts can be made. So total no. of handicrafts in this case which can be completed is  $(15 + 35) = 50$ . It can be seen that maximum total number of handicrafts that can be completed is 50 only. It can be achieved if the numbers of Shiksha International handicrafts are from 0 to 20. If Shiksha International handicrafts are more than 20, then total number of handicrafts will be reduced.

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

Twelve friends – Ankit, Bimal, Chetan, Devendra, Emly, Faizan, Ghanshyam, Harish, Ishan, Jayant, Kamal and Lalit – live in four cities among Delhi, Mumbai, Lucknow and Chennai, and at least ten friends among them like any political party among VJP, BNC, TMP and VP. Any two friends who like VJP and BNC cannot live in the same city. Ghanshyam and Ishan live in a same city and no other friend lives in that city. Only two friends among Ankit, Devendra, Harish and Lalit live in the same city i.e., Delhi. At least one friend who likes TMP live(s) in each of the four cities. The party which is liked by maximum number of friends is VJP. Each political party is liked by at least one friend. If Bimal likes any political party, then that party is liked by both Bimal and Kamal but that party can't be VJP. A friend, who lives in Mumbai, likes BNC and exactly two other friends also live in that city. Delhi is the most diversified city in terms of politics i.e., friends liking maximum possible number of parties live in this city. Bimal and Kamal live in the same city.

**Q.63****Maximum number of friends that can live in Chennai is**1  32  43  5

4  6**Solution:****Correct Answer : 2** **Bookmark** **Answer key/Solution**

It is mentioned that at least one friend likes TMP in each of the city and VJP is liked by maximum number of friends, so at least 5 friends must like VJP.

Delhi has the most diversified political party liking, and two friends liking VJP and BNC can not live in the same city, therefore 3 different political parties must be liked by friends in Delhi. Mumbai has 3 friends, one of which likes BNC and other one likes TMP. Third friend could like either of them or none.

Ghanshyam and Ishan live in the same city and no other friend lives in that city-which can be either Lucknow or Chennai. Any two out Ankit, Devendra, Harish and Lalit live in Delhi and rest two live in different cities.

From these, condition, we can build cases as per the question:

To find maximum number of friends in Chennai, we need to minimize the number of friends in other cities. Delhi has 3 friends; Mumbai has 3 friends and 2 friends live in Lucknow. A total of 4 friends can live in Chennai.

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

**Twelve friends – Ankit, Bimal, Chetan, Devendra, Emly, Faizan, Ghanshyam, Harish, Ishan, Jayant, Kamal and Lalit – live in four cities among Delhi, Mumbai, Lucknow and Chennai, and at least ten friends among them like any political party among VJP, BNC, TMP and VP. Any two friends who like VJP and BNC cannot live in the same city. Ghanshyam and Ishan live in a same city and no other friend lives in that city. Only two friends among Ankit, Devendra, Harish and Lalit live in the same city i.e., Delhi. At least one friend who likes TMP live(s) in each of the four cities. The party which is liked by maximum number of friends is VJP. Each political party is liked by at least one friend. If Bimal likes any political party, then that party is liked by both Bimal and Kamal but that party can't be VJP. A friend, who lives in Mumbai, likes BNC and exactly two other friends also live in that city. Delhi is the most diversified city in terms of politics i.e., friends liking maximum possible number of parties live in this city. Bimal and Kamal live in the same city.**

**Q.64**

**If number of friends living in Chennai is more than that living in Delhi, then how many friend/s from Chennai support VJP?**

1  22  33  44  1

**Solution:****Correct Answer : 2****Bookmark****Answer key/Solution**

It is mentioned that at least one friend likes TMP in each of the city and VJP is liked by maximum number of friends, so at least 5 friends must like VJP.

Delhi has the most diversified political party liking, and two friends liking VJP and BNC can not live in the same city, therefore 3 different political parties must be liked by friends in Delhi. Mumbai has 3 friends, one of which likes BNC and other one likes TMP. Third friend could like either of them or none.

Ghanshyam and Ishan live in the same city and no other friend lives in that city-which can be either Lucknow or Chennai. Any two out Ankit, Devendra, Harish and Lalit live in Delhi and rest two live in different cities.

From these, condition, we can build cases as per the question:

If more people live in Chennai, than Delhi, then according to the case in previous question, 3 friends from Chennai like VJP.

	Delhi	Mumbai	Lucknow	Chennai
VJP	II		II	III III III
BNC		II		
TMP	II	II	II	II
VP	II			
	Three friends live in Mumbai,	Ghanshyam and Ishan live in Lucknow		3 friends from Chennai like VJP

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

Twelve friends – Ankit, Bimal, Chetan, Devendra, Emly, Faizan, Ghanshyam, Harish, Ishan, Jayant, Kamal and Lalit – live in four cities among Delhi, Mumbai, Lucknow and Chennai, and at least ten friends among them like any political party among VJP, BNC, TMP and VP. Any two friends who like VJP and BNC cannot live in the same city. Ghanshyam and Ishan live in a same city and no other friend lives in that city. Only two friends among Ankit, Devendra, Harish and Lalit live in the same city i.e., Delhi. At least one friend who likes TMP live(s) in each of the four cities. The party which is liked by maximum number of friends is VJP. Each political party is liked by at least one friend. If Bimal likes any political party, then that party is liked by both Bimal and Kamal but that party can't be VJP. A friend, who lives in Mumbai, likes BNC and exactly two other friends also live in that city. Delhi is the most diversified city in terms of politics i.e., friends liking maximum possible number of parties live in this city. Bimal and Kamal live in the same city.

**Q.65****Bimal lives in**1  **Chennai**2  **Lucknow**3  **Mumbai**

## 4 ● Delhi

**Solution:****Correct Answer : 3****Bookmark****Answer key/Solution**

It is mentioned that at least one friend likes TMP in each of the city and VJP is liked by maximum number of friends, so at least 5 friends must like VJP.

Delhi has the most diversified political party liking, and two friends liking VJP and BNC can not live in the same city, therefore 3 different political parties must be liked by friends in Delhi. Mumbai has 3 friends, one of which likes BNC and other one likes TMP. Third friend could like either of them or none.

Ghanshyam and Ishan live in the same city and no other friend lives in that city-which can be either Lucknow or Chennai. Any two out Ankit, Devendra, Harish and Lalit live in Delhi and rest two live in different cities.

From these, condition, we can build cases as per the question:

It is given that Bimal and Kamal live in same city and like the same party, which is not VJP. They cannot live in Delhi, because otherwise VJP will not have maximum supporters. They can also not live in the city where Ishan and Ghanshyam live-Lucknow or Chennai. And they can live in Mumbai because one friend likes TMP and there is no condition on friend liking VJP or not. Bimal might like BNC or TMP and will definitely stay in Mumbai.

