



## All India CAT Open Mock - 2 2019

Scorecard (procreview.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Accuracy (AccSelectGraph.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Qs Analysis (QsAnalysis.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Booster Analysis (BoosterAnalysis.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Video Attempt (VideoAnalysis.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Solutions (Solution.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Bookmarks (Bookmarks.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

Toppers (Toppers.jsp?sid=aaaacfmeUdDwo8biKQs\_wSat Jan 11 23:11:02 IST 2020&qsetId=jSH/zmDayFk=&qsetName=All India CAT Open Mock - 2 2019)

VARC

DILR

QA

## Sec 1

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

**Bad behaviour at work can have very real consequences. People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health problems, and are more likely to burn out and quit their jobs. And nearly all of us are affected**

by rudeness and other types of workplace misbehaviour, like interrupting and exclusion: Estimates suggest 98% of employees are on the receiving end over the course of a year.

Given bad behaviour's prevalence and impact, surely leaders take reports of it seriously, get the facts, and punish offenders, right? Some scholars have noted that, when information about misbehaviour surfaces, savvy leaders know better than to blame the messenger. Unfortunately, our research paints a picture that is much bleaker.

We set out to investigate how people in positions of power view victims and perpetrators of workplace misbehaviour. [...] The two studies were telling, but they had an important limitation: Because employees who experience rudeness may also be rude themselves, as our earlier research has shown, bosses who blame victims might actually be evaluating these employees accurately. That is, these victims might also be perpetrators. If so, leaders' evaluations might not be biased after all. [...]

When we crunched the numbers, we found that participants perceived victims as having engaged in misbehaviour. And by presenting participants with clear information that some employees did *not* behave rudely, we were able to demonstrate that victims are blamed for their mistreatment *even when they've done nothing wrong*.

It gets worse: We also wanted to see if leaders' bias toward victims extended to their assessments of the victims' job performance, even when we provided concrete information about whether the employee was a high performer or a low performer. It does: Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance. As performance ratings often have a substantial impact on compensation and promotion decisions, our results show that victims of workplace mistreatment can be adversely impacted in several other important ways, adding insult to injury.

So, how can leaders combat bias when evaluating employees? We recommend leaders receive training similar to that undergone by judges and arbitrators, who are taught to distinguish between relevant and irrelevant information. Homing in on job-relevant behaviours, whether during interviews or performance appraisals, can effectively reduce subjectivity and enhance decision accuracy. But because unrelated contextual and personal factors can influence the outcome — even among highly skilled judicial decision makers — training should also increase leaders' awareness of the forces that may be influencing their decisions. Organizations might take a page from the Federal Judicial Centre, which runs a program that does just that: It trains new judicial appointees to become more aware of their biases and prevent those biases from affecting their decision making. Given the central role leaders play as decision makers in the workplace, it's critical that they assess employee behaviour fairly and accurately. To our dismay, our study discovered a tendency on the part of managers to blame employees for the mistreatment they experience. For those leaders responsible for evaluating others at work, we hope our research reminds you to be more judicious.

**Q.1**

**The main advice of the author for decision makers in workplace is:**

- 1  **to not be biased in their outlook towards low performing employees.**
- 2  **to be just and accurate in their assessment of employee behaviour.**
- 3  **to not punish the messenger for delivering a complaint.**
- 4  **to be critical yet fair while conducting performance appraisal.**

**Solution:**

**Correct Answer : 2**

Refer to the last paragraph. The author states that “Given the central role leaders play as decision makers in the workplace, it’s critical that they assess employee behaviour fairly and accurately.” The entire passage deals with the issue of workplace behaviour, especially rudeness. So, option 2 is the correct answer.



**Answer key/Solution**

**Option 1 – Incorrect as performance appraisal is not the main issue.**

**Option 3 – Too narrow to be the main conclusion. It’s mentioned as an example.**

**Option 4 – Performance appraisal is not the main focus of the author.**

**FeedBack**

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

Bad behaviour at work can have very real consequences. People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health problems, and are more likely to burn out and quit their jobs. And nearly all of us are affected by rudeness and other types of workplace misbehaviour, like interrupting and exclusion: Estimates suggest 98% of employees are on the receiving end over the course of a year.

Given bad behaviour’s prevalence and impact, surely leaders take reports of it seriously, get the facts, and punish offenders, right? Some scholars have noted that, when information about misbehaviour surfaces, savvy leaders know better than to blame the messenger. Unfortunately, our research paints a picture that is much bleaker.

We set out to investigate how people in positions of power view victims and perpetrators of workplace misbehaviour. [...] The two studies were telling, but they had an important limitation: Because employees who experience rudeness may also be rude themselves, as our earlier research has shown, bosses who blame victims might actually be evaluating these employees accurately. That is, these victims might also be perpetrators. If so, leaders’ evaluations might not be biased after all. [...]

When we crunched the numbers, we found that participants perceived victims as having engaged in misbehaviour. And by presenting participants with clear information that some

**employees did *not* behave rudely, we were able to demonstrate that victims are blamed for their mistreatment even when they've done nothing wrong.**

**It gets worse: We also wanted to see if leaders' bias toward victims extended to their assessments of the victims' job performance, even when we provided concrete information about whether the employee was a high performer or a low performer. It does: Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance. As performance ratings often have a substantial impact on compensation and promotion decisions, our results show that victims of workplace mistreatment can be adversely impacted in several other important ways, adding insult to injury.**

**So, how can leaders combat bias when evaluating employees? We recommend leaders receive training similar to that undergone by judges and arbitrators, who are taught to distinguish between relevant and irrelevant information. Focusing on job-relevant behaviours, whether during interviews or performance appraisals, can effectively reduce subjectivity and enhance decision accuracy. But because unrelated contextual and personal factors can influence the outcome — even among highly skilled judicial decision makers — training should also increase leaders' awareness of the forces that may be influencing their decisions. Organizations might take a page from the Federal Judicial Centre, which runs a program that does just that: It trains new judicial appointees to become more aware of their biases and prevent those biases from affecting their decision making. Given the central role leaders play as decision makers in the workplace, it's critical that they assess employee behaviour fairly and accurately. To our dismay, our study discovered a tendency on the part of managers to blame employees for the mistreatment they experience. For those leaders responsible for evaluating others at work, we hope our research reminds you to be more judicious.**

---

## Q.2

**Why does the author mention the program run by the Federal Judicial Centre?**

- 
- 1  **To show how decision makers are trained in the judicial world.**
  - 2  **To highlight the importance of training in the making of judges.**
  - 3  **To show how decision makers can be trained to be impartial.**
  - 4  **To highlight a parallel problem in the world of judges.**
-

Bookmark

Answer key/Solution

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

The author mentions this program in the penultimate paragraph.

The main point is that this program can be adopted by the management world to train leaders effectively. So, this is seen as a solution, not as the problem. This eliminates option 4 straightaway.

**Option 1 –** This example is given to offer a solution for the management world. So, this option doesn't capture the real intention of the author.

**Option 2 –** 'Judges' are not the focus of the author.

**Option 3 –** It is the correct idea. It also matches the main aim of the author.

FeedBack

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

Bad behaviour at work can have very real consequences. People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health problems, and are more likely to burn out and quit their jobs. And nearly all of us are affected by rudeness and other types of workplace misbehaviour, like interrupting and exclusion: Estimates suggest 98% of employees are on the receiving end over the course of a year.

Given bad behaviour's prevalence and impact, surely leaders take reports of it seriously, get the facts, and punish offenders, right? Some scholars have noted that, when information about misbehaviour surfaces, savvy leaders know better than to blame the messenger. Unfortunately, our research paints a picture that is much bleaker.

We set out to investigate how people in positions of power view victims and perpetrators of workplace misbehaviour. [...] The two studies were telling, but they had an important limitation: Because employees who experience rudeness may also be rude themselves, as our earlier research has shown, bosses who blame victims might actually be evaluating these employees accurately. That is, these victims might also be perpetrators. If so, leaders' evaluations might not be biased after all. [...]

When we crunched the numbers, we found that participants perceived victims as having engaged in misbehaviour. And by presenting participants with clear information that some employees did *not* behave rudely, we were able to demonstrate that victims are blamed for their mistreatment even when they've done nothing wrong.

It gets worse: We also wanted to see if leaders' bias toward victims extended to their assessments of the victims' job performance, even when we provided concrete information about whether the employee was a high performer or a low performer. It does: Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance. As performance ratings often have a substantial impact on compensation and promotion decisions, our results show that victims of workplace mistreatment can be adversely impacted in several

**other important ways, adding insult to injury.**

**So, how can leaders combat bias when evaluating employees? We recommend leaders receive training similar to that undergone by judges and arbitrators, who are taught to distinguish between relevant and irrelevant information. Focusing on job-relevant behaviours, whether during interviews or performance appraisals, can effectively reduce subjectivity and enhance decision accuracy. But because unrelated contextual and personal factors can influence the outcome — even among highly skilled judicial decision makers — training should also increase leaders' awareness of the forces that may be influencing their decisions. Organizations might take a page from the Federal Judicial Centre, which runs a program that does just that: It trains new judicial appointees to become more aware of their biases and prevent those biases from affecting their decision making. Given the central role leaders play as decision makers in the workplace, it's critical that they assess employee behaviour fairly and accurately. To our dismay, our study discovered a tendency on the part of managers to blame employees for the mistreatment they experience. For those leaders responsible for evaluating others at work, we hope our research reminds you to be more judicious.**

### Q.3

**Which of the following has not been cited as a consequence for people who face workplace rudeness?**

- 1  Suffer emotional and bodily challenges
- 2  Feel demotivated to participate in the workplace
- 3  Not encouraged to prolong one's association with the company
- 4  Are negatively assessed by the management

**Solution:**

**Correct Answer : 4**

The answer to this question can be found in the first paragraph.

Refer to the lines: "People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health problems, and are more likely to burn out and quit their jobs." Options 1 (physical and emotional problems), 2 (report lower engagement), and 3 (quit their jobs) are clearly mentioned. Option 4 has been mentioned with respect to people who complain (not just face) about this. So, option 4 is the correct answer.

 **Bookmark**

 **Answer key/Solution**

**Feedback**

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

**Bad behaviour at work can have very real consequences. People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health**

problems, and are more likely to burn out and quit their jobs. And nearly all of us are affected by rudeness and other types of workplace misbehaviour, like interrupting and exclusion: Estimates suggest 98% of employees are on the receiving end over the course of a year.

Given bad behaviour's prevalence and impact, surely leaders take reports of it seriously, get the facts, and punish offenders, right? Some scholars have noted that, when information about misbehaviour surfaces, savvy leaders know better than to blame the messenger. Unfortunately, our research paints a picture that is much bleaker.

We set out to investigate how people in positions of power view victims and perpetrators of workplace misbehaviour. [...] The two studies were telling, but they had an important limitation: Because employees who experience rudeness may also be rude themselves, as our earlier research has shown, bosses who blame victims might actually be evaluating these employees accurately. That is, these victims might also be perpetrators. If so, leaders' evaluations might not be biased after all. [...]

When we crunched the numbers, we found that participants perceived victims as having engaged in misbehaviour. And by presenting participants with clear information that some employees did *not* behave rudely, we were able to demonstrate that victims are blamed for their mistreatment *even when they've done nothing wrong*.

It gets worse: We also wanted to see if leaders' bias toward victims extended to their assessments of the victims' job performance, even when we provided concrete information about whether the employee was a high performer or a low performer. It does: Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance. As performance ratings often have a substantial impact on compensation and promotion decisions, our results show that victims of workplace mistreatment can be adversely impacted in several other important ways, adding insult to injury.

So, how can leaders combat bias when evaluating employees? We recommend leaders receive training similar to that undergone by judges and arbitrators, who are taught to distinguish between relevant and irrelevant information. Homing in on job-relevant behaviours, whether during interviews or performance appraisals, can effectively reduce subjectivity and enhance decision accuracy. But because unrelated contextual and personal factors can influence the outcome — even among highly skilled judicial decision makers — training should also increase leaders' awareness of the forces that may be influencing their decisions. Organizations might take a page from the Federal Judicial Centre, which runs a program that does just that: It trains new judicial appointees to become more aware of their biases and prevent those biases from affecting their decision making. Given the central role leaders play as decision makers in the workplace, it's critical that they assess employee behaviour fairly and accurately. To our dismay, our study discovered a tendency on the part of managers to blame employees for the mistreatment they experience. For those leaders responsible for evaluating others at work, we hope our research reminds you to be more judicious.

**Q.4**

**How were the victims of rudeness perceived by their superiors in the study?**

- 1  As being ungrateful
- 2  As being biased
- 3  As being subpar performers
- 4  As being low wage earners

**Solution:**

**Correct Answer : 3**

It's an easy fact based question. Refer to the line, "Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance." So, option 3 is the clear answer.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

Bad behaviour at work can have very real consequences. People who experience workplace rudeness, for example, report lower engagement, suffer more mental and physical health problems, and are more likely to burn out and quit their jobs. And nearly all of us are affected by rudeness and other types of workplace misbehaviour, like interrupting and exclusion: Estimates suggest 98% of employees are on the receiving end over the course of a year.

Given bad behaviour's prevalence and impact, surely leaders take reports of it seriously, get the facts, and punish offenders, right? Some scholars have noted that, when information about misbehaviour surfaces, savvy leaders know better than to blame the messenger. Unfortunately, our research paints a picture that is much bleaker.

We set out to investigate how people in positions of power view victims and perpetrators of workplace misbehaviour. [...] The two studies were telling, but they had an important limitation: Because employees who experience rudeness may also be rude themselves, as our earlier research has shown, bosses who blame victims might actually be evaluating these employees accurately. That is, these victims might also be perpetrators. If so, leaders' evaluations might not be biased after all. [...]

When we crunched the numbers, we found that participants perceived victims as having engaged in misbehaviour. And by presenting participants with clear information that some employees did *not* behave rudely, we were able to demonstrate that victims are blamed for their mistreatment even when they've done nothing wrong.

**It gets worse: We also wanted to see if leaders' bias toward victims extended to their**

assessments of the victims' job performance, even when we provided concrete information about whether the employee was a high performer or a low performer. It does: Victims of rudeness were perceived as performing considerably worse on the job than employees who hadn't been mistreated, regardless of the employees' *actual* performance. As performance ratings often have a substantial impact on compensation and promotion decisions, our results show that victims of workplace mistreatment can be adversely impacted in several other important ways, adding insult to injury.

**So, how can leaders combat bias when evaluating employees? We recommend leaders receive training similar to that undergone by judges and arbitrators, who are taught to distinguish between relevant and irrelevant information. Homing in on job-relevant behaviours, whether**

**during interviews or performance appraisals, can effectively reduce subjectivity and enhance decision accuracy. But because unrelated contextual and personal factors can influence the outcome — even among highly skilled judicial decision makers — training should also increase leaders' awareness of the forces that may be influencing their decisions.**

**Organizations might take a page from the Federal Judicial Centre, which runs a program that does just that: It trains new judicial appointees to become more aware of their biases and prevent those biases from affecting their decision making.**

**Given the central role leaders play as decision makers in the workplace, it's critical that they assess employee behaviour fairly and accurately. To our dismay, our study discovered a tendency on the part of managers to blame employees for the mistreatment they experience. For those leaders responsible for evaluating others at work, we hope our research reminds you to be more judicious.**

## Q.5

**The tone of the author can best be described as:**

1  **explanatory**

2  **cautious**

3  **ambiguous**

4  **fastidious**

**Solution:**

**Correct Answer : 1**

**The author in the passage is very objective and clear in the assessment of workplace rudeness.**

**The author is not vague or uncertain. So, options 2 and 3 are eliminated.**

**The author is not unnecessarily nit-picking. So, option 4 is eliminated.**

**Option 1 is the correct answer as the author explains a problem with examples and also gives some possible solutions.**

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

---

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

What colour were the dinosaurs? If you have a picture in your head, fresh studies suggest you may need to revise it. New fossil research also suggests that pigment-producing structures go beyond how the dinosaurs looked and may have played a fundamental role inside their bodies too. The latest findings have also paved the way for a more accurate reconstruction of the internal anatomy of extinct animals, and insight into the origins of features such as feathers and flight.

Much of this stems from investigations into melanin, a pigment found in structures called melanosomes inside cells that gives external features including hair, feather, skin and eyes their colour—and which, it now turns out, is abundant inside animals' bodies too. "We've found it in places where we didn't think it existed," said Maria McNamara, a paleobiologist at University College Cork, in Ireland.

The discoveries in her team's newest research, published in mid-August, were made using advanced microscopy and synchrotron X-ray techniques, which harness the energy of fast-moving electrons to help examine fossils in minute detail. Using these, the researchers found that melanin was widespread in the internal organs of both modern and fossil amphibians, reptiles, birds, and mammals—following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally. What's more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types, thus opening up exciting opportunities to use them to map the soft tissues of ancient animals.

These studies also have further implications. For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function, says McNamara. "There's the potential that melanin didn't evolve for colour at all," she said. "That role may actually be secondary to much more important physiological functions." Her research indicates that it may have an important role in homeostasis, or regulation of the internal chemical and physical state of the body, and the balance of its metallic elements. "A big question now is does this apply to the first, most primitive vertebrates?" said McNamara. "Can we find fossil evidence of this? Which function of melanin is evolutionarily primitive—production of colour or homeostasis?"

At the same time, the findings imply that we may need to review our understanding of the colours of ancient animals. That's because fossil melanosomes previously assumed to represent external hues may in fact be from internal tissues, especially if the fossil has been disturbed over time. McNamara says her research has also shown that melanosomes can change shape and shrink over the course of millions of years, potentially affecting colour reconstructions.

Further complicating the picture is that animals contain additional non-melanin pigments such as carotenoids and what is known as structural colour, which was only recently identified in fossils. In 2016, a study by McNamara's team on the skin of a 10-million-year-old snake found that these could be preserved in certain mineralized remains. "These have the potential to preserve all aspects of the colour-producing gamut that vertebrates have,"

she said. She hopes over time that these findings and techniques will together help us to much more accurately interpret the colours of ancient organisms—though in these early days, she doesn't have examples of animals for which this has already changed. [...]

#### Q.6

As per the passage, which of the following can be inferred about melanin?

- 1  Its evolutionary role has changed over the course of history.
- 2  Its impact on the internal structure of animals has now been revealed.
- 3  Its structural and evolutionary importance is now under question.
- 4  Its role in the development of colours is not very significant.

**Solution:**

**Correct Answer : 2**

The author states that melanin might have evolved for some other purpose, not to give colours. So, option 2 is the correct inference.

**Option 1 – There is no data to support that melanin's role has changed.**

**Option 3 – The author doesn't question the role of melanin.**

**Option 4 – The author doesn't question the significance of melanin.**

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

What colour were the dinosaurs? If you have a picture in your head, fresh studies suggest you may need to revise it. New fossil research also suggests that pigment-producing structures go beyond how the dinosaurs looked and may have played a fundamental role inside their bodies too. The latest findings have also paved the way for a more accurate reconstruction of the internal anatomy of extinct animals, and insight into the origins of features such as feathers and flight.

Much of this stems from investigations into melanin, a pigment found in structures called melanosomes inside cells that gives external features including hair, feather, skin and eyes their colour—and which, it now turns out, is abundant inside animals' bodies too. "We've found it in places where we didn't think it existed," said Maria McNamara, a paleobiologist at University College Cork, in Ireland.

The discoveries in her team's newest research, published in mid-August, were made using advanced microscopy and synchrotron X-ray techniques, which harness the energy of fast-moving electrons to help examine fossils in minute detail. Using these, the researchers found that melanin was widespread in the internal organs of both modern and fossil amphibians, reptiles, birds, and mammals—following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally.

**What's more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types, thus opening up exciting opportunities to use them to map the soft tissues of ancient animals.**

These studies also have further implications. For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function, says McNamara. "There's the potential that melanin didn't evolve for colour at all," she said. "That role may actually be secondary to much more important physiological functions." Her research indicates that it may have an important role in homeostasis, or regulation of the internal chemical and physical state of the body, and the balance of its metallic elements. "A big question now is does this apply to the first, most primitive vertebrates?" said McNamara. "Can we find fossil evidence of this? Which function of melanin is evolutionarily primitive—production of colour or homeostasis?"

At the same time, the findings imply that we may need to review our understanding of the colours of ancient animals. That's because fossil melanosomes previously assumed to represent external hues may in fact be from internal tissues, especially if the fossil has been disturbed over time. McNamara says her research has also shown that melanosomes can change shape and shrink over the course of millions of years, potentially affecting colour reconstructions.

Further complicating the picture is that animals contain additional non-melanin pigments such as carotenoids and what is known as structural colour, which was only recently identified in fossils. In 2016, a study by McNamara's team on the skin of a 10-million-year-old snake found that these could be preserved in certain mineralized remains. "These have the potential to preserve all aspects of the colour-producing gamut that vertebrates have," she said. She hopes over time that these findings and techniques will together help us to much more accurately interpret the colours of ancient organisms—though in these early days, she doesn't have examples of animals for which this has already changed. [...]

---

#### Q.7

**Which of the following is the thematic highlight of the passage?**

- 
- 1  An analysis of the reconstruction of the internal anatomy of extinct animals.
  - 2  An evaluation of research done to better understand the evolutionary purpose of dinosaurs.
  - 3  A description of certain internal anomalies in the structure of extinct animals.
  - 4  An analysis of certain new findings regarding the structural makeup of dinosaurs.
-

 Bookmark Answer key/Solution**Solution:****Correct Answer : 4****This can be answered by the method of elimination.****Option 1 – The author doesn't focus on 'extinct animals'. It's too generic.****Option 2 – It is wrong because the author is not focusing on the evolutionary purpose of dinosaurs. Rather the focus is on the evolutionary purpose of melanin.****Option 3 – 'Anomalies' is an alien term.****Option 4 – This is the best choice. The author focuses on the role of pigment inducing elements and how they could have played an important role in the structural makeup of animals, especially dinosaurs. So, this is the best choice.****FeedBack****Direction for questions (6-10): Read the given passage and answer the questions that follow.**

**What colour were the dinosaurs? If you have a picture in your head, fresh studies suggest you may need to revise it. New fossil research also suggests that pigment-producing structures go beyond how the dinosaurs looked and may have played a fundamental role inside their bodies too. The latest findings have also paved the way for a more accurate reconstruction of the internal anatomy of extinct animals, and insight into the origins of features such as feathers and flight.**

**Much of this stems from investigations into melanin, a pigment found in structures called melanosomes inside cells that gives external features including hair, feather, skin and eyes their colour—and which, it now turns out, is abundant inside animals' bodies too. "We've found it in places where we didn't think it existed," said Maria McNamara, a paleobiologist at University College Cork, in Ireland.**

**The discoveries in her team's newest research, published in mid-August, were made using advanced microscopy and synchrotron X-ray techniques, which harness the energy of fast-moving electrons to help examine fossils in minute detail. Using these, the researchers found that melanin was widespread in the internal organs of both modern and fossil amphibians, reptiles, birds, and mammals—following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally. What's more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types, thus opening up exciting opportunities to use them to map the soft tissues of ancient animals.**

**These studies also have further implications. For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function, says McNamara. "There's the potential that melanin didn't evolve for colour at all," she said. "That role may actually be secondary to much more important physiological functions." Her research indicates that it may have an important role in homeostasis, or regulation of the internal chemical and physical state of the body, and the balance of its metallic elements. "A**

**big question now is does this apply to the first, most primitive vertebrates?" said McNamara. "Can we find fossil evidence of this? Which function of melanin is evolutionarily primitive—production of colour or homeostasis?"**

At the same time, the findings imply that we may need to review our understanding of the colours of ancient animals. That's because fossil melanosomes previously assumed to represent external hues may in fact be from internal tissues, especially if the fossil has been disturbed over time. McNamara says her research has also shown that melanosomes can change shape and shrink over the course of millions of years, potentially affecting colour reconstructions.

Further complicating the picture is that animals contain additional non-melanin pigments such as carotenoids and what is known as structural colour, which was only recently identified in fossils. In 2016, a study by McNamara's team on the skin of a 10-million-year-old snake found that these could be preserved in certain mineralized remains. "These have the potential to preserve all aspects of the colour-producing gamut that vertebrates have," she said. She hopes over time that these findings and techniques will together help us to much more accurately interpret the colours of ancient organisms—though in these early days, she doesn't have examples of animals for which this has already changed. [...]

#### Q.8

**Why does the author say that we need to revise our mental image of dinosaurs?**

- 1  Because a new research has disputed the perceived belief that dinosaurs had any colour.
- 2  Because researchers have found evidence that dinosaurs may have looked different from what we thought.
- 3  Because researchers now speculate that the internal structure of dinosaurs might be more complicated than previously thought.
- 4  Because a new research has raised new questions about pigment producing structures in animals.

**Solution:**

**Correct Answer : 2**

This can be answered by looking at the first paragraph. The author states that new research has discovered some evidence to suggest that dinosaurs probably looked quite different from what we thought so far. So, option 2 is the answer.

 **Bookmark**

 **Answer key/Solution**

**Option 1 – We can't infer that dinosaurs didn't have 'any' colour.**

**Option 3 – Colour is not part of 'internal structure'.**

**Option 4 – It's too generic as it talks about all animals and their internal structures. The question is specific to dinosaurs.**

**FeedBack**

---

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

What colour were the dinosaurs? If you have a picture in your head, fresh studies suggest you may need to revise it. New fossil research also suggests that pigment-producing structures go beyond how the dinosaurs looked and may have played a fundamental role inside their bodies too. The latest findings have also paved the way for a more accurate reconstruction of the internal anatomy of extinct animals, and insight into the origins of features such as feathers and flight.

Much of this stems from investigations into melanin, a pigment found in structures called melanosomes inside cells that gives external features including hair, feather, skin and eyes their colour—and which, it now turns out, is abundant inside animals' bodies too. "We've found it in places where we didn't think it existed," said Maria McNamara, a paleobiologist at University College Cork, in Ireland.

The discoveries in her team's newest research, published in mid-August, were made using advanced microscopy and synchrotron X-ray techniques, which harness the energy of fast-moving electrons to help examine fossils in minute detail. Using these, the researchers found that melanin was widespread in the internal organs of both modern and fossil amphibians, reptiles, birds, and mammals—following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally. What's more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types, thus opening up exciting opportunities to use them to map the soft tissues of ancient animals.

These studies also have further implications. For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function, says McNamara. "There's the potential that melanin didn't evolve for colour at all," she said. "That role may actually be secondary to much more important physiological functions." Her research indicates that it may have an important role in homeostasis, or regulation of the internal chemical and physical state of the body, and the balance of its metallic elements. "A big question now is does this apply to the first, most primitive vertebrates?" said McNamara. "Can we find fossil evidence of this? Which function of melanin is evolutionarily primitive—production of colour or homeostasis?"

At the same time, the findings imply that we may need to review our understanding of the colours of ancient animals. That's because fossil melanosomes previously assumed to represent external hues may in fact be from internal tissues, especially if the fossil has been disturbed over time. McNamara says her research has also shown that melanosomes can change shape and shrink over the course of millions of years, potentially affecting colour reconstructions.

Further complicating the picture is that animals contain additional non-melanin pigments such as carotenoids and what is known as structural colour, which was only recently identified in fossils. In 2016, a study by McNamara's team on the skin of a 10-million-year-old snake found that these could be preserved in certain mineralized remains. "These have the potential to preserve all aspects of the colour-producing gamut that vertebrates have,"

she said. She hopes over time that these findings and techniques will together help us to much more accurately interpret the colours of ancient organisms—though in these early days, she doesn't have examples of animals for which this has already changed. [...]

### Q.9

Which of the following is not true regarding the research cited in the passage?

- 1  It used techniques to examine fossils in a more detailed manner.
- 2  It expanded upon the finding of a previous related study.
- 3  Some of the researchers found an exciting way to recreate soft tissues of animals.
- 4  Some findings of the research surprised the researchers.

**Solution:**

**Correct Answer : 3**

Options 1, 2, and 4 are clearly mentioned in the passage. Refer to the paragraph: “The discoveries in her team’s newest research ... map the soft tissues of ancient animals.”

 **Bookmark**

 **Answer key/Solution**

Option 1 – “...which harness the energy of fast-moving electrons to help examine fossils in minute detail.”