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

**Twelve friends – Ankit, Bimal, Chetan, Devendra, Emly, Faizan, Ghanshyam, Harish, Ishan, Jayant, Kamal and Lalit – live in four cities among Delhi, Mumbai, Lucknow and Chennai, and at least ten friends among them like any political party among VJP, BNC, TMP and VP. Any two friends who like VJP and BNC cannot live in the same city. Ghanshyam and Ishan live in a same city and no other friend lives in that city. Only two friends among Ankit, Devendra, Harish and Lalit live in the same city i.e., Delhi. At least one friend who likes TMP live(s) in each of the four cities. The party which is liked by maximum number of friends is VJP. Each political party is liked by at least one friend. If Bimal likes any political party, then that party is liked by both Bimal and Kamal but that party can't be VJP. A friend, who lives in Mumbai, likes BNC and exactly two other friends also live in that city. Delhi is the most diversified city in terms of politics i.e., friends liking maximum possible number of parties live in this city. Bimal and Kamal live in the same city.**

**Q.66****Maximum number of friends that can live in Delhi is**

**Solution:****Correct Answer : 6** **Bookmark** **Answer key/Solution**

It is mentioned that at least one friend likes TMP in each of the city and VJP is liked by maximum number of friends, so at least 5 friends must like VJP.

Delhi has the most diversified political party liking, and two friends liking VJP and BNC can not live in the same city, therefore 3 different political parties must be liked by friends in Delhi. Mumbai has 3 friends, one of which likes BNC and other one likes TMP. Third friend could like either of them or none.

Ghanshyam and Ishan live in the same city and no other friend lives in that city-which can be either Lucknow or Chennai. Any two out Ankit, Devendra, Harish and Lalit live in Delhi and rest two live in different cities.

From these, condition, we can build cases as per the question:

To maximum the number of friends that live in Delhi, minimize the friends that live elsewhere.

3 friends live in Mumbai ; 2 friends (Ishan and Ghanshyam) like in Lucknow or Chennai. In the remaining city : Chennai or Lucknow there must be one friend who likes TMP. In total 6 friends must live in three other cities. Therefore, 6 friends can live in Delhi at max. Here is one of the possible combination:

	Delhi	Mumbai	Lucknow	Chennai
VJP	Ankit + Dev + Chetan + Emily		Ghanshyam / Ishan	
BNC		Bimal + Kamal		
TMP	Jayant	Harish	Ishan/Ghanshyam	Lalit
VP	Faizan			

**FeedBack****Sec 3****Q.67**

Ravi, Rohit and Chetan scored 45%, 70% and 50% of maximum marks respectively in subject A and 55%, 85% and 70% of maximum marks respectively in subject B. Had Ravi scored 40 more marks in subject A, his score in subject A would have been equal to his score in subject B. If Chetan scored 60 marks less in subject A as compared to his marks in subject B, then what is the sum of maximum marks of both the subjects?



**Solution:****Correct Answer : 300****Your Answer : 300**

Let the maximum marks in subject A and B be  $100x$  and  $100y$  respectively.

$\therefore$  Marks of Ravi, Rohit and Chetan in these two subjects will be

	Ravi	Rohit	Chetan
Subject A	$45x$	$70x$	$50x$
Subject B	$55y$	$85y$	$70y$

Now according to the question,

$$45x + 40 = 55y$$

$$\text{or } 9x + 8 = 11y \quad \dots(\text{i})$$

$$\text{and } 70y - 60 = 50x$$

$$\text{or } 7y - 6 = 5x \quad \dots(\text{ii})$$

Solving both equations (i) and (ii), we get,  $x = \frac{5}{4}$  and  $y = \frac{7}{4}$ .

$\therefore$  Sum of maximum marks of both the subjects is  $100(x + y) = 100\left(\frac{5}{4} + \frac{7}{4}\right) = 300$ .

**FeedBack**

**Q.68**

A boy in a boat went downstream for 32 km and returned immediately. While returning, it took him five times as long as he took while going downstream. If the velocity of the stream was reduced to half, then the total time taken while going upstream and downstream would be 480 minutes. Find the speed of the boat in still water and velocity of stream respectively.

1  9 km/hr, 6 km/hr

2  3 km/hr, 6 km/hr

3  6 km/hr, 9 km/hr

4  6 km/hr, 3 km/hr



**Solution:****Correct Answer : 1****Your Answer : 1**

Let the velocity of the boat and the stream be  $u$  km/hr and  $v$  km/hr respectively  
 $\therefore$  According to the question,

$$\frac{32}{u-v} = 5 \left( \frac{32}{u+v} \right)$$

$$\Rightarrow u+v = 5u - 5v$$

$$\Rightarrow 2u = 3v \quad \dots(i)$$

$$\text{And, } \frac{32}{u+\frac{v}{2}} + \frac{32}{u-\frac{v}{2}} = \frac{480}{60}$$

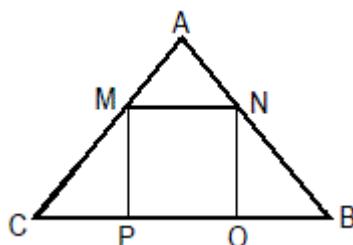
$$\Rightarrow \frac{8}{2u+v} + \frac{8}{2u-v} = 1 \quad \dots(ii)$$

Putting the value of  $2u$  from equation (i) in equation (ii), we get

$$\frac{1}{4v} + \frac{1}{2v} = \frac{1}{8} \Rightarrow v = 6 \text{ km/hr and } u = 9 \text{ km/hr.}$$

 **Bookmark**
 **Answer key/Solution**
FeedBack
**Q.69**

In the figure given below, MNOP is a square inscribed in the triangle ABC such that the base OP of the square lies on the side BC. If AB = 20 cm, BC = 25 cm and AC = 15 cm, then find the length (in cm) of the side of the square.

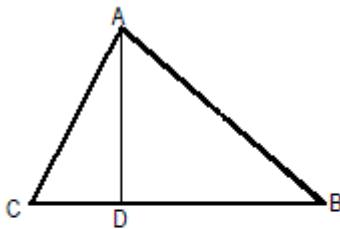


1   $8\frac{4}{37}$

2   $4\frac{14}{29}$

3  5

4  7

**Solution:****Correct Answer : 1****Bookmark****Answer key/Solution**Let  $CD = y$ 

$$\text{Now, } AD^2 = AC^2 - CD^2 = AB^2 - DB^2$$

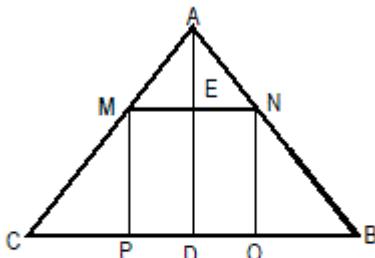
$$\Rightarrow 15^2 - y^2 = 20^2 - (25 - y)^2$$

$$\Rightarrow (25 - y)^2 - y^2 = 20^2 - 15^2$$

$$\Rightarrow (25 - 2y)(25) = 5(35)$$

$$\Rightarrow 25 - 2y = 7 \Rightarrow y = 9$$

$$\therefore AD = \sqrt{AC^2 - CD^2} = \sqrt{15^2 - 9^2} = 12$$

Let the measure of the side of the square be  $x$ .Now, using the similarity of triangles  $\triangle AMN$  and  $\triangle ACB$ ,

$$\text{we have, } \frac{AE}{AD} = \frac{MN}{CB} \Rightarrow \frac{12-x}{12} = \frac{x}{25} \Rightarrow 300 - 25x = 12x \Rightarrow x = \frac{300}{37} = 8\frac{4}{37}$$

**FeedBack****Q.70****Find the remainder when  $37!$  is divided by 41.**1  72  93  114  13

**Solution:****Correct Answer : 1****Your Answer : 1**

By Wilson's Theorem,

 $(p - 1)! + 1$  is divisible by  $p$ Let  $(p - 1)! + 1 = pk$ 

$$\Rightarrow (p - 1)(p - 2)(p - 3)(p - 4)! + 1 = pk$$

$$\Rightarrow (p^3 - 6p^2 + 11p - 6)(p - 4)! + 1 = pk$$

$$\Rightarrow p(p^2 - 6p + 11)(p - 4)! - (6(p - 4)! - 1) = pk$$

Hence,  $(6(p - 4)! - 1)$  must be multiple of  $p$ .Let the remainder when  $(p - 4)!$  is divisible by  $p$  be  $r$ .

$$\Rightarrow (6r - 1) \text{ must be divisible by } p.$$

Using the above result, for  $p = 41$ , we conclude  $6(r) - 1$  must be divisible by 41.

$$\text{Thus we get, } 6r - 1 = 41 \Rightarrow r = 7$$

Therefore,  $37!$  (i.e.,  $(41 - 4)!$ ) when divided by 41 leaves a remainder of 7.**Bookmark****Answer key/Solution****FeedBack****Q.71**

If  $f(x) = x^2 + ax + b$ , where  $a, b \neq 0$ , is a quadratic expression such that the positive difference between the roots of  $f(x) = 0$  is three times of that of  $f(x) = -2$ , then which of the following is the minimum value of  $f(x)$ ?

1  4/32  -9/43  24  Cannot be determined

**Solution:****Correct Answer : 2** **Bookmark** **Answer key/Solution**

The roots of the equations  $f(x) = x^2 + ax + b$  are

$\frac{-a + \sqrt{a^2 - 4b}}{2}$  and  $\frac{-a - \sqrt{a^2 - 4b}}{2}$  respectively and their positive difference is  $\sqrt{a^2 - 4b}$

Similarly the positive difference between the roots of  $x^2 - ax + b + 2 = 0$  is  $\sqrt{a^2 - 4(b + 2)}$

It is given that  $\sqrt{a^2 - 4b} = 3\sqrt{a^2 - 4(b + 2)}$

Squaring both sides, we get

$$a^2 - 4b = 9(a^2 - 4(b + 2))$$

$$\Rightarrow 8a^2 - 32b - 72 = 0$$

$$\Rightarrow a^2 - 4b = 9$$

... (1)

$$\therefore f(x) = x^2 + ax + (a^2 - 9)/4$$

$$= \frac{4x^2 + 4ax + a^2 - 9}{4} = \left(\frac{2x + a}{2}\right)^2 - \frac{9}{4}$$

As,  $\left(\frac{2x + a}{2}\right)^2 \geq 0$ , thus the minimum value of  $f(x)$  is  $-9/4$ .

**FeedBack**
**Q.72**

**Deepa takes 10 more days than Aman to complete a work. Deepa and Aman start this work together and Aman leaves the work 10 days before the work is completed. Aman completes 40% of the overall work. How long would Deepa have taken to complete the work if she had worked alone?**

**Solution:****Correct Answer : 30****Your Answer : 30** **Bookmark** **Answer key/Solution**

Let Aman takes  $x$  days to complete the work. Therefore, Deepa takes  $(x + 10)$  days to complete the entire work.

Aman has to complete 40% of the work. Therefore, Aman will take  $2x/5$  days.

Deepa has to complete 60% of the work. Therefore, Deepa will take  $3(x + 10)/5$  days.

Therefore,  $3(x + 10)/5 = 2x/5 + 10$

$$\Rightarrow x = 20$$

Hence, required number of days =  $20 + 10 = 30$  days.

**FeedBack**

**Q.73**

An experiment was conducted with a certain population consisted of 'x' living organisms in the starting of a month. At the end of each month, the population size increased by twice of its size which was at the beginning of that month. If the total population at the end of five months is greater than 1000, then what is the minimum possible value of x?

**X****Solution:****Correct Answer : 5****Your Answer : 100****Bookmark****Answer key/Solution**

Population at the start of the experiment =  $x$ .

Increase in population after the 1st month =  $2x$ .

Thus, population size after the 1st month =  $x + 2x = 3x$ .

Increase in population after the 2nd month =  $2 \times 3x = 6x$ .

Thus, population size after the 2nd month =  $3x + 6x = 9x$ .

Increase in population after the 3rd month =  $2 \times 9x = 18x$ .

Thus, population size after the 3rd month =  $9x + 18x = 27x$ .

Thus, we observe that the population size triples after every month.

Thus, the population size after the 5th month

=  $3 \times (\text{The population size after the 4th month})$

=  $3 \times 3 \times (\text{The population size after the 3rd month})$

=  $3^2 \times 27x = 243x$

Thus, we have:

$243x > 1000$

$\Rightarrow x > 1000/243$

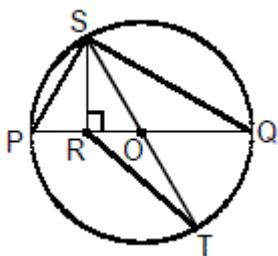
$\Rightarrow x > 4.1$

Since  $x$  must be an integer value (it represents the number of organisms), the minimum possible value of  $x = 5$ .

**FeedBack****Q.74**

Let PQ be a diameter of a circle, having centre at O, and R be a point on PQ with  $3PR = QR$ .

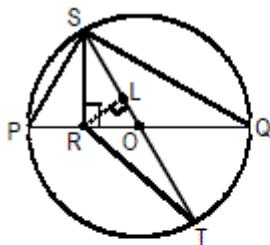
Let S and T be points on the circle such that SR is perpendicular to PQ and ST passes through the centre O. What is the ratio of the area of triangle SRT to the area of triangle PQS?



1  1 : 3

2  1 : 4

3  1 : 2

4  1 : 6**Solution:****Correct Answer : 3** **Bookmark** **Answer key/Solution**

Draw a perpendicular RL from point R to line ST.

$$\frac{\text{Area of } \triangle SRT}{\text{Area of } \triangle PQS} = \frac{\left(\frac{1}{2} \times RL \times ST\right)}{\left(\frac{1}{2} \times SR \times PQ\right)} = \frac{RL}{SR} \quad (\text{Since } ST = PQ = \text{Diameter})$$

As triangle LRO is similar to triangle SRO (AAA similarity),

$$\therefore \frac{RL}{SR} = \frac{RO}{SO} = \frac{PO - PR}{SO}$$

As  $3PR = QR$ ,

$$\therefore PQ = 4PR$$

Let  $PR = x$ .

$$\therefore PQ = 4x$$

And  $PO = OQ = \text{radius} = 2x$ .

$$\therefore RO = x$$

$\Rightarrow R$  is the mid point of PO.

And  $SO = PO = \text{radius}$

$$\therefore SO = 2x.$$

$$\text{Hence, } \frac{RO}{SO} = \frac{x}{2x} = \frac{1}{2}$$

$$\therefore \frac{\text{Area}(\triangle SRT)}{\text{Area}(\triangle PQS)} = \frac{1}{2}$$

### Q.75

If under compound interest, a certain sum becomes eight times itself in 27 years, after how many more years will it become 16 times itself?