Option 2 – “...following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally.”

Option 4 – “What’s more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types...”

Option 3 – It is a distorted option. The author mentions this point as a possible new application of the findings of the study. So, this is the correct answer.

**FeedBack**

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

What colour were the dinosaurs? If you have a picture in your head, fresh studies suggest you may need to revise it. New fossil research also suggests that pigment-producing structures go beyond how the dinosaurs looked and may have played a fundamental role inside their bodies too. The latest findings have also paved the way for a more accurate reconstruction of the internal anatomy of extinct animals, and insight into the origins of features such as feathers and flight.

Much of this stems from investigations into melanin, a pigment found in structures called melanosomes inside cells that gives external features including hair, feather, skin and eyes their colour—and which, it now turns out, is abundant inside animals’ bodies too. “We’ve found it in places where we didn’t think it existed,” said Maria McNamara, a paleobiologist at University College Cork, in Ireland.

**The discoveries in her team’s newest research, published in mid-August, were made using**

advanced microscopy and synchrotron X-ray techniques, which harness the energy of fast-moving electrons to help examine fossils in minute detail. Using these, the researchers found that melanin was widespread in the internal organs of both modern and fossil amphibians, reptiles, birds, and mammals—following up a finding they made last year that melanosomes in the body of existing and fossil frogs in fact vastly outnumbered those found externally. What's more, they were surprised to discover that the chemical make-up and shape of the melanosomes varied between organ types, thus opening up exciting opportunities to use them to map the soft tissues of ancient animals.

These studies also have further implications. For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function, says McNamara. "There's the potential that melanin didn't evolve for colour at all," she said. "That role may actually be secondary to much more important physiological functions." Her research indicates that it may have an important role in homeostasis, or regulation of the internal chemical and physical state of the body, and the balance of its metallic elements. "A big question now is does this apply to the first, most primitive vertebrates?" said McNamara. "Can we find fossil evidence of this? Which function of melanin is evolutionarily primitive—production of colour or homeostasis?"

At the same time, the findings imply that we may need to review our understanding of the colours of ancient animals. That's because fossil melanosomes previously assumed to represent external hues may in fact be from internal tissues, especially if the fossil has been disturbed over time. McNamara says her research has also shown that melanosomes can change shape and shrink over the course of millions of years, potentially affecting colour reconstructions.

Further complicating the picture is that animals contain additional non-melanin pigments such as carotenoids and what is known as structural colour, which was only recently identified in fossils. In 2016, a study by McNamara's team on the skin of a 10-million-year-old snake found that these could be preserved in certain mineralized remains. "These have the potential to preserve all aspects of the colour-producing gamut that vertebrates have," she said. She hopes over time that these findings and techniques will together help us to much more accurately interpret the colours of ancient organisms—though in these early days, she doesn't have examples of animals for which this has already changed. [...]

---

#### Q.10

As per the passage, the result of the study cited can:

- 
- 1  change our comprehension of melanin's function.
  - 2  make melanin an obsolete element in terms of colour studies.
  - 3  dispute the role of homeostasis or regulation of internal chemical.
  - 4  implicate the primitive role attached to evolution.
-

**Solution:****Correct Answer : 1**

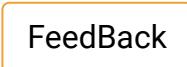
Refer to the lines: "These studies also have further implications.

For one, the finding that melanosomes are so common inside animals' bodies may overhaul our very understanding of melanin's function..." So, option 1 is the clear answer. The other options are distorted.

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

**Option 2 – 'Obsolete' makes it illogical.**

**Options 3 and 4 – 'Dispute' and 'implicate' make these wrong.**

 **FeedBack**

**Direction for questions (11-14): Read the given passage and answer the questions that follow.**

In 70,000 years, *Homo sapiens* have grown from thousands of hunter-gatherers teetering on the brink of extinction to a global population of 7.7 billion. In *Growth*, Vaclav Smil explains how we have peopled the planet through our growing capacity for harvesting energy from our environment: food from plants, labour from animals and energy from fossil fuels. Civilization has developed by dominating Earth's resources. Smil, whose research spans energy, population and environmental change, drives home the cost of growth on a finite planet. It is high: polluted land, air and water, lost wilderness and rising levels of atmospheric carbon dioxide.

He argues that most economic projections predict growth by ignoring the biophysical reality of limited resources. Economists emphasize that efficient use enables growth without pumping up energy consumption. Smil does not deny that energy efficiency has increased. For example, he details how agriculture now extracts ten times as much food energy from each parcel of land as it did a century ago. But the 10-fold increase in yield has been driven by a 90-fold boost in energetic inputs – caused by fossil-fuelled farm machinery, and electricity for irrigation and fertilizer production. When this complexity is accounted for, the story of efficiency is turned on its head: we now put more fossil-fuel energy in for each unit of food we get out.

On a crowded Earth, we mostly address this challenge by eating up more land. As grasslands and forests are converted to agriculture, the land is no longer available for carbon storage or biodiversity-sustaining wilderness. Human history is a story of innovation and increased efficiency, but also of relentless depletion of Earth's resources. Is there a path to prosperity and well-being that does not rely on overconsumption?

Smil is not optimistic. There are no solutions to reconcile our species' burgeoning consumption with a viable future. Instead, he focuses on simple equations that can be used to model (but rarely predict) growth and the energetic, physical and biological principles that are its foundations. He amasses examples of seemingly disparate systems that start small,

enter a phase of exponential increase and then plateau.

In some cases, the trajectories tip into dramatic decline, as happened with video tapes and CDs. In others, a decline can rebound. US oil production, for instance, was in decline from 1970; with the expansion of hydraulic fracturing, or fracking, a decade ago, it rebounded. In 2018, it surpassed its 50-year-old peak. Smil shows repeatedly how beautifully fitting models have failed to predict the future.

As energy use has increased, per capita gross domestic product and life spans have risen while birth rates and infant mortality have fallen. Smil admits that disentangling cause from effect and fundamental drivers from correlative happenstance is enormously difficult. However, he argues that energy is essential to the growth of our immensely complex modern civilization because it is required to do work. Every baby born, bit transmitted, material moved demands energy.

Smil is sceptical of the “techno-optimists” who envision solutions to our immense challenges coming from greater efficiency, shrinking material inputs to economic production, or information technology. He looks at technologies such as smartphones, laptop batteries and supercomputers, in which growth follows Moore’s Law – computing capacity doubles approximately every two years. In that exponential growth, he sees no hope of solving environmental crises.

As for the cost of computing, it has, in Smil’s estimate, fallen an astonishing 100 billion times since the days of vacuum tubes. But again, he sees little evidence that the ‘saving’ will save us from planetary crises, quipping that social media proves “convincingly that the volume of communication must be inversely related to its quality”. Our most spectacular technological achievements have, thus far, done little to abate our impact on the planet. Many have exacerbated it.

#### Q.11

Which of the following measures is Smil most likely to support to address the problem of over-consumption of resources?

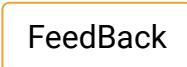
- 
- 1  Increasing the funding for research in energy, population and environmental change
  - 2  Targeted technological innovation that focuses on maximum utilization of finite agricultural land
  - 3  Optimal resource utilization planning in tandem with research to predict future outcomes
  - 4  Using elementary equations to model growth, and the biophysical principles it depends upon
-

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

Option (1) and (3) are not correct because the impact or viability of research and the funding of such research is not discussed by the author or Smil in the passage.

Option (2) is not correct because from the seventh paragraph onward the discussion is primarily focused on why Smil is skeptical about technology.

Option (4) is correct because the fourth paragraph informs us about Smil's method to tackle resource use by stating "... he focuses on simple equations that can be used to model (but rarely predict) growth..."

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

**Direction for questions (11-14):** Read the given passage and answer the questions that follow.

In 70,000 years, Homo sapiens have grown from thousands of hunter-gatherers teetering on the brink of extinction to a global population of 7.7 billion. In *Growth*, Vaclav Smil explains how we have peopled the planet through our growing capacity for harvesting energy from our environment: food from plants, labour from animals and energy from fossil fuels. Civilization has developed by dominating Earth's resources. Smil, whose research spans energy, population and environmental change, drives home the cost of growth on a finite planet. It is high: polluted land, air and water, lost wilderness and rising levels of atmospheric carbon dioxide.

He argues that most economic projections predict growth by ignoring the biophysical reality of limited resources. Economists emphasize that efficient use enables growth without pumping up energy consumption. Smil does not deny that energy efficiency has increased. For example, he details how agriculture now extracts ten times as much food energy from each parcel of land as it did a century ago. But the 10-fold increase in yield has been driven by a 90-fold boost in energetic inputs – caused by fossil-fuelled farm machinery, and electricity for irrigation and fertilizer production. When this complexity is accounted for, the story of efficiency is turned on its head: we now put more fossil-fuel energy in for each unit of food we get out.

On a crowded Earth, we mostly address this challenge by eating up more land. As grasslands and forests are converted to agriculture, the land is no longer available for carbon storage or biodiversity-sustaining wilderness. Human history is a story of innovation and increased efficiency, but also of relentless depletion of Earth's resources. Is there a path to prosperity and well-being that does not rely on overconsumption?

Smil is not optimistic. There are no solutions to reconcile our species' burgeoning consumption with a viable future. Instead, he focuses on simple equations that can be used to model (but rarely predict) growth and the energetic, physical and biological principles that are its foundations. He amasses examples of seemingly disparate systems that start small,

**enter a phase of exponential increase and then plateau.**

In some cases, the trajectories tip into dramatic decline, as happened with video tapes and CDs. In others, a decline can rebound. US oil production, for instance, was in decline from 1970; with the expansion of hydraulic fracturing, or fracking, a decade ago, it rebounded. In 2018, it surpassed its 50-year-old peak. Smil shows repeatedly how beautifully fitting models have failed to predict the future.

As energy use has increased, per capita gross domestic product and life spans have risen while birth rates and infant mortality have fallen. Smil admits that disentangling cause from effect and fundamental drivers from correlative happenstance is enormously difficult. However, he argues that energy is essential to the growth of our immensely complex modern civilization because it is required to do work. Every baby born, bit transmitted, material moved demands energy.

Smil is sceptical of the “techno-optimists” who envision solutions to our immense challenges coming from greater efficiency, shrinking material inputs to economic production, or information technology. He looks at technologies such as smartphones, laptop batteries and supercomputers, in which growth follows Moore’s Law – computing capacity doubles approximately every two years. In that exponential growth, he sees no hope of solving environmental crises.

As for the cost of computing, it has, in Smil’s estimate, fallen an astonishing 100 billion times since the days of vacuum tubes. But again, he sees little evidence that the ‘saving’ will save us from planetary crises, quipping that social media proves “convincingly that the volume of communication must be inversely related to its quality”. Our most spectacular technological achievements have, thus far, done little to abate our impact on the planet. Many have exacerbated it.

## Q.12

According to the author, Smil is skeptical about the “techno-optimists” because:

- 1  human history is a story of innovation and increased efficiency, but also of relentless depletion of Earth’s resources.
- 2  more computing capacity at lower cost and mere reduction in material inputs will not solve the environmental crises.
- 3  technological innovations often start small, enter a phase of exponential increase and then plateau.
- 4  we have increased our capacity to harvest energy from the planet using technological advancements.

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

**Option (1) is not correct because it does not address the “techno-optimism”.**

**Option (2) is correct because Smil does not believe that technological advancements have the potential to solve environmental crises.**

**Option (3) is not correct because the passage makes the statement about plateauing with regards to “disparate systems” mentioned in the passage.**

**Option (4) is not correct because it speaks of the past results of technology while ‘techno-optimism’ is forward-looking.**

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

**Direction for questions (11-14): Read the given passage and answer the questions that follow.**

In 70,000 years, Homo sapiens have grown from thousands of hunter-gatherers teetering on the brink of extinction to a global population of 7.7 billion. In *Growth*, Vaclav Smil explains how we have peopled the planet through our growing capacity for harvesting energy from our environment: food from plants, labour from animals and energy from fossil fuels. Civilization has developed by dominating Earth’s resources. Smil, whose research spans energy, population and environmental change, drives home the cost of growth on a finite planet. It is high: polluted land, air and water, lost wilderness and rising levels of atmospheric carbon dioxide.

He argues that most economic projections predict growth by ignoring the biophysical reality of limited resources. Economists emphasize that efficient use enables growth without pumping up energy consumption. Smil does not deny that energy efficiency has increased. For example, he details how agriculture now extracts ten times as much food energy from each parcel of land as it did a century ago. But the 10-fold increase in yield has been driven by a 90-fold boost in energetic inputs – caused by fossil-fuelled farm machinery, and electricity for irrigation and fertilizer production. When this complexity is accounted for, the story of efficiency is turned on its head: we now put more fossil-fuel energy in for each unit of food we get out.

On a crowded Earth, we mostly address this challenge by eating up more land. As grasslands and forests are converted to agriculture, the land is no longer available for carbon storage or biodiversity-sustaining wilderness. Human history is a story of innovation and increased efficiency, but also of relentless depletion of Earth’s resources. Is there a path to prosperity and well-being that does not rely on overconsumption?

Smil is not optimistic. There are no solutions to reconcile our species’ burgeoning consumption with a viable future. Instead, he focuses on simple equations that can be used to model (but rarely predict) growth and the energetic, physical and biological principles that are its foundations. He amasses examples of seemingly disparate systems that start small,

enter a phase of exponential increase and then plateau.

In some cases, the trajectories tip into dramatic decline, as happened with video tapes and CDs. In others, a decline can rebound. US oil production, for instance, was in decline from 1970; with the expansion of hydraulic fracturing, or fracking, a decade ago, it rebounded. In 2018, it surpassed its 50-year-old peak. Smil shows repeatedly how beautifully fitting models have failed to predict the future.

As energy use has increased, per capita gross domestic product and life spans have risen while birth rates and infant mortality have fallen. Smil admits that disentangling cause from effect and fundamental drivers from correlative happenstance is enormously difficult. However, he argues that energy is essential to the growth of our immensely complex modern civilization because it is required to do work. Every baby born, bit transmitted, material moved demands energy.

Smil is sceptical of the “techno-optimists” who envision solutions to our immense challenges coming from greater efficiency, shrinking material inputs to economic production, or information technology. He looks at technologies such as smartphones, laptop batteries and supercomputers, in which growth follows Moore’s Law – computing capacity doubles approximately every two years. In that exponential growth, he sees no hope of solving environmental crises.

As for the cost of computing, it has, in Smil’s estimate, fallen an astonishing 100 billion times since the days of vacuum tubes. But again, he sees little evidence that the ‘saving’ will save us from planetary crises, quipping that social media proves “convincingly that the volume of communication must be inversely related to its quality”. Our most spectacular technological achievements have, thus far, done little to abate our impact on the planet. Many have exacerbated it.

### Q.13

Smil shows repeatedly how beautifully fitting models have failed to predict the future in order to:

- 1  discredit the steady growth attributed to certain industries like CDs and video tapes.
- 2  explain the benefits of adopting simple equations to model growth rather than using complex models.
- 3  argue against making economic predictions while ignoring the paucity of available resources.
- 4  show how oil production which had fallen in the US has risen again, which highlights the increase in demand for oil.

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

**Option (1)** is not correct because the CDs and video tapes are used to suggest that complex models don't always work.

**Option (2)** is correct because in the fourth paragraph simple models are discussed as Smil's focus area. In contrast to this, in the fifth paragraph we're told about the shortcomings of the complex models. This is done to highlight the preference for simple models.

**Option (3)** is not correct because Smil is critical of making predictions.

**Option (4)** is not correct because the example of US oil production is used to only demonstrate the fact that these beautifully fitting models have failed.

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

**Direction for questions (11-14):** Read the given passage and answer the questions that follow.

In 70,000 years, *Homo sapiens* have grown from thousands of hunter-gatherers teetering on the brink of extinction to a global population of 7.7 billion. In *Growth*, Vaclav Smil explains how we have peopled the planet through our growing capacity for harvesting energy from our environment: food from plants, labour from animals and energy from fossil fuels. Civilization has developed by dominating Earth's resources. Smil, whose research spans energy, population and environmental change, drives home the cost of growth on a finite planet. It is high: polluted land, air and water, lost wilderness and rising levels of atmospheric carbon dioxide.

He argues that most economic projections predict growth by ignoring the biophysical reality of limited resources. Economists emphasize that efficient use enables growth without pumping up energy consumption. Smil does not deny that energy efficiency has increased. For example, he details how agriculture now extracts ten times as much food energy from each parcel of land as it did a century ago. But the 10-fold increase in yield has been driven by a 90-fold boost in energetic inputs – caused by fossil-fuelled farm machinery, and electricity for irrigation and fertilizer production. When this complexity is accounted for, the story of efficiency is turned on its head: we now put more fossil-fuel energy in for each unit of food we get out.

On a crowded Earth, we mostly address this challenge by eating up more land. As grasslands and forests are converted to agriculture, the land is no longer available for carbon storage or biodiversity-sustaining wilderness. Human history is a story of innovation and increased efficiency, but also of relentless depletion of Earth's resources. Is there a path to prosperity and well-being that does not rely on overconsumption?

Smil is not optimistic. There are no solutions to reconcile our species' burgeoning consumption with a viable future. Instead, he focuses on simple equations that can be used to model (but rarely predict) growth and the energetic, physical and biological principles that

are its foundations. He amasses examples of seemingly disparate systems that start small, enter a phase of exponential increase and then plateau.

In some cases, the trajectories tip into dramatic decline, as happened with video tapes and CDs. In others, a decline can rebound. US oil production, for instance, was in decline from 1970; with the expansion of hydraulic fracturing, or fracking, a decade ago, it rebounded. In 2018, it surpassed its 50-year-old peak. Smil shows repeatedly how beautifully fitting models have failed to predict the future.

As energy use has increased, per capita gross domestic product and life spans have risen while birth rates and infant mortality have fallen. Smil admits that disentangling cause from effect and fundamental drivers from correlative happenstance is enormously difficult. However, he argues that energy is essential to the growth of our immensely complex modern civilization because it is required to do work. Every baby born, bit transmitted, material moved demands energy.

Smil is sceptical of the “techno-optimists” who envision solutions to our immense challenges coming from greater efficiency, shrinking material inputs to economic production, or information technology. He looks at technologies such as smartphones, laptop batteries and supercomputers, in which growth follows Moore’s Law – computing capacity doubles approximately every two years. In that exponential growth, he sees no hope of solving environmental crises.

As for the cost of computing, it has, in Smil’s estimate, fallen an astonishing 100 billion times since the days of vacuum tubes. But again, he sees little evidence that the ‘saving’ will save us from planetary crises, quipping that social media proves “convincingly that the volume of communication must be inversely related to its quality”. Our most spectacular technological achievements have, thus far, done little to abate our impact on the planet. Many have exacerbated it.

#### Q.14

Which of the following statements best expresses the overall argument of this passage?

- 
- 1  We must use simple equations to model growth for proper utilization natural resources while maintaining equilibrium in nature, .
  - 2  To minimize environmental degradation and to better human lives requires more than just technology and resource efficiency strategies.
  - 3  There are no solutions to reconcile our species’ excessive and increasing capacity for consumption with a viable future.
  - 4  Using economic projections to predict and forecast growth while overlooking the biophysical reality of limited resources is unsustainable.
-

**Solution:****Correct Answer : 2****Option (2) is the correct choice.****Option (1) is not correct because proper utilization vis-a-vis "maintaining *equilibrium* in nature" is not discussed in the passage.****Option (2) is correct because the passage highlights and criticizes the prominent strategies employed in resource optimization without clearly highlighting a solution. And although the tone of the passage is negative, the passage is not inherently defeatist. But it does not offer any ideal solution.****Option (3) is not correct because this statement is mentioned as Smil's opinion. This does not represent the overall argument of the passage as it continues to speak of simple equation models etc.****Option (4) is not correct because it focuses on economic forecasting and growth while the passage discusses the topic holistically.** **Bookmark** **Answer key/Solution****FeedBack**

**Direction for questions (15-19): Read the given passage and answer the questions that follow.**

In Veronica Gonzalez Peña's fascinating new documentary about the painter Pat Steir, which premiered at the New York Jewish Film Festival earlier this year, Steir recalls an interview with the philosopher Sylvère Lotringer in which he remarked: "When I look at your work closely, I feel that your entire career has been a long effort to disappear." "It's true," Steir says in the film, adding that she has been "trying to take my ego out of the art and my body out of the art. I want the paintings to express something in the will of nature."

"In much of her work," writes Colm Tóibín, "Steir—whose latest paintings are on view in the exhibition "Pat Steir Silent Secret Waterfalls," at the Barnes Foundation in Philadelphia until mid-November—applies a mass of oil paint to the upper part of her canvases, many of which are taller than herself, then lets it drip. Or she throws paint at the surface, letting the marks happen by accident or by a process we might call random design. "My idea," she says in the documentary, "was not to touch the canvas, not to paint, but to pour the paint and let the paint itself make a picture. I set the limitations. The limitations, of course, are the color, the size, the wind in the room, and how I put the paint on. And then everything outside of me controls how that paint falls. It's a joy to let the painting make itself. It takes away all kinds of responsibility."

In the Annenberg Court of the Barnes Foundation (the large space where people line up to see the permanent collection), Steir's monumental black-and-white paintings—all seven feet tall and ranging from about five to seventeen feet wide—cover three walls. These eleven "Silent Secret Waterfalls" enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint—the great, luminous whiteness that Steir allows to have its own inner life. She is more concerned with essences than with experiences, more interested in what the poet Gerard Manley Hopkins called inscape than she is in landscape.

While it should be possible for someone looking at these paintings to feel that they depict or suggest the flowing of water downward over rock or stone, that is to miss the point of works that are concerned much more with the potential of paint than the need to represent something in nature. They are, to a large extent, autonomous spaces, powered by the visual possibilities of chance and flow. This may connect them to nature: they do what a waterfall does. They have some of the same force. But as paintings, they are dynamic rather than completed; they happened by an arranged accident, the surface is not settled, it is often fully free, moving beyond the natural phenomenon of the exhibition's title and reaching into the realm of the visionary.

### Q.15

**Lotringer's observation that Steir's entire career has been a long effort to disappear is best explained by:**

- 1  Steir 'paints' but without touching the canvas, she pours the paint to allow it to make the picture.

- 2  Steir's method is to step away physically and not let her ego have any control over the paintings.
- 3  Steir excluding both her ego and her body from her work allows the potential of paint to express nature's will.
- 4  Steir paints by disassociating herself from her canvas by throwing paint at its surface, or by allowing applied paint to drip.

**Solution:**

**Correct Answer : 3**

Option (1) is not correct because it is narrow and focuses solely on the process of painting and not on what she is trying to bring to light through her works.

Option (2) is not correct because she still sets the parameters of the process of painting. Thus, "not let her ego have any control" is extreme.

Option (3) is correct. Since the question asks about Lotringer's observation and not about Steir's reply to him, we must infer the nature of her works that prompted him to observe this.

Option (3) correctly addresses both the exclusion of the self and depiction of nature's will through the potential of paint mentioned in the last paragraph.

Option (4) is not correct because it is narrow and focuses solely on the process of painting.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Direction for questions (15-19): Read the given passage and answer the questions that follow.**

In Veronica Gonzalez Peña's fascinating new documentary about the painter Pat Steir, which premiered at the New York Jewish Film Festival earlier this year, Steir recalls an interview with the philosopher Sylvère Lotringer in which he remarked: "When I look at your work closely, I feel that your entire career has been a long effort to disappear." "It's true," Steir says in the film, adding that she has been "trying to take my ego out of the art and my body out of the art. I want the paintings to express something in the will of nature."

"In much of her work," writes Colm Tóibín, "Steir—whose latest paintings are on view in the exhibition "Pat Steir Silent Secret Waterfalls," at the Barnes Foundation in Philadelphia until mid-November—applies a mass of oil paint to the upper part of her canvases, many of which are taller than herself, then lets it drip. Or she throws paint at the surface, letting the marks happen by accident or by a process we might call random design. "My idea," she says in the documentary, "was not to touch the canvas, not to paint, but to pour the paint and let the paint itself make a picture. I set the limitations. The limitations, of course, are the color, the size, the wind in the room, and how I put the paint on. And then everything outside of me controls how that paint falls. It's a joy to let the painting make itself. It takes away all kinds of responsibility."

In the Annenberg Court of the Barnes Foundation (the large space where people line up to see the permanent collection), Steir's monumental black-and-white paintings—all seven feet tall and ranging from about five to seventeen feet wide—cover three walls. These eleven "Silent Secret Waterfalls" enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint—the great, luminous whiteness that Steir allows to have its own inner life. She is more concerned with essences than with experiences, more interested in what the poet Gerard Manley Hopkins called inscape than she is in landscape.

While it should be possible for someone looking at these paintings to feel that they depict or suggest the flowing of water downward over rock or stone, that is to miss the point of works that are concerned much more with the potential of paint than the need to represent something in nature. They are, to a large extent, autonomous spaces, powered by the visual possibilities of chance and flow. This may connect them to nature: they do what a waterfall does. They have some of the same force. But as paintings, they are dynamic rather than completed; they happened by an arranged accident, the surface is not settled, it is often fully free, moving beyond the natural phenomenon of the exhibition's title and reaching into the realm of the visionary.

#### **Q.16**

**According to the author, Steir's works move beyond the exhibition's title "Pat Steir Silent Secret Waterfalls" because:**

- 1  they enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint.

- 2  in them the paint takes over, thus creating a work that depicts nature but is also both subjected to and created by nature itself.
- 3  they depict nature without merely mimicking it, which allows the viewer to go beyond and experience even the sounds of the waterfall.
- 4  they are interpretative, evocative and dynamic and have 'some of the same force as the waterfall' and are hence more than just 'silent'.

**Solution:**

**Correct Answer : 4**

Option (1) is not correct because it does not describe as to why they move beyond the title.

Option (2) is not correct because it focuses on paint alone and does not discuss the interpretative nature of the paintings.

Option (3) is not correct because we cannot outright state that one can 'experience even the sounds of the waterfall' as 'Silent' in the title can be taken to mean unspoken or unsaid as well.

Option (4) is correct because the last paragraph of the passage tells us that due to the nature of these paintings, they evoke more than the natural phenomenon in its title. As they don't depict the 'waterfalls' like a photo does, and are evocative, they move the viewer into realms which are not 'silent'.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Direction for questions (15-19): Read the given passage and answer the questions that follow.**

In Veronica Gonzalez Peña's fascinating new documentary about the painter Pat Steir, which premiered at the New York Jewish Film Festival earlier this year, Steir recalls an interview with the philosopher Sylvère Lotringer in which he remarked: "When I look at your work closely, I feel that your entire career has been a long effort to disappear." "It's true," Steir says in the film, adding that she has been "trying to take my ego out of the art and my body out of the art. I want the paintings to express something in the will of nature."

"In much of her work," writes Colm Tóibín, "Steir—whose latest paintings are on view in the exhibition "Pat Steir Silent Secret Waterfalls," at the Barnes Foundation in Philadelphia until mid-November—applies a mass of oil paint to the upper part of her canvases, many of which are taller than herself, then lets it drip. Or she throws paint at the surface, letting the marks happen by accident or by a process we might call random design. "My idea," she says in the documentary, "was not to touch the canvas, not to paint, but to pour the paint and let the paint itself make a picture. I set the limitations. The limitations, of course, are the color, the size, the wind in the room, and how I put the paint on. And then everything outside of me controls how that paint falls. It's a joy to let the painting make itself. It takes away all kinds of responsibility."

In the Annenberg Court of the Barnes Foundation (the large space where people line up to see the permanent collection), Steir's monumental black-and-white paintings—all seven feet tall and ranging from about five to seventeen feet wide—cover three walls. These eleven "Silent Secret Waterfalls" enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint—the great, luminous whiteness that Steir allows to have its own inner life. She is more concerned with essences than with experiences, more interested in what the poet Gerard Manley Hopkins called inscape than she is in landscape.

While it should be possible for someone looking at these paintings to feel that they depict or suggest the flowing of water downward over rock or stone, that is to miss the point of works that are concerned much more with the potential of paint than the need to represent something in nature. They are, to a large extent, autonomous spaces, powered by the visual possibilities of chance and flow. This may connect them to nature: they do what a waterfall does. They have some of the same force. But as paintings, they are dynamic rather than completed; they happened by an arranged accident, the surface is not settled, it is often fully free, moving beyond the natural phenomenon of the exhibition's title and reaching into the realm of the visionary.