1  32  43  64  9

**Solution:****Correct Answer : 4**

Let the principal and the rate of interest be denoted by P and r% per annum. Now, it is given that,

$$P \left(1 + \frac{r}{100}\right)^{27} = 8P \Rightarrow \left(1 + \frac{r}{100}\right)^{27} = 8 \Rightarrow \left(1 + \frac{r}{100}\right)^{9 \times 3} = 2^3 \Rightarrow \left(1 + \frac{r}{100}\right)^9 = 2$$

Raising both sides to the power of 4, we get

$$\left(1 + \frac{r}{100}\right)^{36} = 16$$

$$\therefore P \left(1 + \frac{r}{100}\right)^{36} = 16P$$

Therefore, it would become 16 times itself after another 9 years.

 **Bookmark**
 **Answer key/Solution**
FeedBack
**Q.76**

If  $f(x) = \sqrt{(x+2)(x-3)(x-7)(x-11)}$  is a real valued function, then how many integers are not in the domain of  $f(x)$ ?

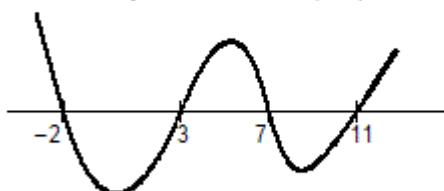
**Solution:****Correct Answer : 7**
 **Bookmark**
 **Answer key/Solution**

$$f(x) = \sqrt{(x+2)(x-3)(x-7)(x-11)}$$

As  $f(x)$  is a real valued function

$$(x+2)(x-3)(x-7)(x-11) \geq 0$$

The critical points are  $x = -2, +3, 7$  and  $11$ .



Therefore, the integral values of  $x$  that do not give real values for  $f(x)$  lie in the range  $(-2, 3) \cup (7, 11)$

The values are  $x = -1, 0, 1, 2, 8, 9$  and  $10$

Thus, there are 7 such values.

FeedBack
**Q.77**

**One liter of p% milk is mixed with 4 liters of q% milk to give 70% milk. If p > q, then how many integral values can p take?**

1  6

2  73  84  9**Solution:****Correct Answer : 2**

Using Alligation:

p% q%

70%

$$70 - q \quad p - 70$$

$$p > q \Rightarrow p > 70 > q$$

$$\text{Therefore, } p - 70 = 4(70 - q)$$

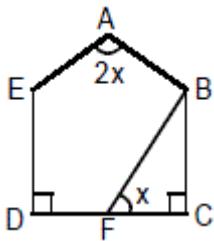
$70 - q$  is an integer  $\Rightarrow p - 70$  has to be a multiple of 4.

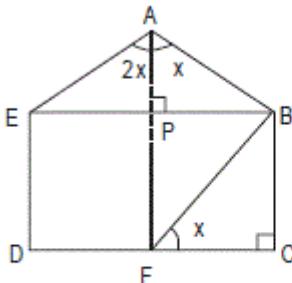
Therefore, p can take values: 74, 78, 82, 86, 90, 94 and 98.

Hence, total number of values is 7.

 **Bookmark**
 **Answer key/Solution**
FeedBack
**Q.78**

In a pentagon ABCDE as shown below, F is the mid point of CD and  $2\angle BFC = \angle EAB$ . If BC = DE = 12 cm, CD = 10 cm and AB = AE, then find the approximate area (to the nearest integer, in sq. cm) of pentagon ABCDE.



**Solution:****Correct Answer : 130****Bookmark****Answer key/Solution**

On drawing a line AF, it intersects BE at P, such that P is mid point of BE. Therefore,  $\angle PAB = \angle PAE = x$

In  $\triangle PAB$  &  $\triangle CFB$ ,

$\angle P = \angle C = 90^\circ$

$\angle PAB = \angle CFB = x$

$\angle ABP = \angle FBC = 90^\circ - x$

$\therefore \triangle PAB \cong \triangle CFB$

$$\frac{PA}{CF} = \frac{BP}{BC} = \frac{5}{12}$$

$$\therefore PA = \frac{5}{12} \times 5 = \frac{25}{12}$$

$$\text{Area of } \triangle ABE = \frac{1}{2} \times 10 \times \frac{25}{12} = 10\text{ cm}^2$$

$$\text{Area of BCDE} = 12 \times 10 = 120 \text{ cm}^2$$

$$\therefore \text{Total area of ABCDE} = 130 \text{ cm}^2.$$

**FeedBack**

### Q.79

If p, q, r and s are real numbers greater than zero but not equal to 1 such that  $p = q^2 = r^3 = s^4$ , then which of the following expressions is/are true?

(i)  $\log_p qrs + \log_q rsp + \log_r spq + \log_s pqr > \frac{50}{3}$

(ii)  $\frac{\log_{pq} rs}{\log_{rs} pq} = \frac{9}{4}$

1  Only (i)

2  Only (ii)

3  Both (i) and (ii)

4  Neither (i) nor (ii)

**Solution:****Correct Answer : 1** **Bookmark** **Answer key/Solution**

We have  $p = q^2 = r^3 = s^4$

$$\log_p qrs = \log_p p^{\frac{1}{2}} \times p^{\frac{1}{3}} \times p^{\frac{1}{4}} = \log_q p^{\frac{13}{12}} = \frac{13}{12} \log_p p = \frac{13}{12}.$$

$$\log_q rsp = \log_q q^{\frac{2}{3}} \times q^{\frac{2}{4}} \times q^{\frac{1}{2}} = \log_q q^{\frac{38}{12}} = \frac{38}{12} = \frac{19}{6}.$$

$$\log_r spq = \log_r r^{\frac{3}{4}} \times r^3 \times r^{\frac{3}{2}} = \frac{21}{4}.$$

$$\log_s pqr = \log_s s^4 \times s^2 \times s^{\frac{4}{3}} = 4 + 2 + \frac{4}{3} = \frac{22}{3}.$$

$$\Rightarrow \log_p qrs + \log_q rsp + \log_r spq + \log_s pqr = \frac{13}{12} + \frac{19}{6} + \frac{21}{4} + \frac{22}{3} = \frac{13+38+63+88}{12} = \frac{202}{12} > \frac{50}{3}.$$

$$\frac{\log_{pq} rs}{\log_{rs} pq} = \frac{\log_{p \times p^{1/2}} p^{\frac{3}{4}} \times p^{\frac{1}{4}}}{\log_{r \times r^{3/4}} r^{\frac{3}{4}} \times r^{\frac{3}{2}}} = \frac{\frac{7}{12} \times \log_{p^{3/2}} p}{\frac{9}{2} \times \log_{r^{7/4}} r} = \frac{\frac{2}{3} \times \frac{7}{12}}{\frac{4}{7} \times \frac{9}{2}} = \frac{7}{18} = \frac{7}{18} \times \frac{7}{18} = \frac{49}{324}.$$

Hence, only statement (i) is correct.

**FeedBack****Q.80**

A wholesale vendor mixes sesame oil with mustard oil and sells the mixture at 20% profit. If he had mixed 2 litres more of sesame oil, his profit would have been doubled to 40%. Find the respective possible quantities (in litres) in which mustard oil and sesame oil could be mixed initially, if sesame oil is available to him at free of cost and in abundant quantity.