### Q.17

The author mentions 'inscape' to refer to:

- 1  the paintings of Steir which enact the falling of water and are accurate representations of waterfalls.
- 2  Steir's concern for essence rather than expression which shines through her works.

- 3  the luminous whiteness in Steir's paintings that focuses on the true essence of things.
- 4  ideas like that of water having its own internal power, that allow Steir to create works that are based in essence.

**Solution:**

**Correct Answer : 2**

**Option (1) is not correct because an 'accurate representation' is not what Steir creates.**

**Option (2) is correct because the passage clearly states "She is more concerned with essences than with experiences".**

**Option (3) is not correct because though the luminous whiteness mentioned is based on 'inner life', the option does not discuss the relation between essence and experience as mentioned in the passage.**

**Option (4) is not correct because the passage does not claim that these 'ideas' allow Steir to work on essence.**

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Direction for questions (15-19): Read the given passage and answer the questions that follow.**

In Veronica Gonzalez Peña's fascinating new documentary about the painter Pat Steir, which premiered at the New York Jewish Film Festival earlier this year, Steir recalls an interview with the philosopher Sylvère Lotringer in which he remarked: "When I look at your work closely, I feel that your entire career has been a long effort to disappear." "It's true," Steir says in the film, adding that she has been "trying to take my ego out of the art and my body out of the art. I want the paintings to express something in the will of nature."

"In much of her work," writes Colm Tóibín, "Steir—whose latest paintings are on view in the exhibition "Pat Steir Silent Secret Waterfalls," at the Barnes Foundation in Philadelphia until mid-November—applies a mass of oil paint to the upper part of her canvases, many of which are taller than herself, then lets it drip. Or she throws paint at the surface, letting the marks happen by accident or by a process we might call random design. "My idea," she says in the documentary, "was not to touch the canvas, not to paint, but to pour the paint and let the paint itself make a picture. I set the limitations. The limitations, of course, are the color, the size, the wind in the room, and how I put the paint on. And then everything outside of me controls how that paint falls. It's a joy to let the painting make itself. It takes away all kinds of responsibility."

In the Annenberg Court of the Barnes Foundation (the large space where people line up to see the permanent collection), Steir's monumental black-and-white paintings—all seven feet tall and ranging from about five to seventeen feet wide—cover three walls. These eleven "Silent Secret Waterfalls" enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint—the great, luminous whiteness that Steir allows to have its own inner life. She is more concerned with essences than with experiences, more interested in what the poet Gerard Manley Hopkins called inscape than she is in landscape.

While it should be possible for someone looking at these paintings to feel that they depict or suggest the flowing of water downward over rock or stone, that is to miss the point of works that are concerned much more with the potential of paint than the need to represent something in nature. They are, to a large extent, autonomous spaces, powered by the visual possibilities of chance and flow. This may connect them to nature: they do what a waterfall does. They have some of the same force. But as paintings, they are dynamic rather than completed; they happened by an arranged accident, the surface is not settled, it is often fully free, moving beyond the natural phenomenon of the exhibition's title and reaching into the realm of the visionary.

#### **Q.18**

**Steir's process of painting can most accurately be described as:**

- 1  applying or throwing paint on a large canvas, and letting the paint tell its own story, such that it takes away all kinds of responsibility.

2  setting limitations, and allowing the thrown or applied paint to paint itself a picture to express something in the will of nature.

3  not touching the canvas, not painting but rather pouring paint, so that everything outside of Steir controls how the painting forms.

4  applying or throwing a mass of oil paint onto the upper part of her canvases, many of which are taller than herself, and then channeling the drip.

**Solution:**

**Correct Answer : 2**

Options (1), (3) and (4) are not correct because they do not speak about the limitations she needs to set, to make it *her* painting but in such a way that it can show the 'will' of nature.

Option (2) is correct because in the first paragraph we're told she wants to exclude her ego and body so as to express will of nature. Her painting process which allows the paint to take over while working under the limitations set by her allows her to take a step back thus letting the 'will' of nature express itself.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Direction for questions (15-19): Read the given passage and answer the questions that follow.**

In Veronica Gonzalez Peña's fascinating new documentary about the painter Pat Steir, which premiered at the New York Jewish Film Festival earlier this year, Steir recalls an interview with the philosopher Sylvère Lotringer in which he remarked: "When I look at your work closely, I feel that your entire career has been a long effort to disappear." "It's true," Steir says in the film, adding that she has been "trying to take my ego out of the art and my body out of the art. I want the paintings to express something in the will of nature."

"In much of her work," writes Colm Tóibín, "Steir—whose latest paintings are on view in the exhibition "Pat Steir Silent Secret Waterfalls," at the Barnes Foundation in Philadelphia until mid-November—applies a mass of oil paint to the upper part of her canvases, many of which are taller than herself, then lets it drip. Or she throws paint at the surface, letting the marks happen by accident or by a process we might call random design. "My idea," she says in the documentary, "was not to touch the canvas, not to paint, but to pour the paint and let the paint itself make a picture. I set the limitations. The limitations, of course, are the color, the size, the wind in the room, and how I put the paint on. And then everything outside of me controls how that paint falls. It's a joy to let the painting make itself. It takes away all kinds of responsibility."

In the Annenberg Court of the Barnes Foundation (the large space where people line up to see the permanent collection), Steir's monumental black-and-white paintings—all seven feet tall and ranging from about five to seventeen feet wide—cover three walls. These eleven "Silent Secret Waterfalls" enact the falling of water, and the idea of water as having its own internal power; but they also enact the falling of paint—the great, luminous whiteness that Steir allows to have its own inner life. She is more concerned with essences than with experiences, more interested in what the poet Gerard Manley Hopkins called inscape than she is in landscape.

While it should be possible for someone looking at these paintings to feel that they depict or suggest the flowing of water downward over rock or stone, that is to miss the point of works that are concerned much more with the potential of paint than the need to represent something in nature. They are, to a large extent, autonomous spaces, powered by the visual possibilities of chance and flow. This may connect them to nature: they do what a waterfall does. They have some of the same force. But as paintings, they are dynamic rather than completed; they happened by an arranged accident, the surface is not settled, it is often fully free, moving beyond the natural phenomenon of the exhibition's title and reaching into the realm of the visionary.

#### **Q.19**

**Looking at Steir's paintings to feel that they depict flowing water over stone, is to miss the point of the works because:**

- 1  they are more like literal depictions of the force of waterfalls and they seek to communicate the true essence of experiencing a waterfall.

- 2  unlike photos or other paintings, they are more than basic copies of waterfalls, they communicate the true essence of waterfalls.
- 3  they are not literal depictions, but they are autonomous spaces that explore the potential of paint and flow to communicate essence.
- 4  Steir paints to communicate the true essence of things and to express the true reality of nature.

**Solution:**

**Correct Answer : 3**

Option (1) is not correct because the passage clearly states that the paintings may be connected to waterfalls but they are more than that.

Option (2) is not correct because a comparison with photos or other paintings extends beyond the scope of the passage.

Option (3) is correct because it encapsulates the crux of the passage i.e. that her paintings are interpretative and they communicate essence.

Option (4) is not correct because of the phrase “express the true reality of nature” as this extends beyond the scope of the passage.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

On November 16th 1949, Nash sent a note barely longer than a page to the Proceedings of the National Academy of Sciences, in which he laid out the concept that has since become known as the “Nash equilibrium”. This concept describes a stable outcome that results from people or institutions making rational choices based on what they think others will do. In a Nash equilibrium, no one is able to improve their own situation by changing strategy: each person is doing as well as they possibly can, even if that does not mean the optimal outcome for society. With a flourish of elegant mathematics, Nash showed that every “game” with a finite number of players, each with a finite number of options to choose from, would have at least one such equilibrium.

His insights expanded the scope of economics. In perfectly competitive markets, where there are no barriers to entry and everyone's products are identical, no individual buyer or seller can influence the market: none need pay close attention to what the others are up to. But most markets are not like this: the decisions of rivals and customers matter. From auctions to labour markets, the Nash equilibrium gave the dismal science a way to make real-world predictions based on information about each person's incentives.

One example in particular has come to symbolise the equilibrium: the prisoner's dilemma. Nash used algebra and numbers to set out this situation in an expanded paper published in 1951, but the version familiar to economics students is altogether more gripping.

**It involves two mobsters sweating in separate prison cells, each contemplating the same deal offered by the district attorney. If they both confess to a bloody murder, they each face ten years in jail. If one stays quiet while the other confesses, then the confessor will get a reward, while the other will face a lifetime in jail. And if both hold their tongue, then they each face a minor charge, and only a year in the clink.**

**There is only one Nash-equilibrium solution to the prisoner's dilemma: both confess. Each is a best response to the other's strategy; since the other might have spilled the beans, confessing avoids a lifetime in jail. The tragedy is that if only they could work out some way of coordinating, they could both make themselves better off.**

**The example illustrates that crowds can be foolish as well as wise; what is best for the individual can be disastrous for the group. This tragic outcome is all too common in the real world. Left freely to plunder the sea, individuals will fish more than is best for the group, depleting fish stocks. Employees competing to impress their boss by staying longest in the office will encourage workforce exhaustion. Banks have an incentive to lend more rather than sit things out when house prices shoot up.**

**The Nash equilibrium thus helped economists to understand how self-improving individuals could lead to self-harming crowds. Better still, it helped them to tackle the problem: they just had to make sure that every individual faced the best incentives possible. If things still went wrong—parents failing to vaccinate their children against measles, say—then it must be because people were not acting in their own self-interest. In such cases, the public-policy challenge would be one of information.**

## Q.20

**The author lists all of the following as aspects of Nash Equilibrium EXCEPT:**

- 1  One cannot improve one's situation by changing strategy.
- 2  Each person doing as well as they possibly can, will not always benefit society.
- 3  In a perfectly competitive market, individuals and society both stand to benefit.
- 4  Self-improving individuals can lead to self-harming crowds.

**Solution:**

**Correct Answer : 3**

**Option (1) is not correct because it is clearly stated in the first paragraph of the passage.**

**Option (2) is not correct because it is clearly stated in the first paragraph of the passage.**

**Option (3) is correct because decisions in made in perfect markets cannot be influenced by the Nash Equilibrium.**

**Option (4) is not correct because it is clearly stated in the last paragraph of the passage.**

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

On November 16th 1949, Nash sent a note barely longer than a page to the Proceedings of the National Academy of Sciences, in which he laid out the concept that has since become known as the “Nash equilibrium”. This concept describes a stable outcome that results from people or institutions making rational choices based on what they think others will do. In a Nash equilibrium, no one is able to improve their own situation by changing strategy: each person is doing as well as they possibly can, even if that does not mean the optimal outcome for society. With a flourish of elegant mathematics, Nash showed that every “game” with a finite number of players, each with a finite number of options to choose from, would have at least one such equilibrium.

His insights expanded the scope of economics. In perfectly competitive markets, where there are no barriers to entry and everyone’s products are identical, no individual buyer or seller can influence the market: none need pay close attention to what the others are up to. But most markets are not like this: the decisions of rivals and customers matter. From auctions to labour markets, the Nash equilibrium gave the dismal science a way to make real-world predictions based on information about each person’s incentives.

One example in particular has come to symbolise the equilibrium: the prisoner’s dilemma. Nash used algebra and numbers to set out this situation in an expanded paper published in 1951, but the version familiar to economics students is altogether more gripping.

It involves two mobsters sweating in separate prison cells, each contemplating the same deal offered by the district attorney. If they both confess to a bloody murder, they each face ten years in jail. If one stays quiet while the other confesses, then the confessor will get a reward, while the other will face a lifetime in jail. And if both hold their tongue, then they each face a minor charge, and only a year in the clink.

There is only one Nash-equilibrium solution to the prisoner’s dilemma: both confess. Each is a best response to the other’s strategy; since the other might have spilled the beans, confessing avoids a lifetime in jail. The tragedy is that if only they could work out some way of coordinating, they could both make themselves better off.

The example illustrates that crowds can be foolish as well as wise; what is best for the individual can be disastrous for the group. This tragic outcome is all too common in the real world. Left freely to plunder the sea, individuals will fish more than is best for the group, depleting fish stocks. Employees competing to impress their boss by staying longest in the office will encourage workforce exhaustion. Banks have an incentive to lend more rather than sit things out when house prices shoot up.

The Nash equilibrium thus helped economists to understand how self-improving individuals could lead to self-harming crowds. Better still, it helped them to tackle the problem: they just had to make sure that every individual faced the best incentives possible. If things still went wrong—parents failing to vaccinate their children against measles, say—then it must be

**because people were not acting in their own self-interest. In such cases, the public-policy challenge would be one of information.**

### Q.21

**Which of the following, if true, is not a valid example of what is best for the individual can be disastrous for the group?**

- 1  Overhunting by an individual negatively affects the ecological balance of a region.
- 2  Two competing companies dump their industrial waste underground which contaminates groundwater.
- 3  A person misses their job interview in order to save the life of an accident victim.
- 4  All countries will benefit from a stable climate, but any single country is hesitant to curb CO2 emissions.

**Solution:**

**Correct Answer : 3**

Option (1) is not correct because it follows the example of overfishing mentioned in the passage. Options (2) and (4) are not correct because they follow the example of banks mentioned in the passage. Option (3) is correct because this example is about an individual whose actions are not disastrous for the group.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

On November 16th 1949, Nash sent a note barely longer than a page to the Proceedings of the National Academy of Sciences, in which he laid out the concept that has since become known as the “Nash equilibrium”. This concept describes a stable outcome that results from people or institutions making rational choices based on what they think others will do. In a Nash equilibrium, no one is able to improve their own situation by changing strategy: each person is doing as well as they possibly can, even if that does not mean the optimal outcome for society. With a flourish of elegant mathematics, Nash showed that every “game” with a finite number of players, each with a finite number of options to choose from, would have at least one such equilibrium.

His insights expanded the scope of economics. In perfectly competitive markets, where there are no barriers to entry and everyone's products are identical, no individual buyer or seller can influence the market: none need pay close attention to what the others are up to. But most markets are not like this: the decisions of rivals and customers matter. From auctions to labour markets, the Nash equilibrium gave the dismal science a way to make real-world predictions based on information about each person's incentives.

**One example in particular has come to symbolise the equilibrium: the prisoner's dilemma. Nash used algebra and numbers to set out this situation in an expanded paper published in 1951, but the version familiar to economics students is altogether more gripping.**

**It involves two mobsters sweating in separate prison cells, each contemplating the same deal offered by the district attorney. If they both confess to a bloody murder, they each face ten years in jail. If one stays quiet while the other confesses, then the confessor will get a reward, while the other will face a lifetime in jail. And if both hold their tongue, then they each face a minor charge, and only a year in the clink.**

**There is only one Nash-equilibrium solution to the prisoner's dilemma: both confess. Each is a best response to the other's strategy; since the other might have spilled the beans, confessing avoids a lifetime in jail. The tragedy is that if only they could work out some way of coordinating, they could both make themselves better off.**

**The example illustrates that crowds can be foolish as well as wise; what is best for the individual can be disastrous for the group. This tragic outcome is all too common in the real world. Left freely to plunder the sea, individuals will fish more than is best for the group, depleting fish stocks. Employees competing to impress their boss by staying longest in the office will encourage workforce exhaustion. Banks have an incentive to lend more rather than sit things out when house prices shoot up.**

**The Nash equilibrium thus helped economists to understand how self-improving individuals could lead to self-harming crowds. Better still, it helped them to tackle the problem: they just had to make sure that every individual faced the best incentives possible. If things still went wrong—parents failing to vaccinate their children against measles, say—then it must be because people were not acting in their own self-interest. In such cases, the public-policy challenge would be one of information.**

## **Q.22**

**Based on the prisoner's dilemma as explained in the passage, which of the following is correct?**

- 
- 1  It assumes that the prisoners are not rational individuals.**
  - 2  If one prisoner betrays the other by confessing, he is rewarded for that decision.**
  - 3  If the prisoners had each taken the decision to not confess, they'd be free to go.**
  - 4  If the prisoners could coordinate with each other they would still confess.**
-

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

**Option (1) is not correct because based on the information in the first paragraph; the Nash Equilibrium operates on individuals making rational choices.**

 **Bookmark**

**Option (2) is correct because the passage clearly states that "If one stays quiet while the other confesses, then the confessor will get a reward."**

 **Answer key/Solution**

**Option (3) is not correct because based on the passage they'd be punished for a year.**

**Option (4) is not correct because coordination would affect the rational decision making and they both could stand to benefit from it.**

 **FeedBack**

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

**On November 16th 1949, Nash sent a note barely longer than a page to the Proceedings of the National Academy of Sciences, in which he laid out the concept that has since become known as the "Nash equilibrium". This concept describes a stable outcome that results from people or institutions making rational choices based on what they think others will do. In a Nash equilibrium, no one is able to improve their own situation by changing strategy: each person is doing as well as they possibly can, even if that does not mean the optimal outcome for society. With a flourish of elegant mathematics, Nash showed that every "game" with a finite number of players, each with a finite number of options to choose from, would have at least one such equilibrium.**

**His insights expanded the scope of economics. In perfectly competitive markets, where there are no barriers to entry and everyone's products are identical, no individual buyer or seller can influence the market: none need pay close attention to what the others are up to. But most markets are not like this: the decisions of rivals and customers matter. From auctions to labour markets, the Nash equilibrium gave the dismal science a way to make real-world predictions based on information about each person's incentives.**

**One example in particular has come to symbolise the equilibrium: the prisoner's dilemma. Nash used algebra and numbers to set out this situation in an expanded paper published in 1951, but the version familiar to economics students is altogether more gripping.**

**It involves two mobsters sweating in separate prison cells, each contemplating the same deal offered by the district attorney. If they both confess to a bloody murder, they each face ten years in jail. If one stays quiet while the other confesses, then the confessor will get a reward, while the other will face a lifetime in jail. And if both hold their tongue, then they each face a minor charge, and only a year in the clink.**

**There is only one Nash-equilibrium solution to the prisoner's dilemma: both confess. Each is a best response to the other's strategy; since the other might have spilled the beans,**

**confessing avoids a lifetime in jail. The tragedy is that if only they could work out some way of coordinating, they could both make themselves better off.**

The example illustrates that crowds can be foolish as well as wise; what is best for the individual can be disastrous for the group. This tragic outcome is all too common in the real world. Left freely to plunder the sea, individuals will fish more than is best for the group, depleting fish stocks. Employees competing to impress their boss by staying longest in the office will encourage workforce exhaustion. Banks have an incentive to lend more rather than sit things out when house prices shoot up.

The Nash equilibrium thus helped economists to understand how self-improving individuals could lead to self-harming crowds. Better still, it helped them to tackle the problem: they just had to make sure that every individual faced the best incentives possible. If things still went wrong—parents failing to vaccinate their children against measles, say—then it must be because people were not acting in their own self-interest. In such cases, the public-policy challenge would be one of information.

### Q.23

Based on the information provided in the last paragraph, which of the following statements can be inferred:

- 1  Despite a massive campaign highlighting the benefits of online banking, most people still prefer the traditional form as there are several benefits that are given to customers that come to the bank.
- 2  After intensive campaign and outreach programs, the people are aware of the benefits of vaccination.
- 3  Fishing of endangered species has increased even after severe penalties.
- 4  Instances of crime have gone down in the capital.

**Solution:**

**Correct Answer : 1**

The last passage states that the Nash equilibrium has helped economists to tackle the problem: they just have to make sure that every individual faces the best incentives possible. Option 3 contradicts this statement and option 4 is vague in its construction. Option 2 is incomplete; it is not clear whether this increase in awareness has resulted in higher percentage of vaccinations. Option 1 is the correct answer as it demonstrates the main idea of the paragraph - only the right incentives will govern the behavior of people.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

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

**On November 16th 1949, Nash sent a note barely longer than a page to the Proceedings of the National Academy of Sciences, in which he laid out the concept that has since become known as the “Nash equilibrium”. This concept describes a stable outcome that results from people or institutions making rational choices based on what they think others will do. In a Nash equilibrium, no one is able to improve their own situation by changing strategy: each person is doing as well as they possibly can, even if that does not mean the optimal outcome for society. With a flourish of elegant mathematics, Nash showed that every “game” with a finite number of players, each with a finite number of options to choose from, would have at least one such equilibrium.**

**His insights expanded the scope of economics. In perfectly competitive markets, where there are no barriers to entry and everyone’s products are identical, no individual buyer or seller can influence the market: none need pay close attention to what the others are up to. But most markets are not like this: the decisions of rivals and customers matter. From auctions to labour markets, the Nash equilibrium gave the dismal science a way to make real-world predictions based on information about each person’s incentives.**

**One example in particular has come to symbolise the equilibrium: the prisoner’s dilemma. Nash used algebra and numbers to set out this situation in an expanded paper published in 1951, but the version familiar to economics students is altogether more gripping.**

**It involves two mobsters sweating in separate prison cells, each contemplating the same deal offered by the district attorney. If they both confess to a bloody murder, they each face ten years in jail. If one stays quiet while the other confesses, then the confessor will get a reward, while the other will face a lifetime in jail. And if both hold their tongue, then they each face a minor charge, and only a year in the clink.**

**There is only one Nash-equilibrium solution to the prisoner’s dilemma: both confess. Each is a best response to the other’s strategy; since the other might have spilled the beans, confessing avoids a lifetime in jail. The tragedy is that if only they could work out some way of coordinating, they could both make themselves better off.**

**The example illustrates that crowds can be foolish as well as wise; what is best for the individual can be disastrous for the group. This tragic outcome is all too common in the real world. Left freely to plunder the sea, individuals will fish more than is best for the group, depleting fish stocks. Employees competing to impress their boss by staying longest in the office will encourage workforce exhaustion. Banks have an incentive to lend more rather than sit things out when house prices shoot up.**

**The Nash equilibrium thus helped economists to understand how self-improving individuals could lead to self-harming crowds. Better still, it helped them to tackle the problem: they just had to make sure that every individual faced the best incentives possible. If things still went wrong—parents failing to vaccinate their children against measles, say—then it must be because people were not acting in their own self-interest. In such cases, the public-policy challenge would be one of information.**

**Q.24**

The author lists all of the following as impacts of the Nash Equilibrium EXCEPT:

- 1  It helped economists to understand how self-improving individuals could lead to self-harming crowds.
- 2  It gave science the ability to make real-world predictions based on information about each person's incentives.
- 3  It extended the scope of economics.
- 4  It gave science the ability to understand decisions made by individual not acting in self-interest.

**Solution:**

**Correct Answer : 4**

Option (1) is not correct because the passage has mentioned this in the last paragraph.



Option (2) is not correct because the passage has mentioned this in the second paragraph.



Option (3) is not correct because the passage has mentioned this in the second paragraph.

Option (4) is correct because the Nash Equilibrium will not work when an individual does not act out of self-interest.

**FeedBack**

**Q.25**

**Directions for question (25):** 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 horns of cattle, the high, long-napped hats of wealthy peasants, the headdresses of the women came to the surface of that sea.
2. Above it occasionally rose a huge burst of laughter from the sturdy lungs of a merry peasant or a prolonged bellow from a tied cow.
3. In the market-place at Goderville was a great crowd, a mingled multitude of men and beasts.
4. And the sharp, shrill, barking voices made a continuous, wild din.

**Solution:****Correct Answer : 3142**

This is an easy question if we can identify all the linking words.

Note 'and' in 4 as well as 'it' in 2. So, the opening sentence can be either 3 or 1.

As 3 gives us the name of the place, it is the correct opening sentence.

'And' in 4 adds to 1. It can't add to 2 as 'continuous, wild din' can't refer to 'tied cow' (keep the pronoun antecedent rule). So, 3124 can't be the correct sequence. It has to be 3142.

**Bookmark****Answer key/Solution****FeedBack****Q.26**

**Directions for question (26):** 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. Fewer than a dozen years passed between the founding of NASA and the Apollo 11 Moon landing on July 20, 1969.
2. It has stuck with us, because the human imagination is puny compared with the vastness of our experience and our potential.
3. The triumphs of the Space Age are perhaps the greatest illustrations of this gap.
4. "Seeing is believing" is such a truism that it was already a cliché in the second century BCE, when the Roman playwright Titus Maccius Plautus planted those words in his comedy Truculentus.

**Solution:****Correct Answer : 4231**

Statements 2 and 3 form a mandatory pair. 2 tells us that imagination is puny compared with experience, and this 'gap' is discussed in 3.

We also know that 23 will not be the opening sequence as 2 states "It has stuck with us..." referring to something else.

This "It" refers to "Seeing is believing" in statement 4. Statement 4 also tells us that "it was already a cliché". This is also thematically continued in statement 2 by stating that it has "stuck" with us. Thus 42 form a mandatory pair.

1 completes the topic of a Space Age mentioned in 3.

Statement 1 cannot be paired with 2 because statement 2 clearly refers to a singular 'it'.

Statement 1 is just informing us of two phenomena, with no particular focus.

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

Thus, 4231 is the correct sequence.

**FeedBack**

**Q.27**

**Directions for question (27): The passage given below is followed by four summaries. Choose the option that best captures the author's position.**

The connection of philosophy with politics has been less evident in Britain than in Continental countries. Empiricism, broadly speaking, is connected with liberalism, but Hume was a Tory; what philosophers call 'idealism' has, in general, a similar connection with conservatism, but T. H. Green was a Liberal. On the Continent distinctions have been more clear-cut, and there has been a greater readiness to accept or reject a block of doctrines as a whole, without critical scrutiny of each separate part.

- 1  On the Continent, unlike in Britain, the connection between politics and philosophy is significantly stronger, thus there has been a greater readiness to accept a block of doctrines as whole.
- 2  In Britain, as compared to the Continent, the connection between philosophy and politics was less apparent as was evinced by the fact that there was a greater readiness to reject doctrines on the Continent.
- 3  If the relationship between philosophy and politics is too strong it can lead to important works and doctrines being rejected as a whole due to the inherent bias of such a connection.
- 4  On the Continent, unlike in Britain, the connection between politics and philosophy is clearer, thus leading to blocks of doctrines being accepted and rejected without scrutiny.

**Solution:**

**Correct Answer : 4**

Option (1) is not correct because of the usage of 'significantly stronger'. This makes it extreme as the passage uses the phrase 'more clear-cut'.

Option (2) is not correct because it is narrow and focuses only on the rejection of doctrines. The crucial issue is the lack of scrutiny before rejection.

Option (3) is not correct because it is narrow and focuses only on the rejection of doctrines. The crucial issue is the lack of scrutiny before rejection.

Option (4) is correct because it addresses both, the connection between politics and philosophy and the effects of such connections – lack of scrutiny of doctrines.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Q.28**

**Directions for question (28):** 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. Kerala received over two and a half times more rainfall over the average for August.
2. The unprecedented rainfall was caused by a spell of low pressure over the region.
3. This was 42% more than during the entire monsoon season.
4. The Indian state of Kerala receives some of India's highest rainfall during the monsoon season.
5. Between August 1 and 19, the state received 758.6 mm of rainfall, compared to the average of 287.6 mm, or 164% more.

**Solution:**

**Correct Answer : 4**

The correct order is 1532. However, it is an easy question. Sentences 1, 2, 3, and 5 are talking about the rainfall in Kerala for a particular year. Sentence 4 is generic as it talks about the normal monsoon pattern in Kerala. So, 4 is the odd one out.

 **Bookmark**

 **Answer key/Solution**

**FeedBack**

**Q.29**

**Directions for question (29):** 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. Not only had Europeans fought many wars with North Africans over the centuries, they had established factories, churches and even cemeteries at all the major ports.
2. North Africa, just across the Mediterranean from Europe, was terra incognita.
3. Three centuries after Christopher Columbus landed in the Americas, Europeans had sailed to the farthest reaches of the Earth, trading in markets as far away as the Americas, Africa and Asia.
4. Still, they were surprisingly unclear about who the North Africans were and how the names they gave them related to those that the people gave themselves.

**Solution:****Correct Answer : 3214**

Statement 1 forms a mandatory pair with 4. In 1 we are told "Not only had Europeans...." to show that these Europeans had sufficient interactions with the North Africans. The use of "still" in 4 continues the idea by showing that despite interactions, they were ill informed about the North Africans.

This topic of interactions with North Africans and the lack of awareness about their culture begins with 3. This introduces the scope of Columbus' travels and contrasts it with North Africa as being 'terra incognita' i.e. 'unknown land'.

Thus the opening pair is 32 followed by 14.

[FeedBack](#)
 [Bookmark](#)
 [Answer key/Solution](#)
**Q.30**

**Directions for question (30):** 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. We have had the potential for total annihilation since 1945, and the capacity for localized mayhem for as long as societies have existed.
2. We are, I promise you, not doomed, no matter what Jonathan Franzen says.
3. As the average temperature warms, the abnormal becomes the new normal, and the new abnormal becomes the unprecedented.
4. Climate change offers the easy choice of a slow destruction through inaction like the proverbial frog in the slowly boiling pot.
5. We could be, of course, if we decided we really wanted to.

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

Option 3 is the odd one out.

 [Bookmark](#)
 [Answer key/Solution](#)

25 form a mandatory pair. The "we are not doomed" in 2 is contradicted in 5 with "we could be", "if we really wanted". This potential to destroy implied by 5 is explained in 1. Then we shift to the source of the current threat which is referred to in 4 with "slow destruction....".

[FeedBack](#)

**Q.31**

**Directions for question (31):** The passage given below is followed by four summaries. Choose the option that best captures the author's position.

It would be foolish to deny that there are any skeletons in IQ-testing's closet. Many, though by no means all, of the originators of the tests were involved with the eugenics movement in the early 20th century, and it's reasonable to be appalled at some of the uses to which IQ tests were originally put. But these concerns are irrelevant to the main question of whether an IQ score, taken today, can tell you anything about a person. Facts are facts, and the validity of intelligence test scores is amply backed by voluminous evidence.

- 
- 1  IQ tests, despite some controversies, remain a trustworthy indicator of one's intelligence.
- 2  Though IQ tests have many secrets, their overall impact on eugenics can't be denied.
- 3  IQ tests owe their origin and related controversies to the eugenics movement of the early 20th century.
- 4  Despite widespread criticism, IQ tests remain a valid indicator of one's intelligence.
- 

**Solution:**

**Correct Answer :** 1

**The author's main points in the paragraph are:**

- IQ tests have some secrets or controversies (skeletons).
- IQ tests are trustworthy as they are backed by facts.

 **Bookmark**

 **Answer key/Solution**

The author mentions the 20th century movement as an example to back point 1. So, option 1 is the correct answer as it contains both the points.

Option 2 – The impact of IQ tests on eugenics has not been discussed in this paragraph.

Option 3 – The origin part is correct. However, the 'controversies' and their origin can't be attributed to the same movement. Hence, it is an incorrect option.

Option 4 – 'Widespread' makes this option illogical.

**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. All three of these 1948 anniversaries are linked.
2. The NHS was one of its key pillars.
3. And mass migration, which began in earnest that year has been intrinsically linked with its development.
4. The human rights framework, with its attention to socioeconomic rights such as healthcare and housing, provided a language for the vision of fairness implicit in Britain's postwar welfare state.

**Solution:**

**Correct Answer : 1423**

This is a very easy question.

 **Bookmark**

 **Answer key/Solution**

42 is a clear pair (framework – its key pillars).

3 starts with 'and'. So, it can't be the first sentence. Furthermore, 3 adds to the idea mentioned in 2.

The year makes it a confusing sentence. But there is no question of 'development' in 1. So, 3 can't come immediately after 1.

1 is clearly the opening sentence. So, the correct sequence is 1423.

**FeedBack**

**Q.33**

**Directions for question (33):** 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. They'll climb to an exposed point, raise their abdomens to the sky, extrude strands of silk, and float away.
2. But that doesn't entirely make sense, especially since spiders only balloon during light winds.
3. It might carry spiders away from predators and competitors, or toward new lands with abundant resources.
4. Spiders have no wings, but they can take to the air nonetheless.
5. This behaviour is called ballooning.

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

The correct order is 4153. However, you don't need to arrange these sentences.

Sentence 2 starts with 'but'. There is no antecedent for the phrase 'that doesn't entirely make sense'.

So, it is the odd one out.

[FeedBack](#) [Bookmark](#) [Answer key/Solution](#)**Q.34**

**Directions for question (34): The passage given below is followed by four summaries. Choose the option that best captures the author's position.**

The saints should always be judged guilty until they are proven innocent, but the tests that have to be applied to them are not, of course, the same in all cases. In Gandhi's case the questions one feels inclined to ask are: to what extent was Gandhi moved by vanity — by the consciousness of himself as a humble, naked old man, sitting on a praying-mat and shaking empires by sheer spiritual power — and to what extent did he compromise his own principles by entering politics, which by their nature are inseparable from coercion and fraud? To give a definite answer one would have to study Gandhi's acts and writings in immense detail, for his whole life was a sort of pilgrimage in which every act was significant.

- 1  Whether or not Gandhi was saint, he must be guilty and for one to declare it otherwise, one needs to study the life and actions of Gandhi in detail as his entire life was shaped by significant events.
- 2  Whether Gandhi's actions were based in vanity, and to what extent he compromised his own principles by entering politics, can be answered only if one was to study his life and his works in immense detail.
- 3  Only by studying Gandhi's actions and writings in detail can one judge his guilt about entering politics and whether or not he was motivated by vanity.
- 4  Vanity, coercion and fraud are tags that can only be attached to Gandhi if his life and writings justified it.

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

**Option (1) is not correct because it states he 'must be guilty' thus negating the need for any further study.**

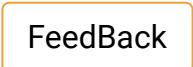
 **Bookmark**

**Option (2) is correct because the passage speaks about the aspects of Gandhi's life that can be questioned and then tells us how one can judge his actions - by studying his life in detail.**

 **Answer key/Solution**

**Option (3) is not correct because it states 'judge his guilt about entering politics'. But the passage does not state that one is automatically guilty if one joins politics.**

**Option (4) is not correct because it is narrow and partial.**

 **FeedBack**

## Sec 2

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

**Based on the types of intelligence, described by American developmental psychologist Howard Gardener, a recruitment firm has designed a new testing mechanism for fresh graduates who are aspiring for jobs. Further, the different types of intelligence are grouped under four broad skill sets - L (Linguistic and Kinesthetic intelligence), M (Mathematical and Logical intelligence), P (Interpersonal and Intrapersonal intelligence) and S (Spatial and Existential intelligence). Also, each of these skill sets are further divided based on four possible grades - E(excellent - 10 points), G(good - 8 points), F(fair - 6 points) and S (satisfactory - 4 points).**

**Four candidates - W, X, Y and Z - aspiring for job are given the following grades, as shown in the below given table, in those four skill sets.**

Skill set \ Person	L	M	P	S
W	E	S	G	F
X	G	G	F	E
Y	F	G	E	G
Z	E	E	G	F

Jobs, available for the fresh graduates, are in three departments - HR, Data Science, and Administration - in a company. The weightage of the different skills required for each of these departments is given in the table shown below.

Weight \ Department	0.4	0.3	0.2	0.1
HR	p	s	l	m
Data Science	m	l	s	p
Administration	s	m	p	l

where, p : the point value of the grade obtained in P

s : the point value of the grade obtained in S

l : the point value of the grade obtained in L

m : the point value of the grade obtained in M

A candidate is considered to be eligible for the job in a particular department, if his score is at least 8 where the score of any candidate is his weighted average.

{For example, the score for a job in HR department will be  $(0.4 \times p) + (0.3 \times s) + (0.2 \times l) + (0.1 \times m)$ .}

### Q.35

**A candidate is considered as an all rounder if he is eligible for a job in all the three departments. Who among the four candidates is an all rounder?**

1  W

2  X

3  Y

4  Z

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

The grades obtained by the candidates can be translated into the following weighted scores:

	HR	Data Science	Administration
W	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 6.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 6.2$
X	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 8.2$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.4$
Y	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 7.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.2$
Z	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 9$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8$

Only Z is an all rounder.

**FeedBack**

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

Based on the types of intelligence, described by American developmental psychologist Howard Gardener, a recruitment firm has designed a new testing mechanism for fresh graduates who are aspiring for jobs. Further, the different types of intelligence are grouped under four broad skill sets - L (Linguistic and Kinesthetic intelligence), M (Mathematical and Logical intelligence), P (Interpersonal and Intrapersonal intelligence) and S (Spatial and Existential intelligence). Also, each of these skill sets are further divided based on four possible grades - E(excellent - 10 points), G(good - 8 points), F(fair - 6 points) and S (satisfactory - 4 points).

Four candidates - W, X, Y and Z - aspiring for job are given the following grades, as shown in the below given table, in those four skill sets.

Skill set Person \	L	M	P	S
W	E	S	G	F
X	G	G	F	E
Y	F	G	E	G
Z	E	E	G	F

Jobs, available for the fresh graduates, are in three departments - HR, Data Science, and Administration - in a company. The weightage of the different skills required for each of these departments is given in the table shown below.

Weight Department \	0.4	0.3	0.2	0.1
HR	p	s	l	m
Data Science	m	l	s	p
Administration	s	m	p	l

where, p : the point value of the grade obtained in P

s : the point value of the grade obtained in S

l : the point value of the grade obtained in L

m : the point value of the grade obtained in M

A candidate is considered to be eligible for the job in a particular department, if his score is at least 8 where the score of any candidate is his weighted average.

{For example, the score for a job in HR department will be  $(0.4 \times p) + (0.3 \times s) + (0.2 \times l) + (0.1 \times m)$ .}

### Q.36

**Which candidate is eligible for exactly two out of the three jobs available?**

1  Only X

2  Both Y and Z

3  Both X and Y

4  Only Y

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

The grades obtained by the candidates can be translated into the following weighted scores:

	HR	Data Science	Administration
W	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 6.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 6.2$
X	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 8.2$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.4$
Y	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 7.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.2$
Z	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 9$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8$

Both X and Y are eligible for exactly two out of the three jobs available.

**FeedBack**

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

Based on the types of intelligence, described by American developmental psychologist Howard Gardener, a recruitment firm has designed a new testing mechanism for fresh graduates who are aspiring for jobs. Further, the different types of intelligence are grouped under four broad skill sets - L (Linguistic and Kinesthetic intelligence), M (Mathematical and Logical intelligence), P (Interpersonal and Intrapersonal intelligence) and S (Spatial and Existential intelligence). Also, each of these skill sets are further divided based on four possible grades - E(excellent - 10 points), G(good - 8 points), F(fair - 6 points) and S (satisfactory - 4 points).

Four candidates - W, X, Y and Z - aspiring for job are given the following grades, as shown in the below given table, in those four skill sets.

Skill set \ Person	L	M	P	S
W	E	S	G	F
X	G	G	F	E
Y	F	G	E	G
Z	E	E	G	F

Jobs, available for the fresh graduates, are in three departments - HR, Data Science, and Administration - in a company. The weightage of the different skills required for each of these departments is given in the table shown below.

Weight \ Department	0.4	0.3	0.2	0.1
HR	p	s	l	m
Data Science	m	l	s	p
Administration	s	m	p	l

where, p : the point value of the grade obtained in P

s : the point value of the grade obtained in S

l : the point value of the grade obtained in L

m : the point value of the grade obtained in M

A candidate is considered to be eligible for the job in a particular department, if his score is at least 8 where the score of any candidate is his weighted average.

{For example, the score for a job in HR department will be  $(0.4 \times p) + (0.3 \times s) + (0.2 \times l) + (0.1 \times m)$ .}

### Q.37

**What is the maximum score obtained by any of these candidates for any of the available jobs?**

**Solution:**

**Correct Answer : 9**

**Bookmark**

**Answer key/Solution**

The grades obtained by the candidates can be translated into the following weighted scores:

	HR	Data Science	Administration
W	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 6.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 6.2$
X	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 8.2$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.4$
Y	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 7.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.2$
Z	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 9$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8$

9 is the maximum score obtained by any of these candidates for any of the available jobs.

**FeedBack**

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

Based on the types of intelligence, described by American developmental psychologist Howard Gardner, a recruitment firm has designed a new testing mechanism for fresh graduates who are aspiring for jobs. Further, the different types of intelligence are grouped under four broad skill sets - L (Linguistic and Kinesthetic intelligence), M (Mathematical and Logical intelligence), P (Interpersonal and Intrapersonal intelligence) and S (Spatial and Existential intelligence). Also, each of these skill sets are further divided based on four possible grades - E(excellent - 10 points), G(good - 8 points), F(fair - 6 points) and S (satisfactory - 4 points).

Four candidates - W, X, Y and Z - aspiring for job are given the following grades, as shown in the below given table, in those four skill sets.

Skill set Person \	L	M	P	S
Person				
W	E	S	G	F
X	G	G	F	E
Y	F	G	E	G
Z	E	E	G	F

Jobs, available for the fresh graduates, are in three departments - HR, Data Science, and Administration - in a company. The weightage of the different skills required for each of these departments is given in the table shown below.

Weight Department \	0.4	0.3	0.2	0.1
Department				
HR	p	s	l	m
Data Science	m	l	s	p
Administration	s	m	p	l

where, p : the point value of the grade obtained in P

s : the point value of the grade obtained in S

l : the point value of the grade obtained in L

m : the point value of the grade obtained in M

A candidate is considered to be eligible for the job in a particular department, if his score is at least 8 where the score of any candidate is his weighted average.

{For example, the score for a job in HR department will be  $(0.4 \times p) + (0.3 \times s) + (0.2 \times l) + (0.1 \times m)$ .}

### Q.38

If W is given a chance to reappear for the test after a month and he can improve one of his skill sets by upgrading the grade got in that skill set by one. For example, he initially got grade S in skill set M, so after upgrading it by one, his new grade becomes F. Then which of the following will get him a job?

- 1  By improving P

2 **By improving M**

3 **Either (1) or (2)**

4 **None of these**

**Solution:**

**Correct Answer : 1**

 **Bookmark**

 **Answer key/Solution**

The grades obtained by the candidates can be translated into the following weighted scores:

	HR	Data Science	Administration
W	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 6.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 6.2$
X	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 7.8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 8.2$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.4$
Y	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8.4$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 7.6$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8.2$
Z	$0.4 \times p + 0.3 \times s + 0.2 \times l + 0.1 \times m = 8$	$0.4 \times m + 0.3 \times l + 0.2 \times s + 0.1 \times p = 9$	$0.4 \times s + 0.3 \times m + 0.2 \times p + 0.1 \times l = 8$

He will get a job by improving score in P.

**FeedBack**

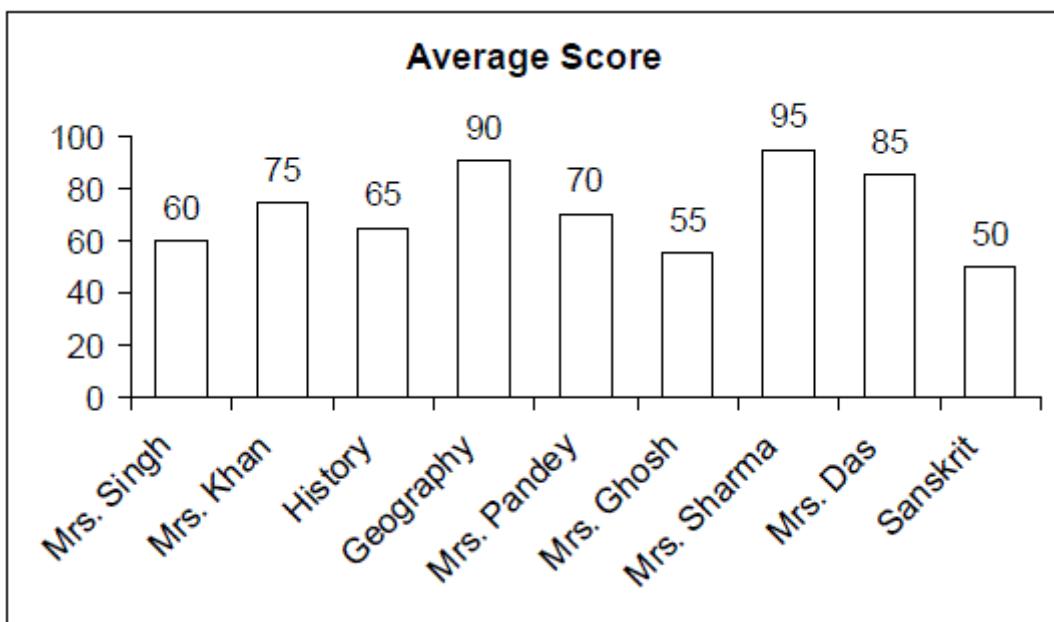
**Directions for questions 39 to 42:** Answer the questions on the basis of the information given below.

At ZPS international school, nine different subjects – English, Hindi, Sanskrit, History, Geography, Physics, Chemistry, Biology and Mathematics - were taught during nine different periods in a day to the 8th class students. Duration of each period is of 30 minutes and the time gap between any two classes is negligible. The first period of the day begins at 8 a.m. and the last period ends at 1:00 p.m. with a 30 minutes recess period in between. Each subject is taught by a different teacher – Mrs. Chopra, Mrs. Sharma, Mrs. Pandey, Mrs. Gupta, Mrs. Joshi, Mrs. Das, Mrs. Ghosh, Mrs. Khan and Mrs. Singh – not necessarily in that order.

Some additional information about these periods routine is also known which is as follows:

- (i) Mrs. Gupta's class begins at 9.30 a.m. and is not immediately preceded by Biology or Physics class.
- (ii) The Mathematics class begins at 8 a.m. and Hindi class ends at noon.
- (iii) Chemistry is taught by Mrs. Sharma which is held some time after the break.
- (iv) Mrs. Joshi's class starts exactly three and a half hours after the end of Mrs. Singh's class and neither of them teaches Physics.
- (v) The Geography period starts exactly one hour before the English period starts and neither of them is taken by Mrs. Chopra or Mrs. Khan.
- (vi) There are exactly three periods between the English period and the Physics period.
- (vii) The Biology period is neither immediately preceded nor immediately followed by the Hindi period.
- (viii) There are exactly five periods between Mrs. Chopra's class and Mrs. Joshi's class.
- (ix) Mrs. Khan's class ends at 9 a.m. and the recess is immediately after the Geography class.
- (x) Biology class is after Mrs. Joshi's class.

The bar graph given below shows the average score of the students in the respective subjects or teacher's classes:



**Q.39**

If the average score of Mrs. Chopra's class is more than the average score of Mrs. Singh's class, then which of the following subjects does Mrs. Chopra teach?

- 1  History
- 2  Sanskrit
- 3  Hindi
- 4  Cannot be determined

**Solution:**

**Correct Answer : 1**

 **Bookmark**

 **Answer key/Solution**

From statement (iv) and statement (x), Mrs. Singh's class and Mrs. Joshi's class must begin at 8:00 a.m. and 12:00 p.m. respectively. From statement (viii), Mrs. Chopra's class must begin at 9:00 a.m.

From statement (x), Biology class begins at 12:30 p.m. According to all the statements given in question, the final table will look like:

Time	Subject	Teacher
8:00	Mathematics	Mrs. Singh
8:30	Physics	Mrs. Khan
9:00	Sanskrit / History	Mrs. Chopra
9:30	Geography	Mrs. Gupta
10:00	Break	Break
10:30	English	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
11:00	Chemistry	Mrs. Sharma
11:30	Hindi	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
12:00	History / Sanskrit	Mrs. Joshi
12:30	Biology	Mrs. Pandey / Mrs. Das / Mrs. Ghosh

If the average score of Mrs. Chopra's class is more than the average score of Mrs. Singh's class, then Mrs. Chopra must teach History.

**FeedBack**

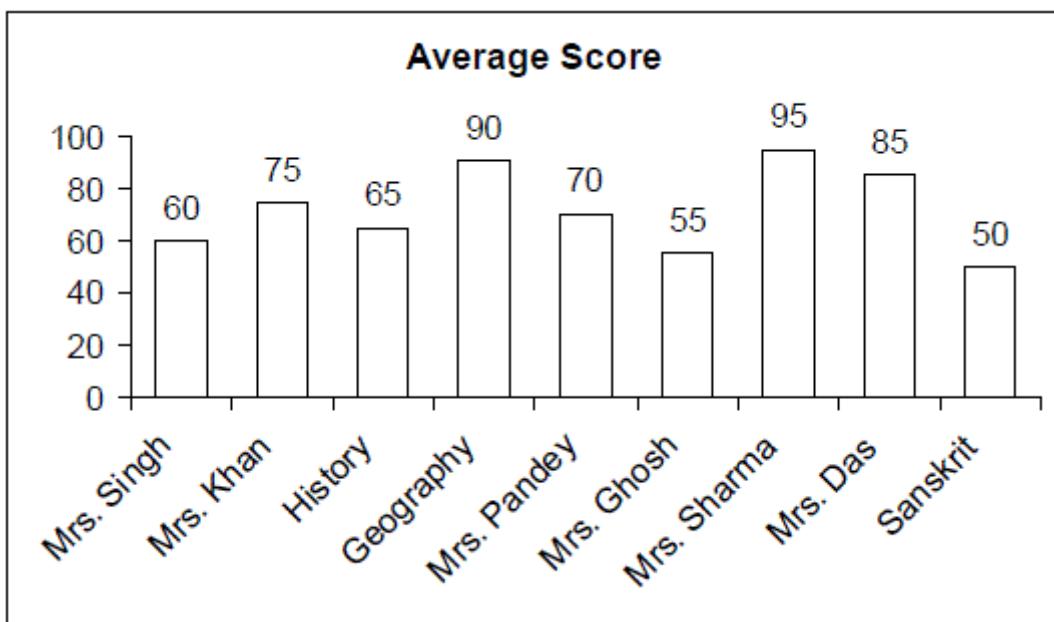
**Directions for questions 39 to 42:** Answer the questions on the basis of the information given below.

At ZPS international school, nine different subjects – English, Hindi, Sanskrit, History, Geography, Physics, Chemistry, Biology and Mathematics - were taught during nine different periods in a day to the 8th class students. Duration of each period is of 30 minutes and the time gap between any two classes is negligible. The first period of the day begins at 8 a.m. and the last period ends at 1:00 p.m. with a 30 minutes recess period in between. Each subject is taught by a different teacher – Mrs. Chopra, Mrs. Sharma, Mrs. Pandey, Mrs. Gupta, Mrs. Joshi, Mrs. Das, Mrs. Ghosh, Mrs. Khan and Mrs. Singh – not necessarily in that order.

Some additional information about these periods routine is also known which is as follows:

- (i) Mrs. Gupta's class begins at 9.30 a.m. and is not immediately preceded by Biology or Physics class.
- (ii) The Mathematics class begins at 8 a.m. and Hindi class ends at noon.
- (iii) Chemistry is taught by Mrs. Sharma which is held some time after the break.
- (iv) Mrs. Joshi's class starts exactly three and a half hours after the end of Mrs. Singh's class and neither of them teaches Physics.
- (v) The Geography period starts exactly one hour before the English period starts and neither of them is taken by Mrs. Chopra or Mrs. Khan.
- (vi) There are exactly three periods between the English period and the Physics period.
- (vii) The Biology period is neither immediately preceded nor immediately followed by the Hindi period.
- (viii) There are exactly five periods between Mrs. Chopra's class and Mrs. Joshi's class.
- (ix) Mrs. Khan's class ends at 9 a.m. and the recess is immediately after the Geography class.
- (x) Biology class is after Mrs. Joshi's class.

The bar graph given below shows the average score of the students in the respective subjects or teacher's classes:



**Q.40**

If the average score of the English class is the mean of the average scores of Mrs. Sharma's class and the Physics class, then who teaches English?

1  Mrs. Pandey

2  Mrs. Das

3  Mrs. Ghosh

4  Mrs. Gupta

**Solution:**

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**

From statement (iv) and statement (x), Mrs. Singh's class and Mrs. Joshi's class must begin at 8:00 a.m. and 12:00 p.m. respectively. From statement (viii), Mrs. Chopra's class must begin at 9:00 a.m.

From statement (x), Biology class begins at 12:30 p.m. According to all the statements given in question, the final table will look like:

Time	Subject	Teacher
8:00	Mathematics	Mrs. Singh
8:30	Physics	Mrs. Khan
9:00	Sanskrit / History	Mrs. Chopra
9:30	Geography	Mrs. Gupta
10:00	Break	Break
10:30	English	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
11:00	Chemistry	Mrs. Sharma
11:30	Hindi	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
12:00	History / Sanskrit	Mrs. Joshi
12:30	Biology	Mrs. Pandey / Mrs. Das / Mrs. Ghosh

If the average score of the English class is the mean of the average scores of Mrs. Sharma's class and the Physics class, then Mrs. Das will teach English.

**FeedBack**

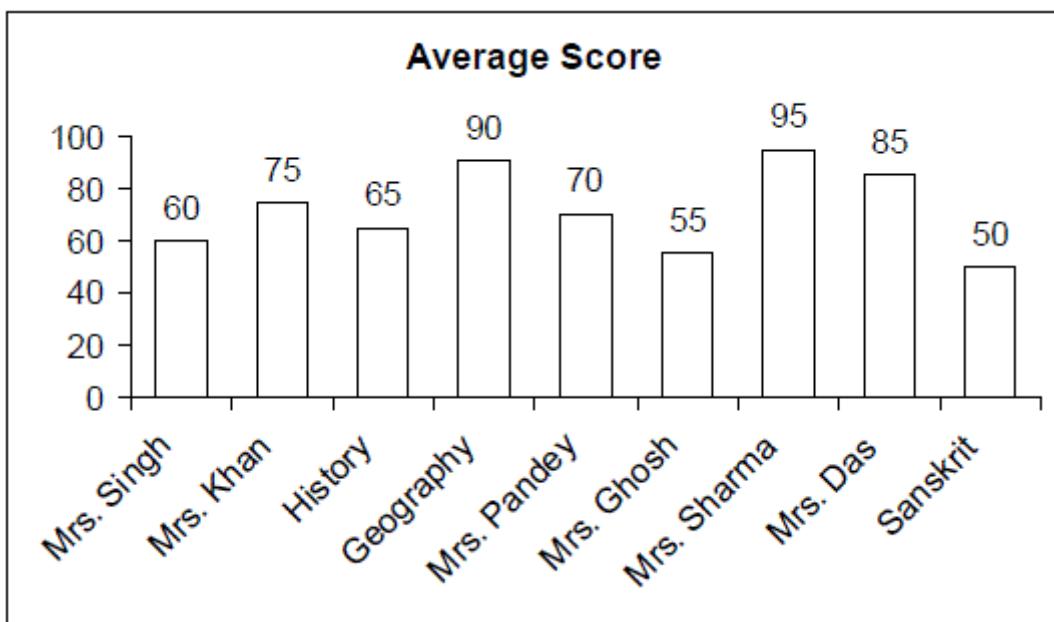
**Directions for questions 39 to 42:** Answer the questions on the basis of the information given below.

At ZPS international school, nine different subjects – English, Hindi, Sanskrit, History, Geography, Physics, Chemistry, Biology and Mathematics - were taught during nine different periods in a day to the 8th class students. Duration of each period is of 30 minutes and the time gap between any two classes is negligible. The first period of the day begins at 8 a.m. and the last period ends at 1:00 p.m. with a 30 minutes recess period in between. Each subject is taught by a different teacher – Mrs. Chopra, Mrs. Sharma, Mrs. Pandey, Mrs. Gupta, Mrs. Joshi, Mrs. Das, Mrs. Ghosh, Mrs. Khan and Mrs. Singh – not necessarily in that order.

Some additional information about these periods routine is also known which is as follows:

- (i) Mrs. Gupta's class begins at 9.30 a.m. and is not immediately preceded by Biology or Physics class.
- (ii) The Mathematics class begins at 8 a.m. and Hindi class ends at noon.
- (iii) Chemistry is taught by Mrs. Sharma which is held some time after the break.
- (iv) Mrs. Joshi's class starts exactly three and a half hours after the end of Mrs. Singh's class and neither of them teaches Physics.
- (v) The Geography period starts exactly one hour before the English period starts and neither of them is taken by Mrs. Chopra or Mrs. Khan.
- (vi) There are exactly three periods between the English period and the Physics period.
- (vii) The Biology period is neither immediately preceded nor immediately followed by the Hindi period.
- (viii) There are exactly five periods between Mrs. Chopra's class and Mrs. Joshi's class.
- (ix) Mrs. Khan's class ends at 9 a.m. and the recess is immediately after the Geography class.
- (x) Biology class is after Mrs. Joshi's class.