1  5, 22  10, 23  20, 44  30, 6

**Solution:****Correct Answer : 2****Your Answer : 2** **Bookmark** **Answer key/Solution**

Let the quantity of mustard oil be 'x' and sesame oil be 'a'. Also, let the cost price of one litre of mustard oil Q and selling price per litre be S.

$$\frac{(x+a)S}{xQ} = \frac{6}{5} \quad \dots \text{(i)}$$

Now, when 2l of sesame oil is added,

$$\frac{(x+a+2)S}{xQ} = \frac{7}{5} \quad \dots \text{(ii)}$$

On dividing (ii) by (i),

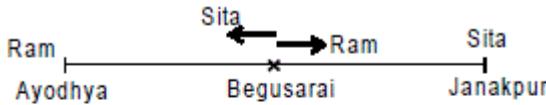
$$\frac{x+a+2}{x+a} = \frac{7}{6} \Rightarrow 1 + \frac{2}{x+a} = \frac{7}{6} \Rightarrow x+a = 12$$

Out of the given options, only second option gives us the sum as 12. So, the possible quantities of mustard oil and sesame oil is 10l and 2l respectively.

**FeedBack**

### Q.81

**Ram and Sita started travelling towards Janakpur and Ayodhya from Ayodhya and Janakpur respectively, at the same time. They meet at Begusarai and after that they started to travel at 3/4th of their usual speed and hence reach at their respective destinations after 16 minutes and 9 minutes respectively. If Ram's usual speed is 12 km/hr, then find the usual speed (in km/hr) of Sita?**

**Solution:****Correct Answer : 16****Bookmark****Answer key/Solution**

Let the speed of Sita be  $x$  km/hr.

$$\frac{\text{Distance between Ayodhya \& Begusarai}}{\text{Distance between Janakpur \& Begusarai}} = \frac{12}{\text{Speed of Sita}} \quad \dots \text{(i)}$$

After meeting,

$$\frac{\text{Distance between Ayodhya \& Begusarai}}{\text{Distance between Janakpur \& Begusarai}} = \frac{\frac{3}{4}(\text{Speed of Sita}) \times 9}{\frac{3}{4} \times 12 \times 16} \quad \dots \text{(ii)}$$

From equation (i) and (ii), we have

$$\begin{aligned} \frac{12}{\text{Speed of Sita}} &= \frac{\text{Speed of Sita} \times 9}{12 \times 16} \\ \Rightarrow \text{Speed of Sita} &= \sqrt{\frac{12 \times 12 \times 16}{9}} = \sqrt{16 \times 16} = 16 \text{ km/hr.} \end{aligned}$$

**FeedBack**

**Q.82**

**How many odd numbers exist between 2000 and 8000 such that all the four digits of that number are distinct?**

- 1  1000
- 2  1236
- 3  1339
- 4  1512

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

Let the number be of the form abcd, where a, b, c and d all are distinct.

Now d can be either 1 or 3 or 5 or 7 or 9, whereas a can be 2 or 3 or 4 or 5 or 6 or 7.

**Case 1 :** When d = 1, a can be 2 or 3 or 4 or 5 or 6 or 7.

$$\frac{a}{6 \text{ ways}} \times \frac{b}{8 \text{ ways}} \times \frac{c}{7 \text{ ways}} \quad d=1$$

**Case 2 :** When d = 3, a cannot be 3.

$$\frac{a}{5 \text{ ways}} \times \frac{b}{8 \text{ ways}} \times \frac{c}{7 \text{ ways}} \quad d=3$$

**Case 3 :** When d = 5, a can be either 2, 3, 4, 6 or 7 but not 5.

$$\frac{a}{5 \text{ ways}} \times \frac{b}{8 \text{ ways}} \times \frac{c}{7 \text{ ways}} \quad d=5$$

**Case 4 :** When d = 7

$$\frac{a}{5 \text{ ways}} \times \frac{b}{8 \text{ ways}} \times \frac{c}{7 \text{ ways}} \quad d=7$$

**Case 5 :** When d = 9

$$\frac{a}{6 \text{ ways}} \times \frac{b}{8 \text{ ways}} \times \frac{c}{7 \text{ ways}} \quad d=9$$

$$\therefore 2 \times (6 \times 8 \times 7) + 3 \times (5 \times 8 \times 7) = 672 + 840 = 1512.$$

**FeedBack**
**Q.83**

If Ap is the sum of the first p terms of the series  $A = 12^{144} + 12^{143} + 12^{142} + \dots$ , then find Bp which is defined as the sum of the first p terms of the series  $A_1 + A_2 + A_3 + \dots$

1   $\frac{12^{145}}{196} \left[ \left( \frac{1}{12} \right)^p + 14p + 1 \right]$

2   $\frac{12^{148}}{169} \left[ \left( \frac{1}{12} \right)^p + 14p + 1 \right]$

3   $\frac{12^{145}}{121} \left[ \left( \frac{1}{12} \right)^p + 11p - 1 \right]$

4   $12^{145} \left[ \left( \frac{1}{12} \right)^p + 14p + 1 \right]$

**Solution:****Correct Answer : 3** **Bookmark** **Answer key/Solution**

$$A_p = \frac{12^{144} \left[ 1 - \left( \frac{1}{12} \right)^p \right]}{1 - \frac{1}{12}} \Rightarrow A_p = \frac{12^{145}}{11} \left( 1 - \left( \frac{1}{12} \right)^p \right) \Rightarrow B_p = \frac{12^{145}}{11} \left[ \left( 1 - \left( \frac{1}{12} \right)^1 \right) + \left( 1 - \left( \frac{1}{12} \right)^2 \right) + \dots + \left( 1 - \left( \frac{1}{12} \right)^p \right) \right]$$

$$\Rightarrow B_p = \frac{12^{145}}{11} \left[ p - \frac{\frac{1}{12} \left( 1 - \left( \frac{1}{12} \right)^p \right)}{1 - \left( \frac{1}{12} \right)} \right] = \frac{12^{145}}{11} \left[ p - \frac{\left( 1 - \left( \frac{1}{12} \right)^p \right)}{11} \right] = \frac{12^{145}}{121} \left[ 11p - \left( 1 - \left( \frac{1}{12} \right)^p \right) \right] = \frac{12^{145}}{121} \left[ \left( \frac{1}{12} \right)^p + 11p - 1 \right].$$

**FeedBack****Q.84**

Each of the two government employees, A and B, received pension for his service after the retirement. A served there for eight years more than B and received Rs.36,000 as his monthly pension. The pension amount, for any employee, is directly proportional to the square root of the duration (in years) of his service. Had A served for  $13\frac{1}{3}$  years more than B, their pension amounts would have been in the ratio 11 : 9. For how long (in years) did A serve as a government employee?

**Solution:****Correct Answer : 35** **Bookmark** **Answer key/Solution**

Let the number of years, that B served in the government organization be T.

It is given that,

Pension  $\propto \sqrt{T}$

Pension =  $k\sqrt{T}$ , where k is constant.

So, A served for  $(T + 8)$  years.