The bar graph given below shows the average score of the students in the respective subjects or teacher's classes:



**Q.41**

If the mean of average score of Mathematics, Physics, Chemistry and Biology is 75, then which of the following is definitely true?

- 1  Mrs. Ghosh teaches Hindi
- 2  Mrs. Das teaches English
- 3  Mrs. Pandey teaches Biology
- 4  Either Mrs. Ghosh or Mrs. Das teaches Biology

**Solution:**

**Correct Answer : 3**

 **Bookmark**

 **Answer key/Solution**

From statement (iv) and statement (x), Mrs. Singh's class and Mrs. Joshi's class must begin at 8:00 a.m. and 12:00 p.m. respectively. From statement (viii), Mrs. Chopra's class must begin at 9:00 a.m.

From statement (x), Biology class begins at 12:30 p.m. According to all the statements given in question, the final table will look like:

Time	Subject	Teacher
8:00	Mathematics	Mrs. Singh
8:30	Physics	Mrs. Khan
9:00	Sanskrit / History	Mrs. Chopra
9:30	Geography	Mrs. Gupta
10:00	Break	Break
10:30	English	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
11:00	Chemistry	Mrs. Sharma
11:30	Hindi	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
12:00	History / Sanskrit	Mrs. Joshi
12:30	Biology	Mrs. Pandey / Mrs. Das / Mrs. Ghosh

If the mean of average score of Mathematics, Physics, Chemistry and Biology is 75, then Mrs. Pandey will teach Biology.

**FeedBack**

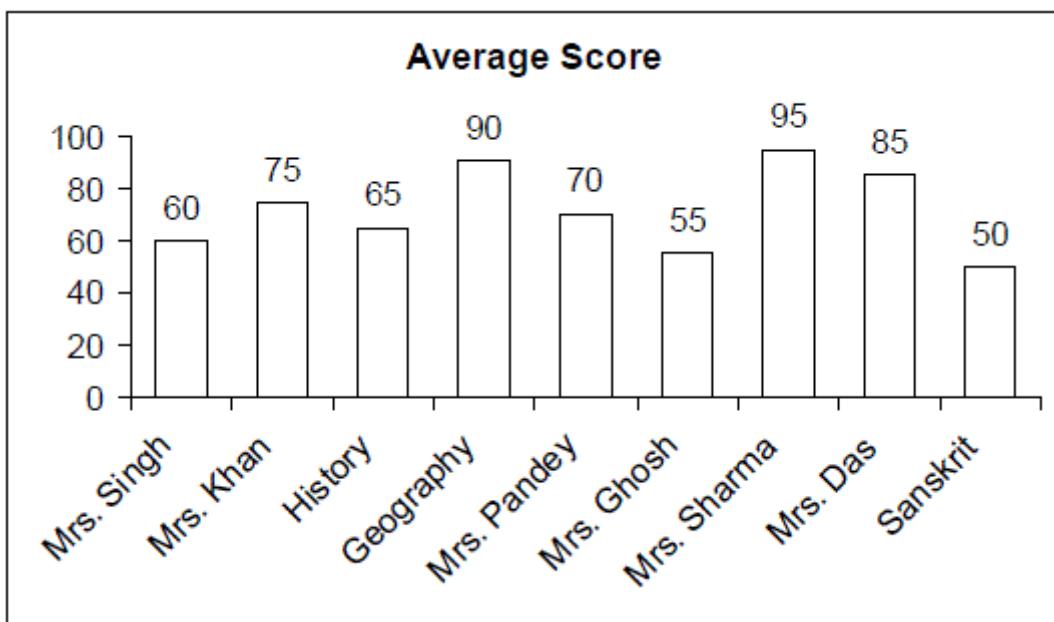
**Directions for questions 39 to 42:** Answer the questions on the basis of the information given below.

At ZPS international school, nine different subjects – English, Hindi, Sanskrit, History, Geography, Physics, Chemistry, Biology and Mathematics - were taught during nine different periods in a day to the 8th class students. Duration of each period is of 30 minutes and the time gap between any two classes is negligible. The first period of the day begins at 8 a.m. and the last period ends at 1:00 p.m. with a 30 minutes recess period in between. Each subject is taught by a different teacher – Mrs. Chopra, Mrs. Sharma, Mrs. Pandey, Mrs. Gupta, Mrs. Joshi, Mrs. Das, Mrs. Ghosh, Mrs. Khan and Mrs. Singh – not necessarily in that order.

Some additional information about these periods routine is also known which is as follows:

- (i) Mrs. Gupta's class begins at 9.30 a.m. and is not immediately preceded by Biology or Physics class.
- (ii) The Mathematics class begins at 8 a.m. and Hindi class ends at noon.
- (iii) Chemistry is taught by Mrs. Sharma which is held some time after the break.
- (iv) Mrs. Joshi's class starts exactly three and a half hours after the end of Mrs. Singh's class and neither of them teaches Physics.
- (v) The Geography period starts exactly one hour before the English period starts and neither of them is taken by Mrs. Chopra or Mrs. Khan.
- (vi) There are exactly three periods between the English period and the Physics period.
- (vii) The Biology period is neither immediately preceded nor immediately followed by the Hindi period.
- (viii) There are exactly five periods between Mrs. Chopra's class and Mrs. Joshi's class.
- (ix) Mrs. Khan's class ends at 9 a.m. and the recess is immediately after the Geography class.
- (x) Biology class is after Mrs. Joshi's class.

The bar graph given below shows the average score of the students in the respective subjects or teacher's classes:



**Q.42**

If Mrs. Joshi takes the subject which has an average score of 50, then which of the following periods do not held before the recess?

1  Mathematics

2  Sanskrit

3  History

4  Geography

**Solution:**

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**

From statement (iv) and statement (x), Mrs. Singh's class and Mrs. Joshi's class must begin at 8:00 a.m. and 12:00 p.m. respectively. From statement (viii), Mrs. Chopra's class must begin at 9:00 a.m.

From statement (x), Biology class begins at 12:30 p.m. According to all the statements given in question, the final table will look like:

Time	Subject	Teacher
8:00	Mathematics	Mrs. Singh
8:30	Physics	Mrs. Khan
9:00	Sanskrit / History	Mrs. Chopra
9:30	Geography	Mrs. Gupta
10:00	Break	Break
10:30	English	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
11:00	Chemistry	Mrs. Sharma
11:30	Hindi	Mrs. Pandey / Mrs. Das / Mrs. Ghosh
12:00	History / Sanskrit	Mrs. Joshi
12:30	Biology	Mrs. Pandey / Mrs. Das / Mrs. Ghosh

If Mrs. Joshi takes the subject which has an average score of 50, then Sanskrit do not held before the recess.

**FeedBack**

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

Eight friends - Mohan, Mohit, Mandeep, Mandar, Mukesh, Manish, Manoj and Vinod - each ordered a food item among Idli, Dosa, Kulcha, Veg thali, Burger, Baby corn, Veg roll and Malai Chap from a food delivery App, not necessarily in that order. The actual cost (in Rupees) of these items were 30, 40, 50, 60, 70, 80, 90 and 100, in any order. But when these friends went on payment page of the App and made payment, the amount deducted from their bank accounts were Rs. 50, 60, 70, 90, 100 and 110, in any order due to high demand of food. It means same amount might be deducted from more than one friend's bank account. It was also known that:

- (i) The price of no item was increased by more than Rs. 20, due to high demand. Mohit's bank account had been debited by the highest possible amount among them and he had ordered Veg thali that had actual cost of Rs. 90.
- (ii) The amount debited from Mukesh's bank account was less than Rs. 70 but more than that from the amount that debited from the friend's account who had ordered Burger. The actual cost of Malai Chap was Rs. 30.
- (iii) A friend whose bank account was debited by Rs. 50 had ordered the item whose actual cost was more than that of the item ordered by the friend whose bank account was debited by Rs. 60.
- (iv) Both, amount deducted and actual cost, were same for four food items. Mandeep's account was debited by Rs. 100 who had ordered Kulcha. The actual price of the items ordered by Manish and Manoj were Rs. 40 and Rs. 80 respectively.
- (v) The actual cost of item ordered by Mandar was less than that ordered by Manish. The bank account of the person who had ordered Idli was deducted by higher amount than that of the friend who had ordered Dosa but by lesser amount than that of the friend who had ordered Veg roll.

#### Q.43

The actual price of Dosa was

1  Rs. 40

2  Rs. 60

3  Rs. 70

4  Either (1) or (2)

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

From statement (i): Mohit had ordered the item having actual price of Rs. 90 and the account debited from his bank account is maximum possible that should be Rs. 110.

From statement (ii): Rs 60 was debited from Mukesh's account and Rs. 50 was debited from the account of the friend who had ordered Burger.

From statement (ii), (iii) and (iv): Since the actual price of the item ordered by Manish was Rs. 40 and the actual price of the item for which Rs. 50 was debited was more than that of the item for which Rs. 60 was debited. Therefore, the actual price of items for which Rs. 50 and Rs. 60 was debited was Rs. 50 and Rs. 40 respectively.

Further analysis leads to the following table:-

Name	Item	Actual price (in Rs.)	Debited amount (in Rs.)
Mohan/Vinod	Idli	70	70
Mohit	Veg Thali	90	110
Mandeep	Kulcha	100	100
Mandar	Malai Chap	30	50
Mukesh	Dosa/Baby Corn	60	60
Manish	Baby Corn/Dosa	40	60
Manoj	Veg. Roll	80	90
Vinod/Mohan	Burger	50	50

The actual price of Dosa was either Rs. 40 or Rs. 60.


**FeedBack**

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

Eight friends - Mohan, Mohit, Mandeep, Mandar, Mukesh, Manish, Manoj and Vinod - each ordered a food item among Idli, Dosa, Kulcha, Veg thali, Burger, Baby corn, Veg roll and Malai Chap from a food delivery App, not necessarily in that order. The actual cost (in Rupees) of these items were 30, 40, 50, 60, 70, 80, 90 and 100, in any order. But when these friends went on payment page of the App and made payment, the amount deducted from their bank accounts were Rs. 50, 60, 70, 90, 100 and 110, in any order due to high demand of food. It means same amount might be deducted from more than one friend's bank account. It was also known that:

- (i) The price of no item was increased by more than Rs. 20, due to high demand. Mohit's bank account had been debited by the highest possible amount among them and he had ordered Veg thali that had actual cost of Rs. 90.
- (ii) The amount debited from Mukesh's bank account was less than Rs. 70 but more than that from the amount that debited from the friend's account who had ordered Burger. The actual cost of Malai Chap was Rs. 30.
- (iii) A friend whose bank account was debited by Rs. 50 had ordered the item whose actual cost was more than that of the item ordered by the friend whose bank account was debited by Rs. 60.
- (iv) Both, amount deducted and actual cost, were same for four food items. Mandeep's account was debited by Rs. 100 who had ordered Kulcha. The actual price of the items ordered by Manish and Manoj were Rs. 40 and Rs. 80 respectively.
- (v) The actual cost of item ordered by Mandar was less than that ordered by Manish. The bank account of the person who had ordered Idli was deducted by higher amount than that of the friend who had ordered Dosa but by lesser amount than that of the friend who had ordered Veg roll.

#### Q.44

**Who had ordered Veg roll?**

1  Manish

2  Manoj

3  Vinod

4  Mohan

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

From statement (i): Mohit had ordered the item having actual price of Rs. 90 and the account debited from his bank account is maximum possible that should be Rs. 110.

From statement (ii): Rs 60 was debited from Mukesh's account and Rs. 50 was debited from the account of the friend who had ordered Burger.

From statement (ii), (iii) and (iv): Since the actual price of the item ordered by Manish was Rs. 40 and the actual price of the item for which Rs. 50 was debited was more than that of the item for which Rs. 60 was debited. Therefore, the actual price of items for which Rs. 50 and Rs. 60 was debited was Rs. 50 and Rs. 40 respectively.

Further analysis leads to the following table:-

Name	Item	Actual price (in Rs.)	Debited amount (in Rs.)
Mohan/Vinod	Idli	70	70
Mohit	Veg Thali	90	110
Mandeep	Kulcha	100	100
Mandar	Malai Chap	30	50
Mukesh	Dosa/Baby Corn	60	60
Manish	Baby Corn/Dosa	40	60
Manoj	Veg. Roll	80	90
Vinod/Mohan	Burger	50	50

Manoj had ordered Veg roll.


**FeedBack**

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

Eight friends - Mohan, Mohit, Mandeep, Mandar, Mukesh, Manish, Manoj and Vinod - each ordered a food item among Idli, Dosa, Kulcha, Veg thali, Burger, Baby corn, Veg roll and Malai Chap from a food delivery App, not necessarily in that order. The actual cost (in Rupees) of these items were 30, 40, 50, 60, 70, 80, 90 and 100, in any order. But when these friends went on payment page of the App and made payment, the amount deducted from their bank accounts were Rs. 50, 60, 70, 90, 100 and 110, in any order due to high demand of food. It means same amount might be deducted from more than one friend's bank account. It was also known that:

- (i) The price of no item was increased by more than Rs. 20, due to high demand. Mohit's bank account had been debited by the highest possible amount among them and he had ordered Veg thali that had actual cost of Rs. 90.
- (ii) The amount debited from Mukesh's bank account was less than Rs. 70 but more than that from the amount that debited from the friend's account who had ordered Burger. The actual cost of Malai Chap was Rs. 30.
- (iii) A friend whose bank account was debited by Rs. 50 had ordered the item whose actual cost was more than that of the item ordered by the friend whose bank account was debited by Rs. 60.
- (iv) Both, amount deducted and actual cost, were same for four food items. Mandeep's account was debited by Rs. 100 who had ordered Kulcha. The actual price of the items ordered by Manish and Manoj were Rs. 40 and Rs. 80 respectively.
- (v) The actual cost of item ordered by Mandar was less than that ordered by Manish. The bank account of the person who had ordered Idli was deducted by higher amount than that of the friend who had ordered Dosa but by lesser amount than that of the friend who had ordered Veg roll.

#### **Q.45**

**The actual price (in Rs.) of Burger and Idli together was**

**Solution:****Correct Answer : 120**
 **Bookmark**
 **Answer key/Solution**

From statement (i): Mohit had ordered the item having actual price of Rs. 90 and the account debited from his bank account is maximum possible that should be Rs. 110.

From statement (ii): Rs 60 was debited from Mukesh's account and Rs. 50 was debited from the account of the friend who had ordered Burger.

From statement (ii), (iii) and (iv): Since the actual price of the item ordered by Manish was Rs. 40 and the actual price of the item for which Rs. 50 was debited was more than that of the item for which Rs. 60 was debited. Therefore, the actual price of items for which Rs. 50 and Rs. 60 was debited was Rs. 50 and Rs. 40 respectively.

Further analysis leads to the following table:-

Name	Item	Actual price (in Rs.)	Debited amount (in Rs.)
Mohan/Vinod	Idli	70	70
Mohit	Veg Thali	90	110
Mandeep	Kulcha	100	100
Mandar	Malai Chap	30	50
Mukesh	Dosa/Baby Corn	60	60
Manish	Baby Corn/Dosa	40	60
Manoj	Veg. Roll	80	90
Vinod/Mohan	Burger	50	50

Actual price of Burger and Idli together =  $70 + 50 = \text{Rs. } 120$ .

 **FeedBack**

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

Eight friends - Mohan, Mohit, Mandeep, Mandar, Mukesh, Manish, Manoj and Vinod - each ordered a food item among Idli, Dosa, Kulcha, Veg thali, Burger, Baby corn, Veg roll and Malai Chap from a food delivery App, not necessarily in that order. The actual cost (in Rupees) of these items were 30, 40, 50, 60, 70, 80, 90 and 100, in any order. But when these friends went on payment page of the App and made payment, the amount deducted from their bank accounts were Rs. 50, 60, 70, 90, 100 and 110, in any order due to high demand of food. It means same amount might be deducted from more than one friend's bank account. It was also known that:

- (i) The price of no item was increased by more than Rs. 20, due to high demand. Mohit's bank account had been debited by the highest possible amount among them and he had ordered Veg thali that had actual cost of Rs. 90.
- (ii) The amount debited from Mukesh's bank account was less than Rs. 70 but more than that from the amount that debited from the friend's account who had ordered Burger. The actual cost of Malai Chap was Rs. 30.
- (iii) A friend whose bank account was debited by Rs. 50 had ordered the item whose actual cost was more than that of the item ordered by the friend whose bank account was debited by Rs. 60.
- (iv) Both, amount deducted and actual cost, were same for four food items. Mandeep's account was debited by Rs. 100 who had ordered Kulcha. The actual price of the items ordered by Manish and Manoj were Rs. 40 and Rs. 80 respectively.
- (v) The actual cost of item ordered by Mandar was less than that ordered by Manish. The bank account of the person who had ordered Idli was deducted by higher amount than that of the friend who had ordered Dosa but by lesser amount than that of the friend who had ordered Veg roll.

#### **Q.46**

**The amount (in Rs.) debited from Mandar's account was**

**Solution:****Correct Answer : 50** **Bookmark** **Answer key/Solution**

From statement (i): Mohit had ordered the item having actual price of Rs. 90 and the account debited from his bank account is maximum possible that should be Rs. 110.

From statement (ii): Rs 60 was debited from Mukesh's account and Rs. 50 was debited from the account of the friend who had ordered Burger.

From statement (ii), (iii) and (iv): Since the actual price of the item ordered by Manish was Rs. 40 and the actual price of the item for which Rs. 50 was debited was more than that of the item for which Rs. 60 was debited. Therefore, the actual price of items for which Rs. 50 and Rs. 60 was debited was Rs. 50 and Rs. 40 respectively.

Further analysis leads to the following table:-

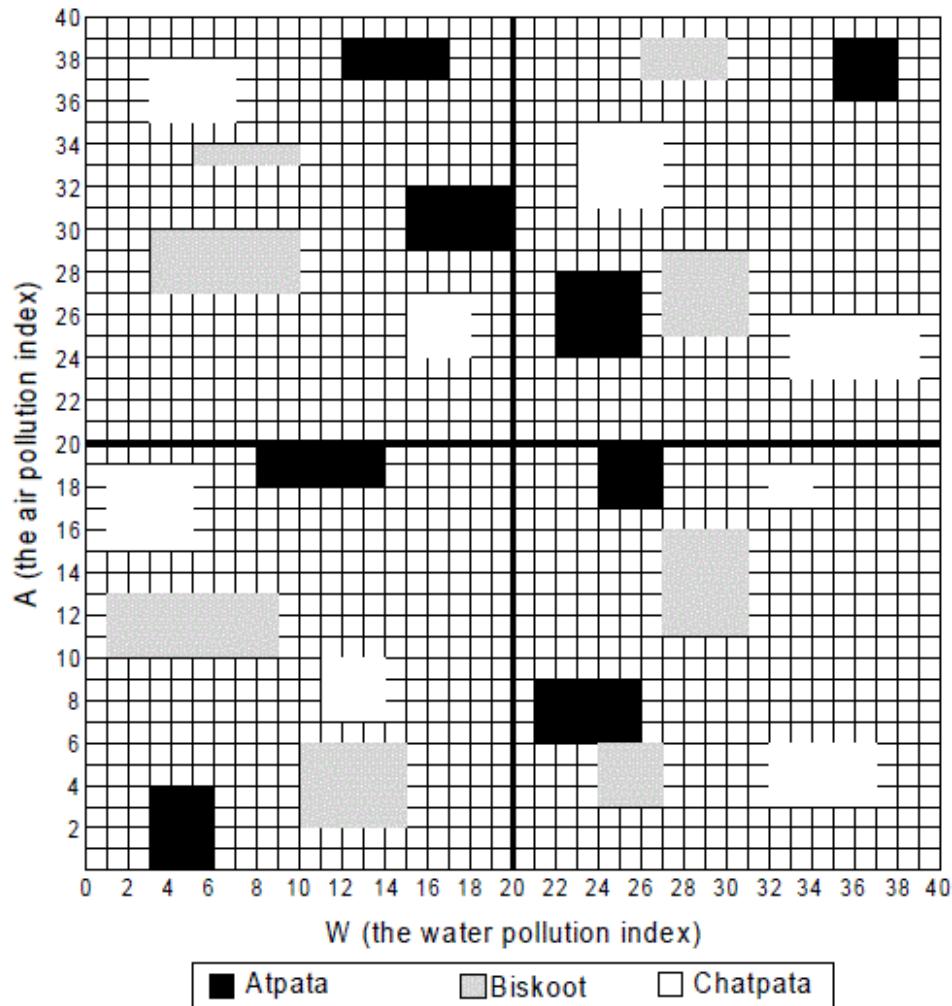
Name	Item	Actual price (in Rs.)	Debited amount (in Rs.)
Mohan/Vinod	Idli	70	70
Mohit	Veg Thali	90	110
Mandeep	Kulcha	100	100
Mandar	Malai Chap	30	50
Mukesh	Dosa/Baby Corn	60	60
Manish	Baby Corn/Dosa	40	60
Manoj	Veg. Roll	80	90
Vinod/Mohan	Burger	50	50

Rs. 50 was debited from Mandar's account.

**FeedBack**

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

Each of the boxes in the picture given below represents a product manufactured by one of the three snack manufacturing companies- Atpata, Biskoot and Chatpata. The area of a box is equal to the revenue, R (in Rs. crores), earned from the corresponding product. Along the axes, the x and y values represent W (the water pollution index) and A (the air pollution index). W and A for each product is the minimum value of x coordinate and minimum value of y coordinate respectively for the box it is represented by. For e.g. for the left upper corner box manufactured by Chatpata company, the value of W and A are 3 and 35 respectively. The fine charged for polluting the environment is Rs. (A + W) lakh.



Based on these indices, these products of the three companies are divided into four categories - Green, Blue, Yellow and Red. The criteria of division of companies are given in the table below.

Blue	Red
$A > 20, W \leq 20$	$A > 20, W > 20$
Green	Yellow
$A \leq 20, W < 20$	$A \leq 20, W > 20$

#### Q.47

Which company pays the maximum percentage of its total revenue as fine?

1  Atpata

2  Biskoot

3  Chatpata

4  Either (1) or (2)

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

The water pollution index (W), the air pollution index (A) and the revenue (R) of each categories of each of the three snacks manufacturing company are given in the table below.

		Green		Yellow		Blue		Red		
Atpata		A	3	8	24	21	15	12	22	35
		W	0	18	17	6	29	37	24	36
		R	12	12	9	15	15	10	16	9
Biskoot		A	1	10	24	27	3	5	26	27
		W	10	2	3	11	27	33	37	25
		R	24	20	9	20	21	5	8	16
Chatpata		A	11	1	32	32	3	15	33	23
		W	7	15	3	17	35	24	23	31
		R	9	16	15	4	12	9	18	16

Fine as a percentage of total revenue for each of the three companies.

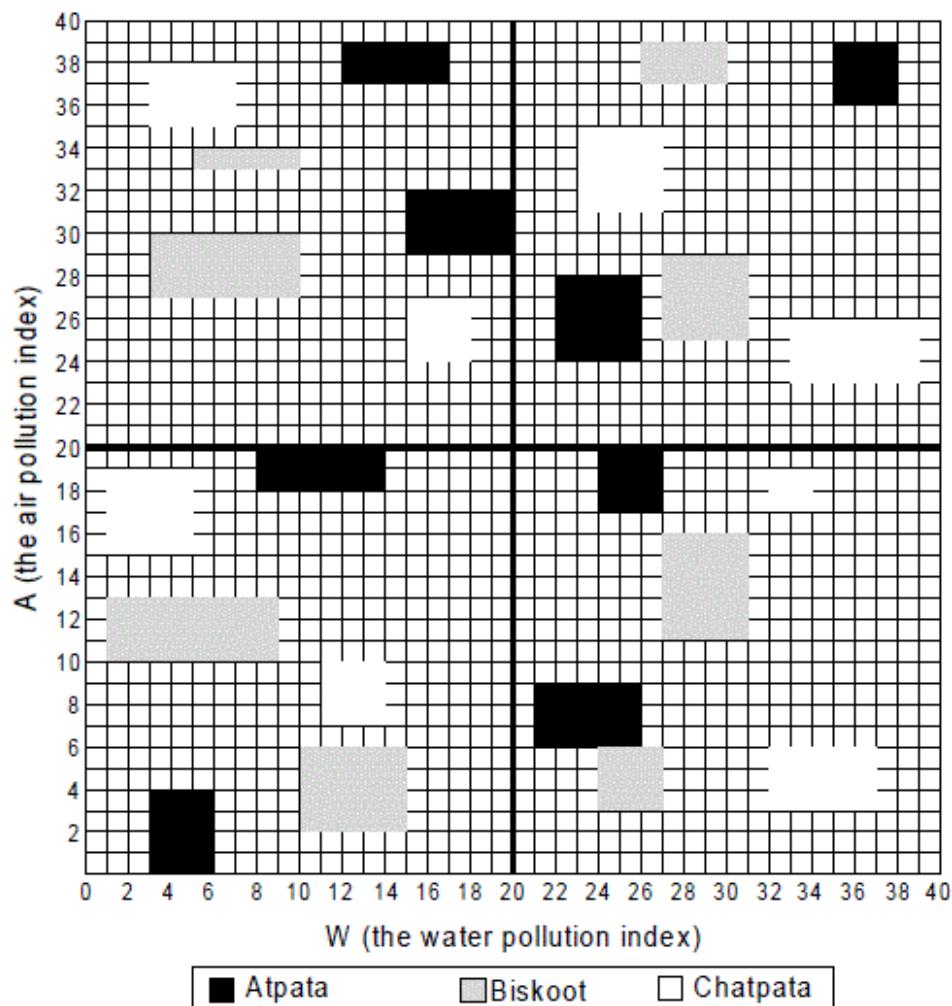
Atpata	Total A = 140	Required percentage $= \frac{(140 + 167) \times 10^5}{98 \times 10^7} \times 100 = 3.13\%$
	Total W = 167	
	Total R = 98	
Biskoot	Total A = 123	Required percentage $= \frac{(123 + 148) \times 10^5}{123 \times 10^7} \times 100 = 2.203\%$
	Total W = 148	
	Total R = 123	
Chatpata	Total A = 150	Required percentage $= \frac{(150 + 155) \times 10^5}{99 \times 10^7} \times 100 = 3.08\%$
	Total W = 155	
	Total R = 99	

∴ Atpata company pays the maximum percentage of its total revenue as fine.

**FeedBack**

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

Each of the boxes in the picture given below represents a product manufactured by one of the three snack manufacturing companies- Atpata, Biskoot and Chatpata. The area of a box is equal to the revenue,  $R$  (in Rs. crores), earned from the corresponding product. Along the axes, the  $x$  and  $y$  values represent  $W$  (the water pollution index) and  $A$  (the air pollution index).  $W$  and  $A$  for each product is the minimum value of  $x$  coordinate and minimum value of  $y$  coordinate respectively for the box it is represented by. For e.g. for the left upper corner box manufactured by Chatpata company, the value of  $W$  and  $A$  are 3 and 35 respectively. The fine charged for polluting the environment is Rs. ( $A + W$ ) lakh.



Based on these indices, these products of the three companies are divided into four categories - Green, Blue, Yellow and Red. The criteria of division of companies are given in the table below.

Blue	Red
$A > 20, W \leq 20$	$A > 20, W > 20$
Green	Yellow
$A \leq 20, W < 20$	$A \leq 20, W > 20$

**Q.48**

What approximate percentage of the total fine collected from the Red and Blue categories was paid by the company Biskoot?

1  **15%**

2  **48%**

3  **29%**

4  **32%**

### Solution:

**Correct Answer : 4**

 **Bookmark**

 **Answer key/Solution**

The water pollution index (W), the air pollution index (A) and the revenue (R) of each categories of each of the three snacks manufacturing company are given in the table below.