Had A served for  $13\frac{1}{3}$  years more than B, then the ratio of their pension amounts would be

$$\frac{P_A}{P_B} = \frac{k\sqrt{T+13\frac{1}{3}}}{k\sqrt{T}} = \frac{11}{9} \Rightarrow \frac{T+13\frac{1}{3}}{T} = \frac{121}{81} \Rightarrow 81T + \frac{40}{3} \times 81 = 121T \Rightarrow T = 27 \text{ years.}$$

Therefore, A served in the organization for  $27 + 8$  i.e., 35 years.

**FeedBack**

**Q.85**

Twenty one circular rings having radius 2 cm each are packed without overlapping in an equilateral triangular wooden plank of minimum possible perimeter. Find the perimeter of the plank.

1   $(6\sqrt{3} + 30)\text{cm}$

2   $(6\sqrt{3} + 60)\text{cm}$

3   $(3\sqrt{3} + 60)\text{cm}$

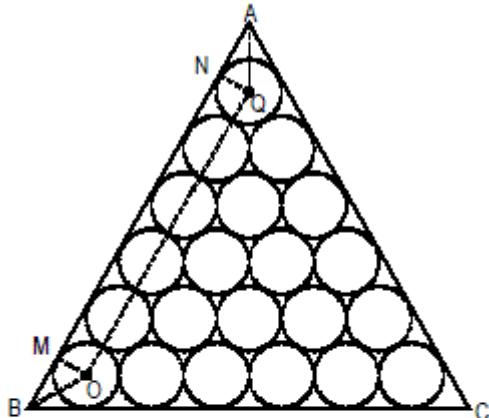
4   $(12\sqrt{3} + 60)\text{cm}$

**Solution:**

**Correct Answer : 4**

 **Bookmark**

 **Answer key/Solution**



We have to find the value of AB first.

$AB = BM + MN + AN$  ( $MN = OQ$ ; where 'O' and 'Q' are centre of two circles as shown above.)

In  $\triangle ABC$ ;  $\angle A = \angle B = \angle C = 60^\circ$

In  $\triangle OMB$ ;  $\angle OBM = 30^\circ$  and  $\angle OMB = 90^\circ$

$$\tan 30^\circ = \frac{OM}{BM} \Rightarrow \frac{1}{\sqrt{3}} = \frac{2}{BM} \quad (\because \text{radius of any circle} = 2 \text{ cm})$$

$$\Rightarrow BM = 2\sqrt{3}$$

$$\text{Similarly; } AN = 2\sqrt{3} \text{ cm}$$

$$\therefore AB = (20 + 4\sqrt{3}) \text{ cm} [\because OQ = 20 \text{ cm}]$$

$$\therefore \text{Perimeter} = 3 \times (20 + 4\sqrt{3}) \text{ cm} = (12\sqrt{3} + 60) \text{ cm}$$

**FeedBack**

**Q.86**

If P is a perfect square of a natural number, such that exactly 11 factors of P are less than  $\sqrt{P}$ , then find the number of factors of  $P^2$ .

1  23

2  **45**

3  **89**

4  **100**

**Solution:****Correct Answer : 2**

The factors of a positive integer N come in pairs, arranged symmetrically around the square root of N.

If P has 11 factors less than its square root, it must have 11 factors above its square root. Since P is a perfect square, its square root is also a factor. Therefore, P has 23 factors ( $11 + 11 + 1$ ).

For  $P^2$ , P is the square root and has 22 factors less than its square root. So,  $P^2$  must have 22 factors more than P as well.

So, total factors of  $P^2 = 22 + 22 + 1 = 45$ .

 **Bookmark** **Answer key/Solution** **FeedBack****Q.87**

Interest at the end of three years was Rs. 18,252 more than that at the end of the second year on a sum of money borrowed at compound interest. If Rs. 24,840 was the interest at the end of the second year, then the amount borrowed was equal to

1  **Rs. 30,000**

2  **Rs. 32,000**

3  **Rs. 36,000**

4  **Rs. 40,000**



**Solution:****Correct Answer : 3****Your Answer : 3**

Interest at the end of the 2nd year = Rs. 24,840.

Interest at the end of the 3rd year = Rs. 24,840 + 18,252 = Rs. 43,092.

Let the principal be Rs. P

According to the question,

$$\frac{P \left[ \left(1 + \frac{r}{100}\right)^3 - 1 \right]}{P \left[ \left(1 + \frac{r}{100}\right)^2 - 1 \right]} = \frac{43092}{24840} = \frac{1197}{690}$$

Put r = 30, which satisfies the above equation.

$$\therefore \frac{(1.3)^3 - 1}{(1.3)^2 - 1} = \frac{1.197}{0.69} = \frac{1197}{690}.$$

Hence, r = 30%.

$$\therefore P \left[ \left(1 + \frac{30}{100}\right)^2 - 1 \right] = 24840 \Rightarrow P \times 0.69 = 24840 \Rightarrow P = \frac{24,840}{0.69} = \text{Rs. } 36,000.$$

**FeedBack****Bookmark****Answer key/Solution****Q.88**

**A can complete a work in x days and B can complete the same work in kx days, where k is a positive integer. If the number of days taken by A and B together to complete the work is an integer less than 5, then how many possible values of (k, x) exist?**

**X****Solution:****Correct Answer : 8****Your Answer : 4****Bookmark****Answer key/Solution**

We know that:

Time taken by A to complete the work =  $x$  days

Time taken by B to complete the work =  $kx$  days

Thus, part of the work completed by A and B together in 1 day =  $\frac{1}{x} + \frac{1}{kx} = \frac{k+1}{kx}$

Thus, time taken by A and B to complete the work =  $\left(\frac{kx}{k+1}\right)$  days

We know that  $\left(\frac{kx}{k+1}\right)$  is an integer.

Thus,  $(k+1)$  is a factor of  $kx$ .

However,  $k$  and  $(k+1)$  are consecutive integers, and hence are co-prime to one another. Thus,  $(k+1)$  or a part of  $(k+1)$  cannot be a factor of  $k$ .

Thus,  $(k+1)$  must be a factor of  $x$

... (i)

We also know that:  $\frac{kx}{k+1} < 5$

$\Rightarrow \frac{kx}{k+1} \leq 4$

... (ii)

Thus, from (i) and (ii), the possible scenarios are:

$k = 1 \Rightarrow k+1 = 2$

$\Rightarrow 2$  is a factor of  $x$ , i.e.,  $x$  is an even number

$\Rightarrow$  Possible values of  $x$  are: 2, 4, 6 or 8

$\Rightarrow$  Possible values of  $(k, x)$  are: (1, 2), (1, 4), (1, 6), (1, 8)

Thus, there are 4 possible values of  $(k, x)$

$k = 2 \Rightarrow k+1 = 3$

$\Rightarrow 3$  is a factor of  $x$

$\Rightarrow$  Possible values of  $x$  are: 3 or 6

$\Rightarrow$  Possible values of  $(k, x)$  are: (2, 3), (2, 6)

Thus, there are 2 possible values of  $(k, x)$

$k = 3 \Rightarrow k+1 = 4$

$\Rightarrow 4$  is a factor of  $x$

$\Rightarrow$  Possible value of  $x$  is: 4

$\Rightarrow$  Possible value of  $(k, x)$  is: (3, 4)

Thus, there is 1 possible value of  $(k, x)$

$k = 4 \Rightarrow k+1 = 5$

$\Rightarrow 5$  is a factor of  $x$

$\Rightarrow$  Possible value of  $x$  is: 5

$\Rightarrow$  Possible value of  $(k, x)$  is: (4, 5)

Thus, there is 1 possible value of  $(k, x)$

For any higher value of  $k$ , the inequality given in (ii) is not satisfied.