		Green		Yellow		Blue		Red	
Atpata	A	3	8	24	21	15	12	22	35
	W	0	18	17	6	29	37	24	36
	R	12	12	9	15	15	10	16	9
Biskoot	A	1	10	24	27	3	5	26	27
	W	10	2	3	11	27	33	37	25
	R	24	20	9	20	21	5	8	16
Chatpata	A	11	1	32	32	3	15	33	23
	W	7	15	3	17	35	24	23	31
	R	9	16	15	4	12	9	18	16

Total fine collected from Red and Blue categories = Rs.580 lakhs

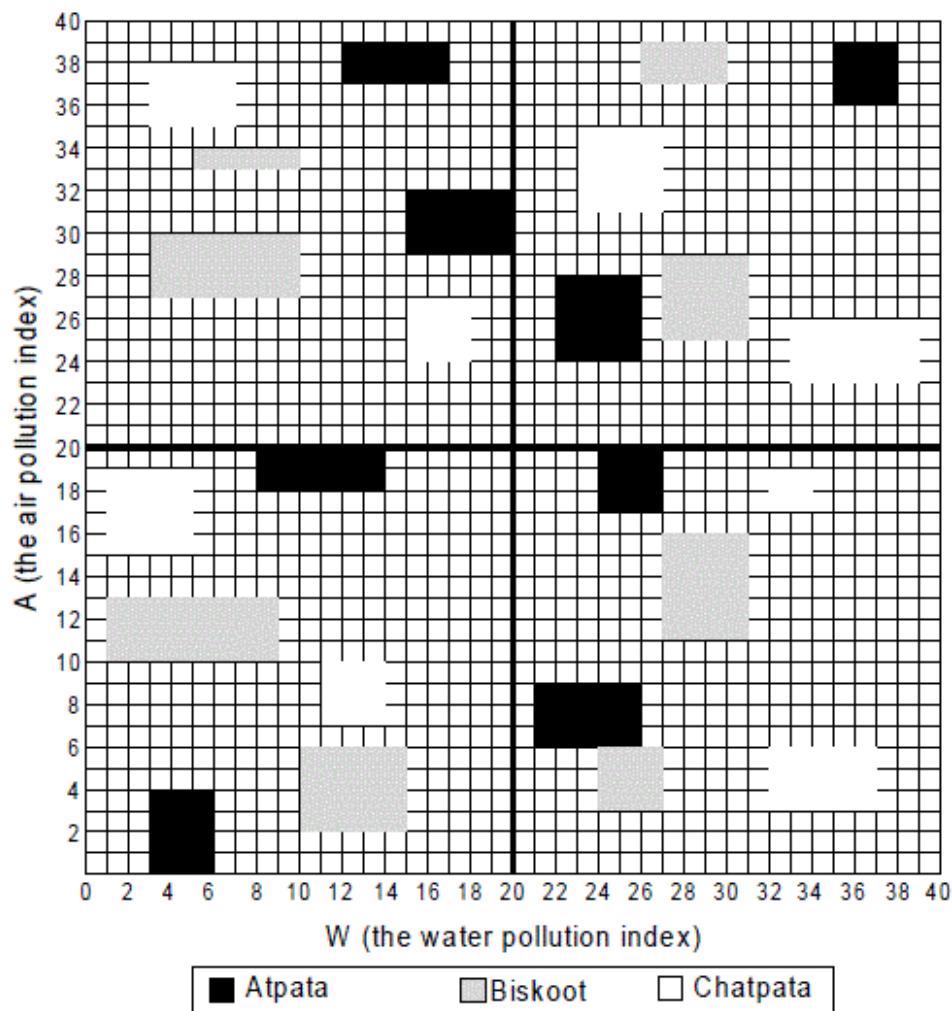
Total fine paid by Biskoot under the Red and Blue categories = Rs.183 lakhs

$$\text{Required percentage} = \frac{183}{580} \times 100 = 31.55 \approx 32\%.$$

**FeedBack**

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

Each of the boxes in the picture given below represents a product manufactured by one of the three snack manufacturing companies- Atpata, Biskoot and Chatpata. The area of a box is equal to the revenue,  $R$  (in Rs. crores), earned from the corresponding product. Along the axes, the  $x$  and  $y$  values represent  $W$  (the water pollution index) and  $A$  (the air pollution index).  $W$  and  $A$  for each product is the minimum value of  $x$  coordinate and minimum value of  $y$  coordinate respectively for the box it is represented by. For e.g. for the left upper corner box manufactured by Chatpata company, the value of  $W$  and  $A$  are 3 and 35 respectively. The fine charged for polluting the environment is Rs. ( $A + W$ ) lakh.



Based on these indices, these products of the three companies are divided into four categories - Green, Blue, Yellow and Red. The criteria of division of companies are given in the table below.

Blue	Red
$A > 20, W \leq 20$	$A > 20, W > 20$
Green	Yellow
$A \leq 20, W < 20$	$A \leq 20, W > 20$

**Q.49**

If  $X = \frac{\text{R from Green category}}{\text{Sum of R from Red, Blue and Yellow categories}}$ , then for which company is X more than 50%?

- 1 Only Biskoot
- 2 Both Atpata and Biskoot
- 3 Only Atpata
- 4 Both Biskoot and Chatpata

**Solution:**

**Correct Answer : 1**

 **Bookmark**

 **Answer key/Solution**

The water pollution index (W), the air pollution index (A) and the revenue (R) of each categories of each of the three snacks manufacturing company are given in the table below.

		Green		Yellow		Blue		Red	
Atpata	A	3	8	24	21	15	12	22	35
	W	0	18	17	6	29	37	24	36
	R	12	12	9	15	15	10	16	9
Biskoot	A	1	10	24	27	3	5	26	27
	W	10	2	3	11	27	33	37	25
	R	24	20	9	20	21	5	8	16
Chatpata	A	11	1	32	32	3	15	33	23
	W	7	15	3	17	35	24	23	31
	R	9	16	15	4	12	9	18	16

Let us find X for the three companies.

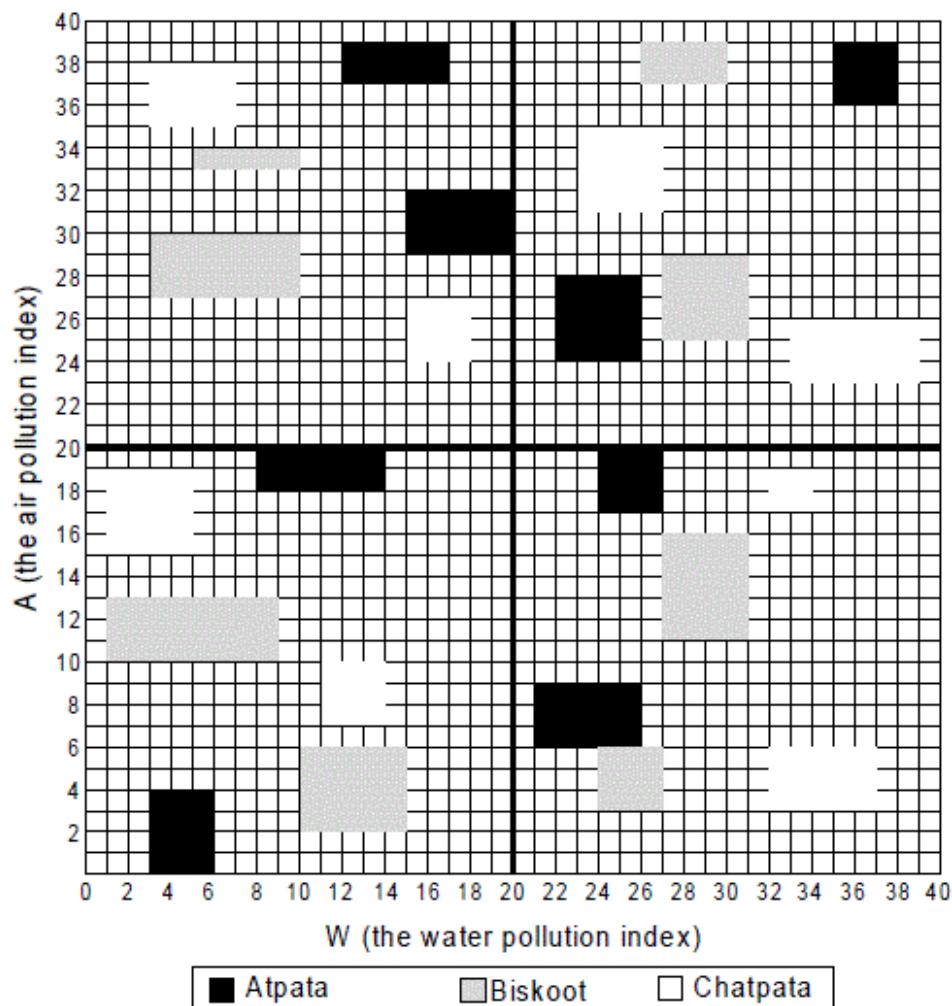
Atpata	Revenue from Green category = 24 lakhs	Revenue from Red, Blue and Yellow categories = 74 lakhs	$X = \frac{24}{74} \times 100 = 32.43\%$
Biskoot	Revenue from Green category = 44 lakhs	Revenue from Red, Blue and Yellow categories = 79 lakhs	$X = \frac{44}{79} \times 100 = 55.56\%$
Chatpata	Revenue from Green category = 25 lakhs	Revenue from Red, Blue and Yellow categories = 74 lakhs	$X = \frac{25}{74} \times 100 = 33.78\%$

For only Biskoot, X is more than 50%.

**FeedBack**

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

Each of the boxes in the picture given below represents a product manufactured by one of the three snack manufacturing companies- Atpata, Biskoot and Chatpata. The area of a box is equal to the revenue,  $R$  (in Rs. crores), earned from the corresponding product. Along the axes, the  $x$  and  $y$  values represent  $W$  (the water pollution index) and  $A$  (the air pollution index).  $W$  and  $A$  for each product is the minimum value of  $x$  coordinate and minimum value of  $y$  coordinate respectively for the box it is represented by. For e.g. for the left upper corner box manufactured by Chatpata company, the value of  $W$  and  $A$  are 3 and 35 respectively. The fine charged for polluting the environment is Rs. ( $A + W$ ) lakh.



Based on these indices, these products of the three companies are divided into four categories - Green, Blue, Yellow and Red. The criteria of division of companies are given in the table below.

Blue	Red
$A > 20, W \leq 20$	$A > 20, W > 20$
Green	Yellow
$A \leq 20, W < 20$	$A \leq 20, W > 20$

**Q.50**

Among all the 24 products of the three companies if the fine paid as a percentage of its revenue is calculated, then what is its maximum value and for which company?

1  **13.5%, Biskoot**

2  **12.25%, Chatpata**

3  **11.2%, Atpata**

4  **9.5%, Biskoot**

### Solution:

**Correct Answer : 2**

 **Bookmark**

 **Answer key/Solution**

The water pollution index (W), the air pollution index (A) and the revenue (R) of each categories of each of the three snacks manufacturing company are given in the table below.

		Green		Yellow		Blue		Red	
Atpata	A	3	8	24	21	15	12	22	35
	W	0	18	17	6	29	37	24	36
	R	12	12	9	15	15	10	16	9
Biskoot	A	1	10	24	27	3	5	26	27
	W	10	2	3	11	27	33	37	25
	R	24	20	9	20	21	5	8	16
Chatpata	A	11	1	32	32	3	15	33	23
	W	7	15	3	17	35	24	23	31
	R	9	16	15	4	12	9	18	16

For maximum value of fine paid as a percentage of its revenue, we shall logically consider only those products for which revenue is among the lowest and the values of A and W are among the highest.

The product from Chatpata under Yellow category having revenue of Rs.4 crores has the maximum value of fine paid as a percentage of its revenue.

$$\text{The required value is } = \frac{(32+17) \times 10^5}{4 \times 10^7} \times 100 = 12.25\%.$$

**FeedBack**

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

Arun has rented out his four storey building i.e., ground, 1st, 2nd and 3rd floor, to ten tenants - Prakash, Gautam, Ankit, Upendra, Samar, Tarun, Saral, Manoj, Sandeep and Ajit. There are 12 flats, named from O to Z, such that the number of flats on ground, 1st, 2nd and 3rd floor are three, four, two and three respectively. Each flat is occupied by one tenant only. The rents paid by these tenants are between Rs. 6k and Rs. 12k (both including). Rent of a flat at any end, either left or right, i.e., corner flat of any floor is not less than that of flat(s) which is/are not at the end i.e., non-corner flats. The maximum rent paid for any flat at a lower floor is less than or equal to that for any flat at upper floor.

Some additional information is as given below:

- (i) Flat 'S' and 'R' are left and right end corner flats respectively. Total rent collected from these twelve flats was Rs. 88k.
- (ii) Sandeep lives exactly between Prakash and Gautam on the same floor, and Saral, Manoj and Ajit live on different floors. Flat T and W are not occupied by anyone.
- (iii) Tarun lives in a right end corner flat 'V' on the ground floor and pays rent of Rs. 7k which is equal to the rent paid by Gautam who lives on the 1st floor. Total rent collected from any floor was not less than Rs. 10k.
- (iv) Flat P, U and Q are on the same floor from left to right in that order but are below to the floor on which flats O, W and Z (in that order from left to right) are located.
- (v) Total rent collected from the flats at ground floor and at 1st floor are Rs. 20k and Rs. 24k respectively.

Manoj, who pays rent of Rs. 9k, lives in a left end corner flat 'X' on the 2nd floor.

(vi) Upendra lives to the left of Saral and pays more rent than that paid by Samar. The flats of Ankit and Ajit are adjacent to each other and Ajit does not pay the least rent among all ten tenants.

(vii) The rents paid by all the tenants are multiple of 1000.

**[Note:- Flats on each floor are in a row facing north direction]**

#### **Q.51**

**Find the total sum of the rents paid by Sandeep, Samar and Saral.**

1  30k

2  31k

3  32k

4  None of these

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

First of all, draw the structure as below :-

	Left end flat	Right end flat	Right end flat
3 <sup>rd</sup> floor	-	-	-
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	-	
1 <sup>st</sup> floor	-	-	-
Ground floor	-	-	Tarun(V) Rs.7K

As per instructions given in question :-

We can conclude that Rent of middle and left corner flat at ground floor must be Rs. 6k and 7k respectively because Tarun pays 7k and total rent collected from ground floor is 20k. It can be concluded from statement (v) that there are 3 persons living at 1st floor because if there were 2 persons at 1st floor then both must pay rent of Rs. 12k which is not possible and if there were 4 persons at 1st floor then at least one person must pay rent less than Rs. 7k which contradicts the statement "Rents for flats at lower floor is not more than that for flats at upper floors".

From statement (iii): Rent of one of flats at 1st floor is Rs. 7k. So sum of rents of remaining two flats that are occupied is Rs. 17k i.e., (24k - 7k). As, rent of flat number 'X' at 2nd floor is 9k, we can observe that rent of any flat at 1st floor cannot be more than 9k and similarly, we can also see that rent of no flat on 1st floor should be less than 7k. Therefore, the only possibility is that rent of left corner flat and middle flat at floor no.1 must be Rs. 9k and 8k respectively.

From statement (iii): Rent collected from no floor is less than Rs. 10k. We can conclude that there must be one more person on 2nd floor other than Manoj. Sum of rents collected from 3rd and 2nd floor = 88 - (20 + 24) = 44k. As Manoj who lives at 2nd floor pays rent of Rs. 9K, remaining three tenants staying at 2nd & 3rd floor will be paying rent of 35k i.e.(44k - 9k). We can conclude that person living on floor no. 2 will be paying rent of Rs. 11k and persons living on 3rd floor will be paying rent of Rs. 12k each.

From Statement (ii): It is given that Sandeep lives exactly between Prakash and Gautam on the same floor. We can conclude that Prakash, Sandeep and Gautam must live in 3 flats in a row starting from left end.

From statement (iv): It may be conclude that flats P, U and Q are on 1st floor and O, W and Z are on 3rd floor. As, T and W are unoccupied flats, so that numbers T must be right end flat at 1st floor.

From statement (ii): It is given that Saral, Manoj and Ajit live on different floors and in statement (vi); it is given that Ankit and Ajit are neighbour of each other. From these two statement; we can conclude that Ajit and Ankit must live at ground floor. As Ajit does not pay the least rent, he must live in left end flat.

From statement (vi): We can conclude that Upendra and Saral must live on 3rd floor in left end and right end flat respectively.

Now, Samar must live at 2nd floor. Now, we have the following final diagram:

3 <sup>rd</sup> floor	Upendra(O) Rs.12k	(W) Vacant flat	Saral(Z) Rs.12k	
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	Samar(R) Rs.11K		
1 <sup>st</sup> floor	Prakash(P) Rs.9k	Sandeep(U) Rs.8 k	Gautam(Q) Rs. 7k	(T) Vacant Flat
Ground floor	Ajit(S) Rs.7k	Ankit(Y) Rs.6k	Tarun(V) Rs.7k	

Sum of rents paid by Sandeep, Samar and Saral is 8k + 11k + 12k = 31k.

**FeedBack**

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

Arun has rented out his four storey building i.e., ground, 1st, 2nd and 3rd floor, to ten tenants - Prakash, Gautam, Ankit, Upendra, Samar, Tarun, Saral, Manoj, Sandeep and Ajit. There are 12 flats, named from O to Z, such that the number of flats on ground, 1st, 2nd and 3rd floor are three, four, two and three respectively. Each flat is occupied by one tenant only. The rents paid by these tenants are between Rs. 6k and Rs. 12k (both including). Rent of a flat at any end, either left or right, i.e., corner flat of any floor is not less than that of flat(s) which is/are not at the end i.e., non-corner flats. The maximum rent paid for any flat at a lower floor is less than or equal to that for any flat at upper floor.

Some additional information is as given below:

- (i) Flat 'S' and 'R' are left and right end corner flats respectively. Total rent collected from these twelve flats was Rs. 88k.
- (ii) Sandeep lives exactly between Prakash and Gautam on the same floor, and Saral, Manoj and Ajit live on different floors. Flat T and W are not occupied by anyone.
- (iii) Tarun lives in a right end corner flat 'V' on the ground floor and pays rent of Rs. 7k which is equal to the rent paid by Gautam who lives on the 1st floor. Total rent collected from any floor was not less than Rs. 10k.
- (iv) Flat P, U and Q are on the same floor from left to right in that order but are below to the floor on which flats O, W and Z (in that order from left to right) are located.
- (v) Total rent collected from the flats at ground floor and at 1st floor are Rs. 20k and Rs. 24k respectively.

Manoj, who pays rent of Rs. 9k, lives in a left end corner flat 'X' on the 2nd floor.

(vi) Upendra lives to the left of Saral and pays more rent than that paid by Samar. The flats of Ankit and Ajit are adjacent to each other and Ajit does not pay the least rent among all ten tenants.

(vii) The rents paid by all the tenants are multiple of 1000.

**[Note:- Flats on each floor are in a row facing north direction]**

#### Q.52

Saral lives in flat named

1  Z

2  O

3  R

4  S

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

First of all, draw the structure as below :-

	Left end flat	Right end flat	Right end flat
3 <sup>rd</sup> floor	-	-	-
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	-	
1 <sup>st</sup> floor	-	-	-
Ground floor	-	-	Tarun(V) Rs.7K

As per instructions given in question :-

We can conclude that Rent of middle and left corner flat at ground floor must be Rs. 6k and 7k respectively because Tarun pays 7k and total rent collected from ground floor is 20k. It can be concluded from statement (v) that there are 3 persons living at 1st floor because if there were 2 persons at 1st floor then both must pay rent of Rs. 12k which is not possible and if there were 4 persons at 1st floor then at least one person must pay rent less than Rs. 7k which contradicts the statement "Rents for flats at lower floor is not more than that for flats at upper floors".

From statement (iii): Rent of one of flats at 1st floor is Rs. 7k. So sum of rents of remaining two flats that are occupied is Rs. 17k i.e., (24k - 7k). As, rent of flat number 'X' at 2nd floor is 9k, we can observe that rent of any flat at 1st floor cannot be more than 9k and similarly, we can also see that rent of no flat on 1st floor should be less than 7k. Therefore, the only possibility is that rent of left corner flat and middle flat at floor no.1 must be Rs. 9k and 8k respectively.

From statement (iii): Rent collected from no floor is less than Rs. 10k. We can conclude that there must be one more person on 2nd floor other than Manoj. Sum of rents collected from 3rd and 2nd floor = 88 - (20 + 24) = 44k. As Manoj who lives at 2nd floor pays rent of Rs. 9K, remaining three tenants staying at 2nd & 3rd floor will be paying rent of 35k i.e.(44k - 9k). We can conclude that person living on floor no. 2 will be paying rent of Rs. 11k and persons living on 3rd floor will be paying rent of Rs. 12k each.

From Statement (ii): It is given that Sandeep lives exactly between Prakash and Gautam on the same floor. We can conclude that Prakash, Sandeep and Gautam must live in 3 flats in a row starting from left end.

From statement (iv): It may be conclude that flats P, U and Q are on 1st floor and O, W and Z are on 3rd floor. As, T and W are unoccupied flats, so that numbers T must be right end flat at 1st floor.

From statement (ii): It is given that Saral, Manoj and Ajit live on different floors and in statement (vi); it is given that Ankit and Ajit are neighbour of each other. From these two statement; we can conclude that Ajit and Ankit must live at ground floor. As Ajit does not pay the least rent, he must live in left end flat.

From statement (vi): We can conclude that Upendra and Saral must live on 3rd floor in left end and right end flat respectively.

Now, Samar must live at 2nd floor. Now, we have the following final diagram:

3 <sup>rd</sup> floor	Upendra(O) Rs.12k	(W) Vacant flat	Saral(Z) Rs.12k	
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	Samar(R) Rs.11K		
1 <sup>st</sup> floor	Prakash(P) Rs.9k	Sandeep(U) Rs.8k	Gautam(Q) Rs.7k	(T) Vacant Flat
Ground floor	Ajit(S) Rs.7k	Ankit(Y) Rs.6k	Tarun(V) Rs.7k	

Saral lives in flat number Z.

**FeedBack**

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

Arun has rented out his four storey building i.e., ground, 1st, 2nd and 3rd floor, to ten tenants - Prakash, Gautam, Ankit, Upendra, Samar, Tarun, Saral, Manoj, Sandeep and Ajit. There are 12 flats, named from O to Z, such that the number of flats on ground, 1st, 2nd and 3rd floor are three, four, two and three respectively. Each flat is occupied by one tenant only. The rents paid by these tenants are between Rs. 6k and Rs. 12k (both including). Rent of a flat at any end, either left or right, i.e., corner flat of any floor is not less than that of flat(s) which is/are not at the end i.e., non-corner flats. The maximum rent paid for any flat at a lower floor is less than or equal to that for any flat at upper floor.

Some additional information is as given below:

- (i) Flat 'S' and 'R' are left and right end corner flats respectively. Total rent collected from these twelve flats was Rs. 88k.
- (ii) Sandeep lives exactly between Prakash and Gautam on the same floor, and Saral, Manoj and Ajit live on different floors. Flat T and W are not occupied by anyone.
- (iii) Tarun lives in a right end corner flat 'V' on the ground floor and pays rent of Rs. 7k which is equal to the rent paid by Gautam who lives on the 1st floor. Total rent collected from any floor was not less than Rs. 10k.
- (iv) Flat P, U and Q are on the same floor from left to right in that order but are below to the floor on which flats O, W and Z (in that order from left to right) are located.
- (v) Total rent collected from the flats at ground floor and at 1st floor are Rs. 20k and Rs. 24k respectively.

Manoj, who pays rent of Rs. 9k, lives in a left end corner flat 'X' on the 2nd floor.

(vi) Upendra lives to the left of Saral and pays more rent than that paid by Samar. The flats of Ankit and Ajit are adjacent to each other and Ajit does not pay the least rent among all ten tenants.

(vii) The rents paid by all the tenants are multiple of 1000.

**[Note:- Flats on each floor are in a row facing north direction]**

### Q.53

**Who among the following can live in the left end corner flats?**

- 1  Saral, Manoj, Ajit
- 2  Upendra, Manoj, Prakash and Ajit
- 3  Saral, Manoj, Prakash and Ajit.
- 4  Upendra, Manoj, Ajit, Samar

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

First of all, draw the structure as below :-

	Left end flat	Right end flat	Right end flat
3 <sup>rd</sup> floor	-	-	-
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	-	
1 <sup>st</sup> floor	-	-	-
Ground floor	-	-	Tarun(V) Rs.7K

As per instructions given in question :-

We can conclude that Rent of middle and left corner flat at ground floor must be Rs. 6k and 7k respectively because Tarun pays 7k and total rent collected from ground floor is 20k. It can be concluded from statement (v) that there are 3 persons living at 1st floor because if there were 2 persons at 1st floor then both must pay rent of Rs. 12k which is not possible and if there were 4 persons at 1st floor then at least one person must pay rent less than Rs. 7k which contradicts the statement "Rents for flats at lower floor is not more than that for flats at upper floors".

From statement (iii): Rent of one of flats at 1st floor is Rs. 7k. So sum of rents of remaining two flats that are occupied is Rs. 17k i.e., (24k - 7k). As, rent of flat number 'X' at 2nd floor is 9k, we can observe that rent of any flat at 1st floor cannot be more than 9k and similarly, we can also see that rent of no flat on 1st floor should be less than 7k. Therefore, the only possibility is that rent of left corner flat and middle flat at floor no.1 must be Rs. 9k and 8k respectively.

From statement (iii): Rent collected from no floor is less than Rs. 10k. We can conclude that there must be one more person on 2nd floor other than Manoj. Sum of rents collected from 3rd and 2nd floor = 88 - (20 + 24) = 44k. As Manoj who lives at 2nd floor pays rent of Rs. 9K, remaining three tenants staying at 2nd & 3rd floor will be paying rent of 35k i.e.(44k - 9k). We can conclude that person living on floor no. 2 will be paying rent of Rs. 11k and persons living on 3rd floor will be paying rent of Rs. 12k each.

From Statement (ii): It is given that Sandeep lives exactly between Prakash and Gautam on the same floor. We can conclude that Prakash, Sandeep and Gautam must live in 3 flats in a row starting from left end.

From statement (iv): It may be conclude that flats P, U and Q are on 1st floor and O, W and Z are on 3rd floor. As, T and W are unoccupied flats, so that numbers T must be right end flat at 1st floor.

From statement (ii): It is given that Saral, Manoj and Ajit live on different floors and in statement (vi); it is given that Ankit and Ajit are neighbour of each other. From these two statement; we can conclude that Ajit and Ankit must live at ground floor. As Ajit does not pay the least rent, he must live in left end flat.

From statement (vi): We can conclude that Upendra and Saral must live on 3rd floor in left end and right end flat respectively.

Now, Samar must live at 2nd floor. Now, we have the following final diagram:

3 <sup>rd</sup> floor	Upendra(O) Rs.12k	(W) Vacant flat	Saral(Z) Rs.12k	
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	Samar(R) Rs.11K		
1 <sup>st</sup> floor	Prakash(P) Rs.9k	Sandeep(U) Rs.8 k	Gautam(Q) Rs. 7k	(T) Vacant Flat
Ground floor	Ajit(S) Rs.7k	Ankit(Y) Rs.6k	Tarun(V) Rs.7k	

Upendra, Manoj, Prakash and Ajit live in left end corner flats.

**FeedBack**

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

Arun has rented out his four storey building i.e., ground, 1st, 2nd and 3rd floor, to ten tenants - Prakash, Gautam, Ankit, Upendra, Samar, Tarun, Saral, Manoj, Sandeep and Ajit. There are 12 flats, named from O to Z, such that the number of flats on ground, 1st, 2nd and 3rd floor are three, four, two and three respectively. Each flat is occupied by one tenant only. The rents paid by these tenants are between Rs. 6k and Rs. 12k (both including). Rent of a flat at any end, either left or right, i.e., corner flat of any floor is not less than that of flat(s) which is/are not at the end i.e., non-corner flats. The maximum rent paid for any flat at a lower floor is less than or equal to that for any flat at upper floor.