Thus, the number of possible values of  $(k, x)$  are:  $4 + 2 + 1 + 1 = 8$

FeedBack

### Q.89

Find the value of  $(22)_3 + (22)_4 + (22)_5 + \dots + (22)_n$  in decimal system.

1   $3n^2 - 2n - 1$

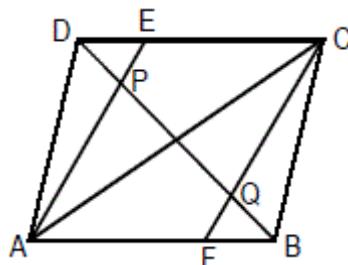
2   $2n^4 - 3n - 1$

3   $n^3 - 3n^2 + 3n + 2$

4   $n^2 + 3n - 10$

**Solution:****Correct Answer : 4**

$$\begin{aligned}
 & (22)_3 + (22)_4 + (22)_5 + \dots + (22)_n \\
 &= (2(3) + 2) + (2(4) + 2) + (2(5) + 2) + \dots + (2(n) + 2) \\
 &= 2(3 + 4 + \dots + n) + 2(n - 2) \\
 &= 2(1 + 2 + 3 + 4 + \dots + n - (1 + 2)) + 2(n - 2) \\
 &= 2\left(\frac{n(n+1)}{2} - 3\right) + 2n - 4 \\
 &= n^2 + n - 6 + 2n - 4 \\
 &= n^2 + 3n - 10.
 \end{aligned}$$

**Bookmark****Answer key/Solution****FeedBack****Q.90**

In the figure shown above, ABCD is a parallelogram, where  $DE : EC = BF : FA = 2 : 5$ . If  $BD = 18$  cm, then find the length (in cm) of PQ?

**Solution:****Correct Answer : 10**

As  $DE : EC = 2 : 5$ , it follows that  $DP : PQ = 2 : 5$

As  $AF : FB = 5 : 2$  it follows that  $PQ : QB = 5 : 2$

Therefore,  $DP : PQ : QB = 2 : 5 : 2$

So,  $PQ : DB = 5 : 9$

As,  $DB = 18$  cm, then PQ is 10 cm.

**Bookmark****Answer key/Solution****FeedBack****Q.91**

Given that,  $-3 < x \leq 1/2$  and  $-1/2 < y \leq 7$ . Which of the following statements is/are true?

1   $\max\{(x+y)(x-y)\} - \min\{(x+y)(x-y)\} = 57 \frac{1}{2}$

2   $\max\{(x+y)^2\} = 169/4$

3   $\min\{(x-y)^2\} = 1$

4  None of the above

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

It can be observed that  $-3 < x$  and  $-1/2 < y$ . That is, there is no  $\leq$  sign for the lower limits of  $x$  and  $y$ .  
 Now for choice (1):

$$\max\{(x+y)(x-y)\} = \max\{x^2 - y^2\} < \left[(-3)^2 - \left(\frac{1}{2}\right)^2\right] \text{ i.e., } \max\{x^2 - y^2\} < 8\frac{3}{4}$$

$$\min\{(x+y)(x-y)\} = \min\{x^2 - y^2\} = \left[\left(-\frac{1}{2}\right)^2 - (7)^2\right] = -48\frac{3}{4}$$

$$\max\{(x+y)(x-y)\} - \min\{(x+y)(x-y)\} < 8\frac{3}{4} - \left(-48\frac{3}{4}\right) \text{ i.e., } 57\frac{1}{2}. \text{ Hence, (1) is not true.}$$

$$\text{For choice (2): } \max\{(x+y)^2\} = \left[\frac{1}{2} + 7\right]^2 = \frac{225}{4}$$

Hence, (2) is not true.

$$\text{For choice (3): } \min\{(x-y)^2\} = [0 - 0]^2 = 0$$

Hence, (3) is also not true.

Hence, option (4) is correct.

**FeedBack**
**Q.92**

Find the least value of  $\frac{48}{|8 - |11 - x||}$ .

1  6

2  12

3  24

4  None of these

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

The minimum value of  $\frac{48}{|8 - |11 - x||}$  occurs when  $|8 - |11 - x||$  is maximum.

If we take the large value of  $x$ , the value of  $|8 - |11 - x||$  will be infinity.

So, the minimum value of  $\frac{48}{|8 - |11 - x||}$  will be zero, since the denominator of the fraction is infinity.

Since there is no option of zero, we take the option (4).

**FeedBack****Q.93**

In a fruit market, the price of apples of variety B is one-third of that of variety A. A fruit seller had bought 15 kg of variety A apples and 30 kg of variety B apples from the market and then sold both the varieties at a fixed price which is 80% more than the price at which he bought the apples of variety B. Find his overall profit percentage in selling all these apples.

**Solution:****Correct Answer : 8**

Let the price of each apple of variety A be  $x$ .

Then, the price of each apple of variety B will be  $\frac{x}{3}$ .

**Bookmark** **Answer key/Solution**

Price at which each apple is sold =  $\frac{x}{3} \times 1.8 = 0.6x$ .

$\therefore$  Required profit percentage =  $\frac{(0.6x \times 45 - 25x)}{25x} \times 100 = 8\%$ .

**FeedBack****Q.94**

If  $t$  is a real number such that on dividing  $81(t + 1)$  by  $27(t - 1)$  gives  $243(t - 1)$ , then find  $t$ .

1  2 2  3 3  1/2 4  1/3

**Solution:****Correct Answer : 2**

It is given that,  $81^{t+1} = 27^{t-1} \times 243^{t-1}$

$$\Rightarrow (3^4)^{t+1} = (3^3)^{t-1} \times (3^5)^{t-1}$$

$$\Rightarrow 3^{4t+4} = 3^{8t-8}$$

Equating the power on both sides, we get

$$4t + 4 = 8t - 8$$

$$\Rightarrow 4t = 12$$

$$\Rightarrow t = 3.$$

 **Bookmark**
 **Answer key/Solution**
FeedBack
**Q.95**

**Two runners - A and B - starting simultaneously from the same point on a circular track, will meet each other for the first time after 24 seconds, if travelled in the same direction and after 8 seconds if travelled in the opposite directions. The speed of the faster runner is what times the speed of the slower runner?**

1  2/3

2  3/2

3  5/2

4  2

**Solution:****Correct Answer : 4**
 **Bookmark**
 **Answer key/Solution**

Let the speed of A and B be  $v_a$  and  $v_b$  respectively. And let the length of the track be  $l$ .