Some additional information is as given below:

- (i) Flat 'S' and 'R' are left and right end corner flats respectively. Total rent collected from these twelve flats was Rs. 88k.
- (ii) Sandeep lives exactly between Prakash and Gautam on the same floor, and Saral, Manoj and Ajit live on different floors. Flat T and W are not occupied by anyone.
- (iii) Tarun lives in a right end corner flat 'V' on the ground floor and pays rent of Rs. 7k which is equal to the rent paid by Gautam who lives on the 1st floor. Total rent collected from any floor was not less than Rs. 10k.
- (iv) Flat P, U and Q are on the same floor from left to right in that order but are below to the floor on which flats O, W and Z (in that order from left to right) are located.
- (v) Total rent collected from the flats at ground floor and at 1st floor are Rs. 20k and Rs. 24k respectively.

Manoj, who pays rent of Rs. 9k, lives in a left end corner flat 'X' on the 2nd floor.

(vi) Upendra lives to the left of Saral and pays more rent than that paid by Samar. The flats of Ankit and Ajit are adjacent to each other and Ajit does not pay the least rent among all ten tenants.

(vii) The rents paid by all the tenants are multiple of 1000.

**[Note:- Flats on each floor are in a row facing north direction]**

#### **Q.54**

Among the following flats, which one has the least rent?

1  O

2  R

3  U

4  S

**Solution:****Correct Answer : 4****Bookmark****Answer key/Solution**

First of all, draw the structure as below :-

	Left end flat	Right end flat	Right end flat
3 <sup>rd</sup> floor	-	-	-
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	-	
1 <sup>st</sup> floor	-	-	-
Ground floor	-	-	Tarun(V) Rs.7K

As per instructions given in question :-

We can conclude that Rent of middle and left corner flat at ground floor must be Rs. 6k and 7k respectively because Tarun pays 7k and total rent collected from ground floor is 20k. It can be concluded from statement (v) that there are 3 persons living at 1st floor because if there were 2 persons at 1st floor then both must pay rent of Rs. 12k which is not possible and if there were 4 persons at 1st floor then at least one person must pay rent less than Rs. 7k which contradicts the statement "Rents for flats at lower floor is not more than that for flats at upper floors".

From statement (iii): Rent of one of flats at 1st floor is Rs. 7k. So sum of rents of remaining two flats that are occupied is Rs. 17k i.e., (24k - 7k). As, rent of flat number 'X' at 2nd floor is 9k, we can observe that rent of any flat at 1st floor cannot be more than 9k and similarly, we can also see that rent of no flat on 1st floor should be less than 7k. Therefore, the only possibility is that rent of left corner flat and middle flat at floor no.1 must be Rs. 9k and 8k respectively.

From statement (iii): Rent collected from no floor is less than Rs. 10k. We can conclude that there must be one more person on 2nd floor other than Manoj. Sum of rents collected from 3rd and 2nd floor = 88 - (20 + 24) = 44k. As Manoj who lives at 2nd floor pays rent of Rs. 9K, remaining three tenants staying at 2nd & 3rd floor will be paying rent of 35k i.e.(44k - 9k). We can conclude that person living on floor no. 2 will be paying rent of Rs. 11k and persons living on 3rd floor will be paying rent of Rs. 12k each.

From Statement (ii): It is given that Sandeep lives exactly between Prakash and Gautam on the same floor. We can conclude that Prakash, Sandeep and Gautam must live in 3 flats in a row starting from left end.

From statement (iv): It may be conclude that flats P, U and Q are on 1st floor and O, W and Z are on 3rd floor. As, T and W are unoccupied flats, so that numbers T must be right end flat at 1st floor.

From statement (ii): It is given that Saral, Manoj and Ajit live on different floors and in statement (vi); it is given that Ankit and Ajit are neighbour of each other. From these two statement; we can conclude that Ajit and Ankit must live at ground floor. As Ajit does not pay the least rent, he must live in left end flat.

From statement (vi): We can conclude that Upendra and Saral must live on 3rd floor in left end and right end flat respectively.

Now, Samar must live at 2nd floor. Now, we have the following final diagram:

3 <sup>rd</sup> floor	Upendra(O) Rs.12k	(W) Vacant flat	Saral(Z) Rs.12k	
2 <sup>nd</sup> floor	Manoj(X) Rs.9k	Samar(R) Rs.11K		
1 <sup>st</sup> floor	Prakash(P) Rs.9k	Sandeep(U) Rs.8k	Gautam(Q) Rs.7k	(T) Vacant Flat
Ground floor	Ajit(S) Rs.7k	Ankit(Y) Rs.6k	Tarun(V) Rs.7k	

The rent of flat S is Rs. 7k.

**FeedBack**

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

**Pramod Gautam, Sachin Kale, Harish Dhandev, Vishwanath Bobade and Rajiv Bittu - are five farmers each having some cattle with him. The total number of cattle with five of them taken together is 249. It is also known that:**

- (i) The number of cattle with Pramod Gautam is the square of a natural number.
- (ii) Each of them has at least 21 cattle.
- (iii) The number of cattle with Harish Dhandev is 6 more than the square of a natural number.
- (iv) The ratio of the number of cattle with Vishwanath Bobade and Rajiv Bittu is 4 : 5 respectively.
- (v) Sachin Kale has an even number of cattle.
- (vi) The sum of the number of cattle with Vishwanath Bobade and Rajiv Bittu is equal to the number of cattle with Pramod Gautam.

---

#### **Q.55**

**Which among the following can be the possible absolute difference between the number of cattle with Sachin Kale and Harish Dhandev?**

1  21

2  23

3  25

4  Either (2) or (3)

---

**Solution:****Correct Answer : 4** **Bookmark** **Answer key/Solution**

Let  $4x$  and  $5x$  be the number of cattle with Vishwanath Bobade and Rajiv Bittu respectively, where  $x$  is a natural number. Then, the number of cattle with Pramod Gautam =  $4x + 5x = 9x$

Since the number of cattle with Pramod Gautam is a perfect square, the value of  $9x$  is 9, 36, 81, 144 or 225.

$x = 1, 4, 9, 16$  or 25

Now,  $x = 16$  or 25 is not possible. In these cases the total number of cattle will exceed 249.  $x = 1$  or 4 is also not possible. In these cases, the number of cattle with Vishwanath Bobade as well as Rajiv Bittu will be less than 21.

Therefore, only  $x = 9$  satisfies all the given conditions.

Hence, the number of cattle with Pramod Gautam, Vishwanath Bobade and Rajiv Bittu are 81, 36 and 45 respectively.

The number of cattle with Sachin Kale and Harish Dhandev together

$$= 249 - (81 + 36 + 45) = 87$$

As Sachin Kale has an even number of cattle, the number of cattle with Harish Dhandev must be odd.

The number of cattle with Harish Dhandev is either 31 or 55 and so the number of cattle with Sachin Kale is either 56 or 32 respectively.

The conclusions drawn above can be tabulated as shown below.

Farmer	Pramod Gautam	Sachin Kale	Harish Dhandev	Vishwanath Bobade	Rajiv Bittu
Case I:	81	56	31	36	45
Case II:	81	32	55	36	45

The absolute difference between the number of cattle with Sachin Kale and Harish Dhandev can be  $55 - 32 = 23$  or  $56 - 31 = 25$ .

**FeedBack**

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

**Pramod Gautam, Sachin Kale, Harish Dhandev, Vishwanath Bobade and Rajiv Bittu** - are five farmers each having some cattle with him. The total number of cattle with five of them taken together is 249. It is also known that:

- (i) The number of cattle with Pramod Gautam is the square of a natural number.
- (ii) Each of them has at least 21 cattle.
- (iii) The number of cattle with Harish Dhandev is 6 more than the square of a natural number.
- (iv) The ratio of the number of cattle with Vishwanath Bobade and Rajiv Bittu is 4 : 5 respectively.
- (v) Sachin Kale has an even number of cattle.
- (vi) The sum of the number of cattle with Vishwanath Bobade and Rajiv Bittu is equal to the number of cattle with Pramod Gautam.

### Q.56

**The sum of the number of cattle with Pramod Gautam and Vishwanath Bobade is**

**Solution:****Correct Answer : 117** **Bookmark** **Answer key/Solution**

Let  $4x$  and  $5x$  be the number of cattle with Vishwanath Bobade and Rajiv Bittu respectively, where  $x$  is a natural number.

Then, the number of cattle with Pramod Gautam =  $4x + 5x = 9x$

Since the number of cattle with Pramod Gautam is a perfect square, the value of  $9x$  is 9, 36, 81, 144 or 225.

$x = 1, 4, 9, 16$  or 25

Now,  $x = 16$  or 25 is not possible. In these cases the total number of cattle will exceed 249.  $x = 1$  or 4 is also not possible. In these cases, the number of cattle with Vishwanath Bobade as well as Rajiv Bittu will be less than 21.

Therefore, only  $x = 9$  satisfies all the given conditions.

Hence, the number of cattle with Pramod Gautam, Vishwanath Bobade and Rajiv Bittu are 81, 36 and 45 respectively.

The number of cattle with Sachin Kale and Harish Dhandev together

$$= 249 - (81 + 36 + 45) = 87$$

As Sachin Kale has an even number of cattle, the number of cattle with Harish Dhandev must be odd.

The number of cattle with Harish Dhandev is either 31 or 55 and so the number of cattle with Sachin Kale is either 56 or 32 respectively.

The conclusions drawn above can be tabulated as shown below.

Farmer	Pramod Gautam	Sachin Kale	Harish Dhandev	Vishwanath Bobade	Rajiv Bittu
Case I:	81	56	31	36	45
Case II:	81	32	55	36	45

The sum of the number of cattle with Pramod Gautam and Vishwanath Bobade =  $81 + 36 = 117$ .

**FeedBack**

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

**Pramod Gautam, Sachin Kale, Harish Dhandev, Vishwanath Bobade and Rajiv Bittu** - are five farmers each having some cattle with him. The total number of cattle with five of them taken together is 249. It is also known that:

- (i) The number of cattle with Pramod Gautam is the square of a natural number.
- (ii) Each of them has at least 21 cattle.
- (iii) The number of cattle with Harish Dhandev is 6 more than the square of a natural number.
- (iv) The ratio of the number of cattle with Vishwanath Bobade and Rajiv Bittu is 4 : 5 respectively.
- (v) Sachin Kale has an even number of cattle.
- (vi) The sum of the number of cattle with Vishwanath Bobade and Rajiv Bittu is equal to the number of cattle with Pramod Gautam.

**Q.57**

**Who among the five farmers has the second lowest number of cattle?**

1  **Vishwanath Bobade**

2  **Sachin Kale**

3  **Harish Dhandev**

**Cannot be determined**

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

Let  $4x$  and  $5x$  be the number of cattle with Vishwanath Bobade and Rajiv Bittu respectively, where  $x$  is a natural number. Then, the number of cattle with Pramod Gautam =  $4x + 5x = 9x$

Since the number of cattle with Pramod Gautam is a perfect square, the value of  $9x$  is 9, 36, 81, 144 or 225.

$x = 1, 4, 9, 16$  or 25

Now,  $x = 16$  or 25 is not possible. In these cases the total number of cattle will exceed 249.  $x = 1$  or 4 is also not possible. In these cases, the number of cattle with Vishwanath Bobade as well as Rajiv Bittu will be less than 21.

Therefore, only  $x = 9$  satisfies all the given conditions.

Hence, the number of cattle with Pramod Gautam, Vishwanath Bobade and Rajiv Bittu are 81, 36 and 45 respectively.

The number of cattle with Sachin Kale and Harish Dhandev together

$$= 249 - (81 + 36 + 45) = 87$$

As Sachin Kale has an even number of cattle, the number of cattle with Harish Dhandev must be odd.

The number of cattle with Harish Dhandev is either 31 or 55 and so the number of cattle with Sachin Kale is either 56 or 32 respectively.

The conclusions drawn above can be tabulated as shown below.

Farmer	Pramod Gautam	Sachin Kale	Harish Dhandev	Vishwanath Bobade	Rajiv Bittu
Case I:	81	56	31	36	45
Case II:	81	32	55	36	45

Vishwanath Bobade has the second lowest number of cattle.

**FeedBack**

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

**Pramod Gautam, Sachin Kale, Harish Dhandev, Vishwanath Bobade and Rajiv Bittu** - are five farmers each having some cattle with him. The total number of cattle with five of them taken together is 249. It is also known that:

- (i) The number of cattle with Pramod Gautam is the square of a natural number.
- (ii) Each of them has at least 21 cattle.
- (iii) The number of cattle with Harish Dhandev is 6 more than the square of a natural number.
- (iv) The ratio of the number of cattle with Vishwanath Bobade and Rajiv Bittu is 4 : 5 respectively.
- (v) Sachin Kale has an even number of cattle.
- (vi) The sum of the number of cattle with Vishwanath Bobade and Rajiv Bittu is equal to the number of cattle with Pramod Gautam.

**Q.58****How many farmers have an odd number of cattle?**

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

Let  $4x$  and  $5x$  be the number of cattle with Vishwanath Bobade and Rajiv Bittu respectively, where  $x$  is a natural number.  
Then, the number of cattle with Pramod Gautam =  $4x + 5x = 9x$

Since the number of cattle with Pramod Gautam is a perfect square, the value of  $9x$  is 9, 36, 81, 144 or 225.

$x = 1, 4, 9, 16$  or 25

Now,  $x = 16$  or 25 is not possible. In these cases the total number of cattle will exceed 249.  $x = 1$  or 4 is also not possible. In these cases, the number of cattle with Vishwanath Bobade as well as Rajiv Bittu will be less than 21.

Therefore, only  $x = 9$  satisfies all the given conditions.

Hence, the number of cattle with Pramod Gautam, Vishwanath Bobade and Rajiv Bittu are 81, 36 and 45 respectively.

The number of cattle with Sachin Kale and Harish Dhandev together

$$= 249 - (81 + 36 + 45) = 87$$

As Sachin Kale has an even number of cattle, the number of cattle with Harish Dhandev must be odd.

The number of cattle with Harish Dhandev is either 31 or 55 and so the number of cattle with Sachin Kale is either 56 or 32 respectively.

The conclusions drawn above can be tabulated as shown below.

Farmer	Pramod Gautam	Sachin Kale	Harish Dhandev	Vishwanath Bobade	Rajiv Bittu
Case I:	81	56	31	36	45
Case II:	81	32	55	36	45

Only three farmers have an odd number of cattle.

 **FeedBack**

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

Each of the three rivers - Krishna, Kaveri and Tapi - flows through three cities - Maularampur, Kualalampur and Jholapur. These rivers are flowing above danger mark in these cities. It is known that if all the three rivers, in a city, flow at more than 5 cm above danger mark, then the city becomes flooded and if any two rivers in a city flow at more than 5 cm above danger mark, then the city becomes semi-flooded. It is also known that one of these three cities is flooded and another one is semi-flooded. Total 200 cusecs (cubic feet per second) of water was released from a dam into the three rivers in three cities. Before that release of water each river was exactly at the danger mark. The table given below shows the increase in water level (in cm) above the danger mark in a river on releasing 1 cusec of water from the dam.

River	Increase in water level
Krishna	0.2 cm
Kaveri	0.3 cm
Tapi	0.4 cm

It is also known that :-

- (i) The level of the river increased above danger mark in all the three cities taken together is same for any two rivers out of the three. One river flows 11 cm above danger mark in a city.
- (ii) Krishna flows at a level above danger mark in cities Maularampur, Kualalampur and Jholapur in the ratio of 3 : 9 : 7. All the three rivers flow at more than 1 cm above its danger mark in each city.
- (iii) Amount of water released in Kaveri in Kualalampur and that in Tapi in Maularampur is in the ratio of 2 : 3.

[Note:- All rivers must flow at a level above danger mark in each city in integer value of cm only.]

**Q.59**

The maximum level (in cm) above danger mark at which Tapi can flow in any city is

**Solution:**

**Correct Answer : 8**

 **Bookmark**

 **Answer key/Solution**

From statement II; let Krishna flow 3 cm, 9cm and 7cm above danger mark in Maularampur, Kualalampur and Jholapur respectively.

$$\therefore \text{Water released in Krishna} = \frac{3+9+7}{0.2} = \frac{19}{0.2} = 95 \text{ cusecs.}$$

Krishna cannot flow (6, 8 and 14) cm above danger mark because in this case water released in krishna will be 190 cusecs and only 10 cusecs water released in Kaveri and Tapi together, which is not possible. From statement I; Two rivers flow at same level above danger mark in three cities together. Suppose; Both Krishna and Kaveri flow 19 cm above danger mark. Water

$$\text{released in Kaveri} = \frac{19}{0.3} = \frac{19}{3} \text{ cusecs.}$$

$$\text{In this case, water released in Tapi} = 200 - \left( 95 + \frac{190}{3} \right) = \frac{125}{3} \text{ cusecs.}$$

Which is not possible because in this case, the sum of water levels above danger mark in Tapi is not an integer. Similarly, we can observe that Krishna and Tapi cannot flow at the same level above danger mark in three cities together. So; it can be concluded that Kaveri and Tapi flow at same level above danger mark in three cities together.

Let Kaveri and Tapi flow at  $x$  cm above danger mark.

$$\therefore \frac{x}{0.3} + \frac{x}{0.4} = 200 - 95 = 105 \Rightarrow \frac{10x}{3} + \frac{5x}{2} = 105 \Rightarrow \frac{20x + 15x}{6} = 105 \Rightarrow x = 18 \text{ cm.}$$

From statement III; we can conclude that Kaveri in Kualalampur and Tapi in Maularampur must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$ .

It is given that all rivers flow at more than 1 cm above its danger mark in each city.

Case I :- Kaveri in Kualalampur and Tapi in Maularampur flows 2 cm and 4 cm above danger mark.

River City	Krishna	Kaveri	Tapi
Maularampur	3		4
Kualalampur	9	2	
Jholapur	7		

In the above table there is only one possibility that Kualampur is some flooded and Jholapur is flooded which is only possible when Kaveri in Jholapur flows 11 cm above danger mark because it is given that one river flows 11 cm above danger mark. Now, we have the following table:-

River City	Krishna	Kaveri	Tapi
Maularampur	3	5	4
Kualalampur	9	2	6/7/8
Jholapur	7	11	8/7/6

Similarly analysis leads to the following case :-

Case II :- Kaveri in Kualalampur and Tapi in Maularampur flows at 3 cm and 6 cm above danger mark respectively.

River City	Krishna	Kaveri	Tapi
Maularampur	3	4	6
Kualalampur	9	3	6
Jholapur	7	11	6

Tapi can flow at maximum of 8 cm above danger mark.

FeedBack

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

Each of the three rivers - Krishna, Kaveri and Tapi - flows through three cities - Maularampur, Kualalampur and Jholapur. These rivers are flowing above danger mark in these cities. It is known that if all the three rivers, in a city, flow at more than 5 cm above danger mark, then the city becomes flooded and if any two rivers in a city flow at more than 5 cm above danger mark, then the city becomes semi-flooded. It is also known that one of these three cities is flooded and another one is semi-flooded. Total 200 cusecs (cubic feet per second) of water was released from a dam into the three rivers in three cities. Before that release of water each river was exactly at the danger mark. The table given below shows the increase in water level (in cm) above the danger mark in a river on releasing 1 cusec of water from the dam.

River	Increase in water level
Krishna	0.2 cm
Kaveri	0.3 cm
Tapi	0.4 cm

It is also known that :-

- (i) The level of the river increased above danger mark in all the three cities taken together is same for any two rivers out of the three. One river flows 11 cm above danger mark in a city.
- (ii) Krishna flows at a level above danger mark in cities Maularampur, Kualalampur and Jholapur in the ratio of 3 : 9 : 7. All the three rivers flow at more than 1 cm above its danger mark in each city.
- (iii) Amount of water released in Kaveri in Kualalampur and that in Tapi in Maularampur is in the ratio of 2 : 3.

[Note:- All rivers must flow at a level above danger mark in each city in integer value of cm only.]

#### Q.60

The minimum water (in cusecs) that can be released in the city 'Maularampur'?

- 1  40 cusecs
- 2   $125/3$  cusecs
- 3   $130/3$  cusecs
- 4  50 cusecs.

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

From statement II; let Krishna flow 3 cm, 9cm and 7cm above danger mark in Maularampur, Kualalampur and Jholapur respectively.

$$\therefore \text{Water released in Krishna} = \frac{3+9+7}{0.2} = \frac{19}{0.2} = 95 \text{ cusecs.}$$

Krishna cannot flow (6, 8 and 14) cm above danger mark because in this case water released in krishna will be 190 cusecs and only 10 cusecs water released in Kaveri and Tapi together, which is not possible. From statement I; Two rivers flow at same level above danger mark in three cities together. Suppose; Both Krishna and Kaveri flow 19 cm above danger mark. Water

$$\text{released in Kaveri} = \frac{19}{0.3} = \frac{19}{3} \text{ cusecs.}$$

$$\text{In this case, water released in Tapi} = 200 - \left( 95 + \frac{190}{3} \right) = \frac{125}{3} \text{ cusecs.}$$

Which is not possible because in this case; the sum of water levels above danger mark in Tapi is not an integer. Similarly, we can observe that Krishna and Tapi cannot flow at the same level above danger mark in three cities together. So; it can be concluded that Kaveri and Tapi flow at same level above danger mark in three cities together.

Let Kaveri and Tapi flow at  $x$  cm above danger mark.

$$\therefore \frac{x}{0.3} + \frac{x}{0.4} = 200 - 95 = 105 \Rightarrow \frac{10x}{3} + \frac{5x}{2} = 105 \Rightarrow \frac{20x + 15x}{6} = 105 \Rightarrow x = 18 \text{ cm.}$$

From statement III; we can conclude that Kaveri in Kualalampur and Tapi in Maularampur must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$ .

It is given that all rivers flow at more than 1 cm above its danger mark in each city.

Case I :- Kaveri in Kualalampur and Tapi in Maularampur flows 2 cm and 4 cm above danger mark.

River City	Krishna	Kaveri	Tapi
Maularampur	3		4
Kualalampur	9	2	
Jholapur	7		

In the above table there is only one possibility that Kualampur is some flooded and Jholapur is flooded which is only possible when Kaveri in Jholapur flows 11 cm above danger mark because it is given that one river flows 11 cm above danger mark. Now, we have the following table:-

River City	Krishna	Kaveri	Tapi
Maularampur	3	5	4
Kualalampur	9	2	6/7/8
Jholapur	7	11	8/7/6

Similarly analysis leads to the following case :-

Case II :- Kaveri in Kualalampur and Tapi in Maularampur flows at 3 cm and 6 cm above danger mark respectively.

River City	Krishna	Kaveri	Tapi
Maularampur	3	4	6
Kualalampur	9	3	6
Jholapur	7	11	6

$$\text{Required water} = \frac{3}{0.2} + \frac{5}{0.3} + \frac{4}{0.4} = 15 + \frac{50}{3} + 10 = \frac{125}{3} \text{ cusecs.}$$

**FeedBack**

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

Each of the three rivers - Krishna, Kaveri and Tapi - flows through three cities - Maularampur, Kualalampur and Jholapur. These rivers are flowing above danger mark in these cities. It is known that if all the three rivers, in a city, flow at more than 5 cm above danger mark, then the city becomes flooded and if any two rivers in a city flow at more than 5 cm above danger mark, then the city becomes semi-flooded. It is also known that one of these three cities is flooded and another one is semi-flooded. Total 200 cusecs (cubic feet per second) of water was released from a dam into the three rivers in three cities. Before that release of water each river was exactly at the danger mark. The table given below shows the increase in water level (in cm) above the danger mark in a river on releasing 1 cusec of water from the dam.

River	Increase in water level
Krishna	0.2 cm
Kaveri	0.3 cm
Tapi	0.4 cm

It is also known that :-

- (i) The level of the river increased above danger mark in all the three cities taken together is same for any two rivers out of the three. One river flows 11 cm above danger mark in a city.
- (ii) Krishna flows at a level above danger mark in cities Maularampur, Kualalampur and Jholapur in the ratio of 3 : 9 : 7. All the three rivers flow at more than 1 cm above its danger mark in each city.
- (iii) Amount of water released in Kaveri in Kualalampur and that in Tapi in Maularampur is in the ratio of 2 : 3.

[Note:- All rivers must flow at a level above danger mark in each city in integer value of cm only.]

**Q.61**

What percentage of total water was released in Kaveri?

**Solution:**

**Correct Answer : 30**

 **Bookmark**

 **Answer key/Solution**

From statement II; let Krishna flow 3 cm, 9cm and 7cm above danger mark in Maularampur, Kualalampur and Jholapur respectively.

$$\therefore \text{Water released in Krishna} = \frac{3+9+7}{0.2} = \frac{19}{0.2} = 95 \text{ cusecs.}$$

Krishna cannot flow (6, 8 and 14) cm above danger mark because in this case water released in krishna will be 190 cusecs and only 10 cusecs water released in Kaveri and Tapi together, which is not possible. From statement I; Two rivers flow at same level above danger mark in three cities together. Suppose; Both Krishna and Kaveri flow 19 cm above danger mark. Water

$$\text{released in Kaveri} = \frac{19}{0.3} = \frac{19}{3} \text{ cusecs.}$$

$$\text{In this case, water released in Tapi} = 200 - \left( 95 + \frac{190}{3} \right) = \frac{125}{3} \text{ cusecs.}$$

Which is not possible because in this case, the sum of water levels above danger mark in Tapi is not an integer. Similarly, we can observe that Krishna and Tapi cannot flow at the same level above danger mark in three cities together. So; it can be concluded that Kaveri and Tapi flow at same level above danger mark in three cities together.

Let Kaveri and Tapi flow at  $x$  cm above danger mark.

$$\therefore \frac{x}{0.3} + \frac{x}{0.4} = 200 - 95 = 105 \Rightarrow \frac{10x}{3} + \frac{5x}{2} = 105 \Rightarrow \frac{20x + 15x}{6} = 105 \Rightarrow x = 18 \text{ cm.}$$

From statement III; we can conclude that Kaveri in Kualalampur and Tapi in Maularampur must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$ .

It is given that all rivers flow at more than 1 cm above its danger mark in each city.

Case I :- Kaveri in Kualalampur and Tapi in Maularampur flows 2 cm and 4 cm above danger mark.

River City	Krishna	Kaveri	Tapi
Maularampur	3		4
Kualalampur	9	2	
Jholapur	7		

In the above table there is only one possibility that Kualampur is some flooded and Jholapur is flooded which is only possible when Kaveri in Jholapur flows 11 cm above danger mark because it is given that one river flows 11 cm above danger mark. Now, we have the following table:-

River City	Krishna	Kaveri	Tapi
Maularampur	3	5	4
Kualalampur	9	2	6/7/8
Jholapur	7	11	8/7/6

Similarly analysis leads to the following case :-

Case II :- Kaveri in Kualalampur and Tapi in Maularampur flows at 3 cm and 6 cm above danger mark respectively.

River City	Krishna	Kaveri	Tapi
Maularampur	3	4	6
Kualalampur	9	3	6
Jholapur	7	11	6

$$\text{Required percentage} = \frac{\frac{18}{0.3}}{200} \times 100 = \frac{60}{200} \times 100 = 30\%$$

FeedBack

**Directions for questions 59 to 62: Answer the questions on the basis of the information given below.**

Each of the three rivers - Krishna, Kaveri and Tapi - flows through three cities - Maularampur, Kualalampur and Jholapur. These rivers are flowing above danger mark in these cities. It is known that if all the three rivers, in a city, flow at more than 5 cm above danger mark, then the city becomes flooded and if any two rivers in a city flow at more than 5 cm above danger mark, then the city becomes semi-flooded. It is also known that one of these three cities is flooded and another one is semi-flooded. Total 200 cusecs (cubic feet per second) of water was released from a dam into the three rivers in three cities. Before that release of water each river was exactly at the danger mark. The table given below shows the increase in water level (in cm) above the danger mark in a river on releasing 1 cusec of water from the dam.

River	Increase in water level
Krishna	0.2 cm
Kaveri	0.3 cm
Tapi	0.4 cm

It is also known that :-

- (i) The level of the river increased above danger mark in all the three cities taken together is same for any two rivers out of the three. One river flows 11 cm above danger mark in a city.
- (ii) Krishna flows at a level above danger mark in cities Maularampur, Kualalampur and Jholapur in the ratio of 3 : 9 : 7. All the three rivers flow at more than 1 cm above its danger mark in each city.
- (iii) Amount of water released in Kaveri in Kualalampur and that in Tapi in Maularampur is in the ratio of 2 : 3.