Let  $v_a > v_b$

Time taken by them to meet for the first time (in the same direction)

$$= \frac{l}{v_a - v_b} = 24 \Rightarrow l = 24(v_a - v_b)$$

Similarly, time taken to meet for the first time when travelling in opposite directions

$$= \frac{l}{v_a + v_b} = 8 \Rightarrow l = 8(v_a + v_b)$$

$$\therefore 24(v_a - v_b) = 8(v_a + v_b)$$

$$\Rightarrow 16v_a = 32v_b$$

$$\Rightarrow v_a = 2v_b$$

Therefore, the speed of the faster person is twice the speed of the slower person.

FeedBack

**Q.96**

**In how many ways can four friends - Bheem, Chutki, Raju and Jaggu - share 50 laddoos among themselves such that each of them gets an odd number of laddoos?**

1  2000

2  2400

3  2600

4  3000

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**

Let the number of laddoos with the four friends be denoted by a, b, c and d respectively.

We know that,  $a + b + c + d = 50$  ...(1) where a, b, c and d are all odd numbers greater than or equal to 1.

Now,  $a + 1, b + 1, c + 1$ , and  $d + 1$  will all be even numbers greater than or equal to 2.

Let us denote them by  $2k_1, 2k_2, 2k_3$  and  $2k_4$  where  $k_1, k_2, k_3$  and  $k_4 \geq 1$

Adding 4 to both sides in equation (1), we get

$$a + 1 + b + 1 + c + 1 + d + 1 = 54.$$

$$\Rightarrow 2k_1 + 2k_2 + 2k_3 + 2k_4 = 2(27).$$

$$\Rightarrow k_1 + k_2 + k_3 + k_4 = 27, \text{ where } k_1, k_2, k_3 \text{ and } k_4 \geq 1.$$

$\therefore$  Number of solutions to the above equation is given by  $^{27-1}C_{4-1} = ^{26}C_3 = 2600$ .

 **FeedBack**

**Q.97**

If  $\log_b a = \frac{1}{5}$  and  $\log_c b^{1/5} = \frac{1}{6}$ , then how many integral value(s) of (b + c) less than 1000 are possible?

**Solution:**

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**

We can re-write the given equation as below:-

$$\log_a b = 5 \text{ and } \log_b b^{1/5} = 6 \Rightarrow \log_a c = 6$$

$$\therefore b = a^5 \text{ and } c = a^6$$

$$b + c = a^5 + a^6$$

$\therefore a$  can't be equal to 1. (As  $\log_a b$  will be undefined)

Possible values of a = 2, 3, 4, ...

If a = 2; then b + c =  $2^5 + 2^6 = 32 + 64 = 96$

If a = 3; then b + c =  $3^5 + 3^6 = 243 + 729 = 972$ .

We can see that two values of (b + c) < 1000 are possible.

 **FeedBack**

**Q.98**

Three pipes X, Y and Z can fill a cistern in 20, 30 and 40 hours respectively. Pipe 'X' is kept open for the whole time while pipe Y and Z are open for two hours each alternatively starting with pipe 'Y'. Find the total time taken to fill the cistern.

- 1  9 hours
- 2  10 hours 36 minutes
- 3  11 hours 24 minutes
- 4  12 hours 36 minutes

**Solution:**

**Correct Answer : 4**

 **Bookmark**

 **Answer key/Solution**

Pipes X, Y and Z can fill a cistern in 20, 30 and 40 hours respectively.

$$\text{Therefore, part filled by pipe X in 1 hour} = \frac{1}{20}$$

$$\text{Part filled by pipe Y in 1 hour} = \frac{1}{30}$$

$$\text{Part filled by pipe Z in 1 hour} = \frac{1}{40}$$

$$\text{Part filled by pipe X and Y together in 1 hour} = \frac{1}{20} + \frac{1}{30} = \frac{1}{12}$$

$$\text{In 2 hours, part filled by X and Y together} = \frac{2}{12} = \frac{1}{6}$$

$$\text{Similarly, part filled by pipe X and pipe Z together in 1 hour} = \frac{1}{20} + \frac{1}{40} = \frac{3}{40}$$

$$\text{In 2 hours, part filled by pipe X and pipe Z together} = 2 \times \frac{3}{40} = \frac{3}{20}$$

$$\therefore \text{In 4 hours, parts filled by pipes X, Y and Z together} = \frac{1}{6} + \frac{3}{20} = \frac{19}{60}$$

$$\text{Therefore, in 12 hours, part filled by pipes X, Y and Z together} = \frac{57}{60}.$$

$$\text{Remaining quantity} = 1 - \frac{57}{60} = \frac{3}{60} = \frac{1}{20}$$

Remaining quantity is filled by pipe X and pipe Y together in  $\frac{12}{20}$  hour i.e., 36 minutes.

$\therefore$  Total time taken to fill the cistem is 12 hours 36 minutes.

**FeedBack**

**Q.99**

**Sixteen squares of dimension  $1 \times 1$  are chosen at random on a chessboard, having 64 squares of dimension  $1 \times 1$ . What is the probability that a square of  $4 \times 4$  is formed?**

1   $\frac{^8C_5 \times ^8C_5}{^{64}C_{16}}$

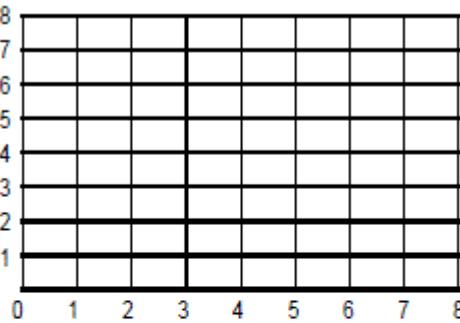
2   $\frac{^8C_4 \times ^8C_4}{^{64}C_{16}}$

3   $\frac{16}{^{64}C_{16}}$

4   $\frac{25}{^{64}C_{16}}$

**Solution:**

**Correct Answer : 4**



**Bookmark**

**Answer key/Solution**

A square of  $4 \times 4$  may be formed in  $5 \times 5$  ways.

5 cases in Horizontal position 0 – 4.

5 cases in Horizontal position 1 – 5.

Similarly, 5 cases each if we select 2 – 6, 3 – 7 and 4 – 8 in horizontal position.

The number of ways of selection of 16 squares =  $^{64}C_{16}$

$$\therefore \text{Required probability} = \frac{25}{^{64}C_{16}}.$$

**FeedBack**

**Q.100**

**Find the number of integral solutions for the inequality:  $(|x - 1| - 4)(|x + 2| - 5) < 0$ .**

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

Given  $(|x - 1| - 4)(|x + 2| - 5) < 0$

We consider 3 cases:

Case 1:  $x > 1$ ;  $(x - 5)(x - 3) < 0 \Rightarrow x \Rightarrow (3, 5)$

Case 2:  $-2 < x < 1$ ;  $(-x - 3)(x - 3) < 0 \Rightarrow (x - 3)(x + 3) > 0 \Rightarrow x > 3$  or  $x < -3$ , as this is not accordance with  $-2 < x < 1$ , no solution in this case.

Case 3:  $x < -2$ ;  $(-x - 3)(-x - 7) < 0 \Rightarrow (x + 3)(x + 7) < 0 \Rightarrow x \in (-7, -3)$

Here the integral solutions are  $x = -6, -5, -4, 4$

So, the number of integral solution is 4.

[FeedBack](#)