[Note:- All rivers must flow at a level above danger mark in each city in integer value of cm only.]

#### Q.62

Which of the following city was semi flooded?

- 1  Maularampur
- 2  Kualalampur
- 3  Jholapur
- 4  Either (1) or (2)

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

From statement II; let Krishna flow 3 cm, 9cm and 7cm above danger mark in Maularampur, Kualalampur and Jholapur respectively.

$$\therefore \text{Water released in Krishna} = \frac{3+9+7}{0.2} = \frac{19}{0.2} = 95 \text{ cusecs.}$$

Krishna cannot flow (6, 8 and 14) cm above danger mark because in this case water released in krishna will be 190 cusecs and only 10 cusecs water released in Kaveri and Tapi together, which is not possible. From statement I; Two rivers flow at same level above danger mark in three cities together. Suppose; Both Krishna and Kaveri flow 19 cm above danger mark. Water

$$\text{released in Kaveri} = \frac{19}{0.3} = \frac{19}{3} \text{ cusecs.}$$

$$\text{In this case, water released in Tapi} = 200 - \left( 95 + \frac{190}{3} \right) = \frac{125}{3} \text{ cusecs.}$$

Which is not possible because in this case; the sum of water levels above danger mark in Tapi is not an integer. Similarly, we can observe that Krishna and Tapi cannot flow at the same level above danger mark in three cities together. So; it can be concluded that Kaveri and Tapi flow at same level above danger mark in three cities together.

Let Kaveri and Tapi flow at  $x$  cm above danger mark.

$$\therefore \frac{x}{0.3} + \frac{x}{0.4} = 200 - 95 = 105 \Rightarrow \frac{10x}{3} + \frac{5x}{2} = 105 \Rightarrow \frac{20x + 15x}{6} = 105 \Rightarrow x = 18 \text{ cm.}$$

From statement III; we can conclude that Kaveri in Kualalampur and Tapi in Maularampur must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$ .

It is given that all rivers flow at more than 1 cm above its danger mark in each city.

Case I :- Kaveri in Kualalampur and Tapi in Maularampur flows 2 cm and 4 cm above danger mark.

River City	Krishna	Kaveri	Tapi
Maularampur	3		4
Kualalampur	9	2	
Jholapur	7		

In the above table there is only one possibility that Kualampur is some flooded and Jholapur is flooded which is only possible when Kaveri in Jholapur flows 11 cm above danger mark because it is given that one river flows 11 cm above danger mark. Now, we have the following table:-

River City	Krishna	Kaveri	Tapi
Maularampur	3	5	4
Kualalampur	9	2	6/7/8
Jholapur	7	11	8/7/6

Similarly analysis leads to the following case :-

Case II :- Kaveri in Kualalampur and Tapi in Maularampur flows at 3 cm and 6 cm above danger mark respectively.

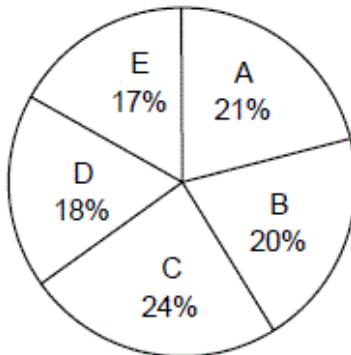
River City	Krishna	Kaveri	Tapi
Maularampur	3	4	6
Kualalampur	9	3	6
Jholapur	7	11	6

Kualampur is semi-flooded.

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

The pie chart given below shows the percentage break-up of the number of competitors who participated from five different countries A, B, C, D and E in Asian Games 2018.



The partially filled-in table given below shows the number of competitors who participated from the five countries in the six sports conducted during the Asian Games 2018.

Sport \ Country	A	B	C	D	E
Sport	A	B	C	D	E
Boxing	24		32	40	18
Badminton	36	29		20	24
Kabaddi	28		35	26	46
Shooting	38	32	52	26	
Wrestling	44	46	34		30
Athletics		23	42	33	20

**Note:**

- (i) Each competitor who came to the Asian Games participated in exactly one of the six sports.
- (ii) At least one competitor from each country participated in each of the six sports.
- (iii) Six cells in the table are left blank and the sum of that six missing values is 222.

**Q.63**

**The number of competitors who participated from the country C in Badminton is what percentage more/less than that from country D in Wrestling?**

- 1  28.57% more
- 2  22.22% more
- 3  28.57% less
- 4  22.22% less

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

Let the number of competitors who participated from A, B, C, D and E countries be  $21k$ ,  $20k$ ,  $24k$ ,  $18k$  and  $17k$  respectively, where 'k' is a natural number.

The total number of competitors who participated from the five countries is equal to  $100k$ .

$$\Rightarrow (170 + 130 + 195 + 145 + 138) + 222 = 100k$$

$$\Rightarrow 100k = 778 + 222 \Rightarrow k = 10.$$

Let the number of competitors who participated in Boxing and Kabaddi from the country B be  $x$  and  $y$  respectively, where  $x + y = 70$ .

Now, we know that, the number of competitors who participated in A, B, C, D and E countries be 210, 200, 240, 180 and 170 respectively.

$\therefore$  We can find out the missing terms in the table.

The final table is given below.

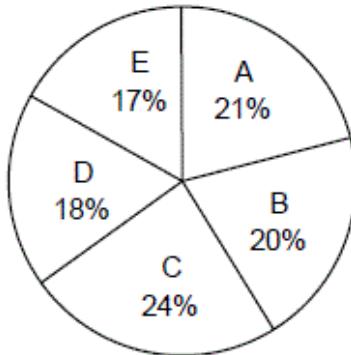
Sport	A	B	C	D	E
Boxing	24	x	32	40	18
Badminton	36	29	45	20	24
Kabaddi	28	y	35	26	46
Shooting	38	32	52	26	32
Wrestling	44	46	34	35	30
Athletics	40	23	42	33	20

$$\text{Required percentage} = \frac{45 - 35}{35} \times 100 \approx 28.57\% \text{ more.}$$

 **FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

The pie chart given below shows the percentage break-up of the number of competitors who participated from five different countries A, B, C, D and E in Asian Games 2018.



The partially filled-in table given below shows the number of competitors who participated from the five countries in the six sports conducted during the Asian Games 2018.

Country \ Sport	A	B	C	D	E
Boxing	24		32	40	18
Badminton	36	29		20	24
Kabaddi	28		35	26	46
Shooting	38	32	52	26	
Wrestling	44	46	34		30
Athletics		23	42	33	20

**Note:**

- (i) Each competitor who came to the Asian Games participated in exactly one of the six sports.
- (ii) At least one competitor from each country participated in each of the six sports.
- (iii) Six cells in the table are left blank and the sum of that six missing values is 222.

**Q.64**

**Which of the following is not a possible ratio of the number of competitors who participated from the country B in Boxing and Kabaddi respectively?**

1  3 : 4

2  2 : 5

3  5 : 3

4  11 : 3

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

Let the number of competitors who participated from A, B, C, D and E countries be  $21k$ ,  $20k$ ,  $24k$ ,  $18k$  and  $17k$  respectively, where 'k' is a natural number.

The total number of competitors who participated from the five countries is equal to  $100k$ .

$$\Rightarrow (170 + 130 + 195 + 145 + 138) + 222 = 100k$$

$$\Rightarrow 100k = 778 + 222 \Rightarrow k = 10.$$

Let the number of competitors who participated in Boxing and Kabaddi from the country B be  $x$  and  $y$  respectively, where  $x + y = 70$ .

Now, we know that, the number of competitors who participated in A, B, C, D and E countries be 210, 200, 240, 180 and 170 respectively.

$\therefore$  We can find out the missing terms in the table.

The final table is given below.

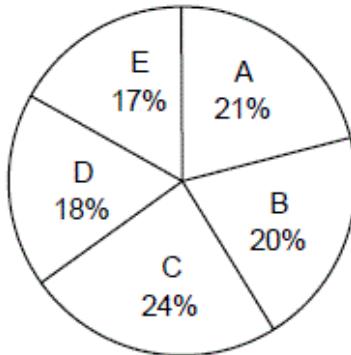
Sport	A	B	C	D	E
Boxing	24	x	32	40	18
Badminton	36	29	45	20	24
Kabaddi	28	y	35	26	46
Shooting	38	32	52	26	32
Wrestling	44	46	34	35	30
Athletics	40	23	42	33	20

The sum of the number of competitors who participated from the country B in Boxing and Kabaddi is 70. Since 70 when divided in the ratio 5 : 3 does not give integer values, 5 : 3 is the answer.

**FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

The pie chart given below shows the percentage break-up of the number of competitors who participated from five different countries A, B, C, D and E in Asian Games 2018.



The partially filled-in table given below shows the number of competitors who participated from the five countries in the six sports conducted during the Asian Games 2018.

Country \ Sport	A	B	C	D	E
Boxing	24		32	40	18
Badminton	36	29		20	24
Kabaddi	28		35	26	46
Shooting	38	32	52	26	
Wrestling	44	46	34		30
Athletics		23	42	33	20

**Note:**

- (i) Each competitor who came to the Asian Games participated in exactly one of the six sports.
- (ii) At least one competitor from each country participated in each of the six sports.
- (iii) Six cells in the table are left blank and the sum of that six missing values is 222.

### Q.65

**Which of the six sports witnessed the highest participation of the competitors from the five countries put together?**

1  **Wrestling**

2  **Kabaddi**

3  **Boxing**

4  **Cannot be determined**

**Solution:****Correct Answer : 4**
 **Bookmark**
 **Answer key/Solution**

Let the number of competitors who participated from A, B, C, D and E countries be  $21k$ ,  $20k$ ,  $24k$ ,  $18k$  and  $17k$  respectively, where 'k' is a natural number.

The total number of competitors who participated from the five countries is equal to  $100k$ .

$$\Rightarrow (170 + 130 + 195 + 145 + 138) + 222 = 100k$$

$$\Rightarrow 100k = 778 + 222 \Rightarrow k = 10.$$

Let the number of competitors who participated in Boxing and Kabaddi from the country B be  $x$  and  $y$  respectively, where  $x + y = 70$ .

Now, we know that, the number of competitors who participated in A, B, C, D and E countries be 210, 200, 240, 180 and 170 respectively.

$\therefore$  We can find out the missing terms in the table.

The final table is given below.

Sport	A	B	C	D	E
Boxing	24	x	32	40	18
Badminton	36	29	45	20	24
Kabaddi	28	y	35	26	46
Shooting	38	32	52	26	32
Wrestling	44	46	34	35	30
Athletics	40	23	42	33	20

The number of competitors who participated in

Badminton = 154

Shooting = 180

Wrestling = 189

Athletics = 158

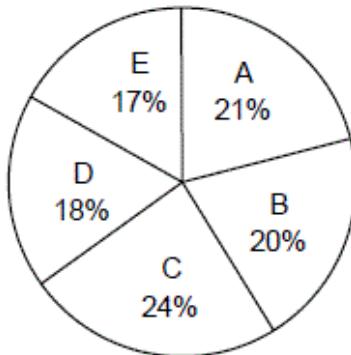
In case of Boxing the number will be highest if  $x = 69$ ,  $y = 1$ , and in case of Kabaddi the number will be highest if  $x = 1$ ,  $y = 69$ .

Hence, answer cannot be determined.

 **FeedBack**

**Directions for questions 63 to 66: Answer the questions on the basis of the information given below.**

The pie chart given below shows the percentage break-up of the number of competitors who participated from five different countries A, B, C, D and E in Asian Games 2018.



The partially filled-in table given below shows the number of competitors who participated from the five countries in the six sports conducted during the Asian Games 2018.

Country Sport \	A	B	C	D	E
Sport					
Boxing	24		32	40	18
Badminton	36	29		20	24
Kabaddi	28		35	26	46
Shooting	38	32	52	26	
Wrestling	44	46	34		30
Athletics		23	42	33	20

**Note:**

- (i) Each competitor who came to the Asian Games participated in exactly one of the six sports.
- (ii) At least one competitor from each country participated in each of the six sports.
- (iii) Six cells in the table are left blank and the sum of that six missing values is 222.

**Q.66**

**Find the absolute difference between the number of competitors who participated from country A in Athletics and that from country E in Shooting.**

**Solution:****Correct Answer : 8** **Bookmark** **Answer key/Solution**

Let the number of competitors who participated from A, B, C, D and E countries be  $21k$ ,  $20k$ ,  $24k$ ,  $18k$  and  $17k$  respectively, where 'k' is a natural number.

The total number of competitors who participated from the five countries is equal to  $100k$ .

$$\Rightarrow (170 + 130 + 195 + 145 + 138) + 222 = 100k$$

$$\Rightarrow 100k = 778 + 222 \Rightarrow k = 10.$$

Let the number of competitors who participated in Boxing and Kabaddi from the country B be  $x$  and  $y$  respectively, where  $x + y = 70$ .

Now, we know that, the number of competitors who participated in A, B, C, D and E countries be 210, 200, 240, 180 and 170 respectively.

∴ We can find out the missing terms in the table.

The final table is given below.

Sport	A	B	C	D	E
Boxing	24	x	32	40	18
Badminton	36	29	45	20	24
Kabaddi	28	y	35	26	46
Shooting	38	32	52	26	32
Wrestling	44	46	34	35	30
Athletics	40	23	42	33	20

Required absolute difference =  $40 - 32 = 8$ .

**FeedBack****Sec 3****Q.67**

If Rahul sells 88 trays of 12 eggs each at a 28% discount on the marked price, then he makes 22% profit. The eggs of eight of these trays are destroyed in transportation. While selling the rest, how much discount should be given on the marked price so that he can make the same amount of profit?

1  **24%**

2  **20.8%**

3  **18.6%**

4  **19.2%**

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

Let marked price per tray be Rs.100.

Then, initial value =  $88 \times 72 = \text{Rs.}6,336$

After transportation, remaining trays =  $88 - 8 = 80$

To get same profit the revenue must remain same.

Required discount percentage =  $100 - \frac{6336}{80} = 100 - 79.2 = 20.8\%$ .

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

**Q.68**

State buses run continuously between two cities, A and B, from 6 a.m. to 10 p.m. such that every 30 minutes a bus leaves city A towards B and another bus leaves city B towards A. All buses travel at a uniform speed ' $U_1$ '. Prajnan, by his car, started moving from A towards B at 2 p.m. at a speed of ' $U_2$ '. He observed that every  $t_1$  minutes, he crossed a bus coming in the opposite direction and every  $t_2$  minutes, he overtook a bus moving in the same direction. If  $U_1 : U_2 = 2 : 3$ , then find  $t_1 : t_2$ .

1  3 : 2

2  1 : 5

3  4 : 9

4  Cannot be determined

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

The distance between any two buses moving in the same direction  $= \left(\frac{30}{60}\right) \times U_1 = \frac{U_1}{2} \text{ km}$

The time taken interval between coming across two buses in the opposite direction

$$t_1 = \frac{\frac{U_1}{2}}{U_2 + U_1}$$

$$\text{Similarly, } t_2 = \frac{\frac{U_1}{2}}{U_2 - U_1}$$

$$\frac{t_1}{t_2} = \frac{U_2 - U_1}{U_2 + U_1}$$

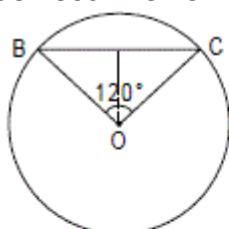
Given,  $U_1 : U_2 = 2 : 3$

$$\text{Let, } \frac{U_1}{U_2} = \frac{2k}{3k}$$

$$\text{So, } \frac{t_1}{t_2} = \frac{3k - 2k}{3k + 2k} = \frac{1}{5} \Rightarrow t_1 : t_2 = 1 : 5.$$

**FeedBack****Q.69**

If the area of a circle, in which a chord of length  $6\sqrt{3}$  units subtends an angle of 120 degrees at the centre of the circle, is  $k\pi$  sq. units, then find k.

**Solution:****Correct Answer : 36****Bookmark****Answer key/Solution**

Let the radius of circle be denoted by r and BC be the chord.

$\therefore \angle BOC = 120^\circ$  (Angle subtended at the center)

Now, OC = OB = Radius of the circle

$\therefore \angle OCB = \angle OBC = 30^\circ$

$$\therefore \frac{BC}{2} = r \cos 30^\circ \Rightarrow \frac{6\sqrt{3}}{2} = r \frac{\sqrt{3}}{2} \Rightarrow r = 6$$

Therefore, area of the circle  $= \pi(6)^2 = 36\pi$  sq. units  $\Rightarrow k = 36$ .

**FeedBack**

**Q.70**

**Find the number of integer values of z such that  $0.0625 = 4^z = 1050$ , and  $4^z + 4$  is perfectly divisible by either 5 or 8.**

**Solution:**

**Correct Answer : 4**

**Bookmark**

**Answer key/Solution**

$$0.0625 \leq 4^z \leq 1050$$

Therefore, possible values of  $z = -2, -1, 0, 1, 2, 3, 4, 5$ .

On putting  $z = 0, 1, 2$  and  $4$  in  $4^z + 4$ , the numbers obtained = 5, 8, 20 and 260 respectively, which are perfectly divisible by either 5 or 8.

Hence, 4 values of  $z$  are possible.

**FeedBack**

**Q.71**

**There were 4 cards A, B, C and D. Two different numbers were written, one on each side such that one of these is a prime number on each card. The other numbers on those four cards in that order were 39, 24, 34 and 12 respectively. If the sum of the two numbers on each of these cards was the same, then the difference between the second smallest and the second largest numbers on these cards is**

1  27

2  5

3  12

4  17

**Solution:**

**Correct Answer : 1**

**Bookmark**

**Answer key/Solution**

Since the sum of the numbers is same on each of the cards, and 3 given numbers are even, sum of this and the prime number on other side of card must be odd.

So A must have 39 and 2 (since 2 is the only even prime number).

This means the sum of both the numbers on each card must be 41.

Therefore, B has 24 and 17 ; C has 34 and 7; D has 12 and 29.

From this, the second largest number is 34 and the second smallest number is 7. The required difference is  $34 - 7 = 27$ .

**FeedBack**

**Q.72**

Sumanta said to Tamal, "When I was half as old as you are today, you were one-sixth as old as I am now". If Sumanta is eight years older than Tamal, then what is the sum of their present ages?

**Solution:**

**Correct Answer : 64**

Let, the present age of Sumanta and Tamal be  $6x$  and  $2y$  respectively.

Now,  $y - x = 6x - 2y$

$$\Rightarrow 3y = 7x \Rightarrow y = \frac{7}{3}x$$

It is given that  $y - x = 8$

$$\text{So, } \frac{7}{3}x - x = 8 \Rightarrow \frac{4}{3}x = 8 \Rightarrow x = 6$$

$$\therefore 6x = 36 \text{ and } 2y = 2 \times \frac{7}{3} \times 6 = 28$$

Hence, the sum of their present ages is 64 years.

**Bookmark**

**Answer key/Solution**

**FeedBack**

**Q.73**

A can complete a work in 12 days. A started the job on September 1. B joined him on September 4. C joined them on September 5. A quit the job after September 6. B quit the job after September 7. C worked alone thereafter. The job was completed at the end of September 9. They were paid Rs. 10000 for completing the job, whereas the share of B out of it was Rs. 3000. Find the number of days, C would take to do the job all by himself.

1  30 days

2   $13\frac{1}{3}$  days

3  25 days

4  15 days

**Solution:**

**Correct Answer : 3**

**Bookmark**

**Answer key/Solution**

From the given information, A worked for 6 days, B worked for 4 days and C worked for 5 days.

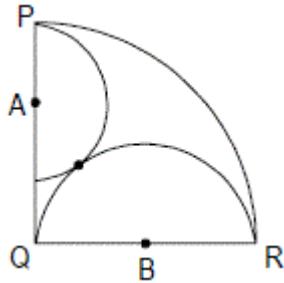
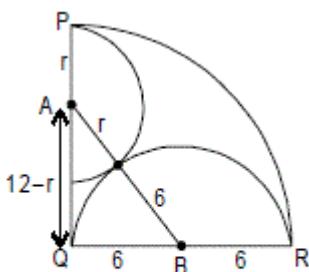
Whereas A did 50% of the work, B did 30% of the work, (since he was paid Rs. 3,000)

So C must have done 20% of the work in 5 days. Hence, C would take 25 days to do the job all by himself.

**FeedBack**

**Q.74**

In a quadrant of a circle, two semicircles are drawn as shown in the figure. The radius of the quadrant PQR is 12 cm. Then AB (in cm) is equal to

1   $6\sqrt{2}$ 2   $8\sqrt{2}$ 3  104  8**Solution:****Correct Answer : 3****Bookmark****Answer key/Solution**

$$(12 - r)^2 + 6^2 = (r + 6)^2$$

$$\Rightarrow r = 4$$

$$\therefore AB = 6 + r = 10 \text{ cm.}$$

**FeedBack****Q.75**

If the rate of simple interest on a certain sum becomes one and a half times of what it is originally, then what would be the percentage reduction in the time taken for the sum to become three times itself?

1  202   $33\frac{1}{3}$ 3   $66\frac{2}{3}$

4  50**Solution:****Correct Answer : 2** **Bookmark** **Answer key/Solution**

As,  $P + \frac{nPr}{100} = 3P$  (where P is principal, n is time and r is rate)  
 $\Rightarrow nr = 200$

Now, 'n' and 'r' are inversely proportional to each other, so if r is increase by 50%, it becomes  $\frac{3}{2}r$ , and n becomes N.

$$p + \frac{p \cdot \frac{3}{2}rN}{100} = 3p \Rightarrow 1 + \frac{\frac{3}{2}rN}{100} = 3 \Rightarrow N = \frac{400}{3r}$$

$$\therefore \frac{N}{n} = \frac{\frac{400}{3r}}{\frac{200}{r}} = \frac{2}{3} \Rightarrow N = \frac{2}{3}n$$

Thus, the percentage reduction in the time taken is  $\frac{1}{n} \times 100 = 33\frac{1}{3}\%$ .

**FeedBack****Q.76**

If  $f(x) + f(3 - x) = 20$ , then find the value of  $f\left(\frac{1}{10}\right) + f\left(\frac{2}{10}\right) + f\left(\frac{3}{10}\right) + \dots + f\left(\frac{29}{10}\right)$ .

1  2702  2903  3104  350

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

$$f(x) + f(3 - x) = 20$$

Putting  $x = \frac{1}{10}$ , we get  $f\left(\frac{1}{10}\right) + f\left(\frac{29}{10}\right) = 20$

Putting  $x = \frac{2}{10}$ , we get  $f\left(\frac{2}{10}\right) + f\left(\frac{28}{10}\right) = 20$

⋮

Putting  $x = \frac{14}{10}$ , we get  $f\left(\frac{14}{10}\right) + f\left(\frac{16}{10}\right)$

Putting  $x = \frac{15}{10}$ , we get  $f\left(\frac{15}{10}\right) + f\left(\frac{15}{10}\right) = 20 \Rightarrow f\left(\frac{15}{10}\right) = 10$

Therefore, the sum of the above terms =  $14 \times 20 + 10 = 290$ .

 **Bookmark**
 **Answer key/Solution**
FeedBack
**Q.77**

The food available for a garrison of 240 men is sufficient to last for exactly 120 days. If after the first 40 days, a re-enforcement of 60 men joins the garrison and every man decreases his daily consumption by 20%, then for how many days more or less than the scheduled time will the food last?

1  10 days less

2  12 days more

3  40 days more

4  None of the above

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

Let the initial consumption per day per person be  $x$  kg.

Quantity of the provision left after 40 days =  $240(80)(x)$  kg

Let the remaining quantity of food last for  $d$  days.

$$\text{Then, } (300)(d)\left(x - \frac{20}{100}x\right) = 240(80)(x)$$

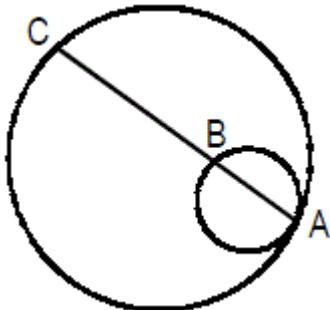
$$\Rightarrow 300 d (0.8x) = 240(80)x \Rightarrow 240d = 240(80) \Rightarrow d = 80$$

Therefore, the provision will get over as per the schedule time.

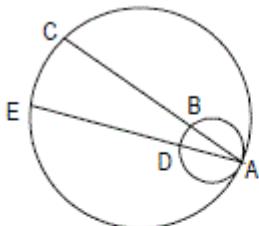
 **Bookmark**
 **Answer key/Solution**
FeedBack

**Q.78**

In the figure shown below, the smaller circle touches the larger circle internally at the point A and AB is a chord of the smaller circle. If AB, when extended, intersects the larger circle at C such that  $AB/BC = 1/2$ , then what fraction of the area of the outer circle is not included in the inner circle?



- 1   $3/4$   
 2   $2/3$   
 3   $8/9$   
 4   $7/9$

**Solution:****Correct Answer : 3**
 [Bookmark](#)
 [Answer key/Solution](#)


We construct a line AE passing through the centers of both the circles.

$\angle ABD = \angle ACE = 90^\circ$  (Angle in a semi-circle)

Now  $\triangle ABD \cong \triangle ACE$

$$\therefore \frac{AB}{AC} = \frac{AD}{AE} = \frac{1}{3}$$

Therefore, diameter of the smaller circle is one-third the diameter of the bigger circle.

Therefore, fraction of the area of the outer circle this is not included in the inner circle  $= 1 - \left(\frac{1}{3}\right)^2 = 1 - \frac{1}{9} = \frac{8}{9}$ .

[FeedBack](#)
**Q.79**

How many distinct four-tuples  $(p, q, r, s)$  of integers are there with  $p \log_{10} 2 + q \log_{10} 3 + r \log_{10} 5 + s \log_{10} 7 = 2149$ ?

1  02  13  21484  Infinitely Many**Solution:****Correct Answer : 2**

$$\begin{aligned} p \log_{10} 2 + q \log_{10} 3 + r \log_{10} 5 + s \log_{10} 7 &= 2149 \\ \Rightarrow \log_{10}(2^p \times 3^q \times 5^r \times 7^s) &= 2149 \\ \Rightarrow 2^p \times 3^q \times 5^r \times 7^s &= 10^{2149} = 2^{2149} \times 5^{2149} \end{aligned}$$

Since the exponents are all integers, therefore  $p = 2149$ ,  $q = 0$ ,  $r = 2149$  and  $s = 0$   
Hence, the only solution is  $(p, q, r, s) = (2149, 0, 2149, 0)$ .

**FeedBack****Q.80**

If an article is sold at a discount of  $p/2\%$ , a profit of  $p/2\%$  is realized. But if it is sold at a discount of  $p\%$ , a loss of  $p/4\%$  is incurred. If it is known that  $p$  is positive, then find the percentage of profit made on the article when it is sold at the discount of  $p/4\%$ .

**Solution:****Correct Answer : 35**

Let the market price and the cost price of the article be denoted by  $M$  and  $C$  respectively.  
We know that,

$$M\left(1 - \frac{P}{200}\right) = C\left(1 + \frac{P}{200}\right) \Rightarrow \frac{M}{C} = \frac{200+P}{200-P}$$

$$M\left(1 - \frac{P}{100}\right) = C\left(1 - \frac{P}{400}\right) \Rightarrow \frac{M}{C} = \frac{400-P}{400-4P}$$

$$\therefore \frac{200+P}{200-P} = \frac{400-P}{400-4P} \Rightarrow 5P^2 - 200P = 0 \Rightarrow 5P(P - 40) = 0$$

Since  $P \neq 0$ ,  $P = 40$

$$\therefore \frac{M}{C} = \frac{200+40}{200-40} = \frac{3}{2}$$

Now, let the marked price and the cost price of the article be 300 and 200 respectively.

$$SP = 300\left(1 - \frac{40}{400}\right) = 270$$

So, profit = 70

$$\text{Therefore, profit\%} = \frac{70}{200} \times 100 = 35\%.$$

**FeedBack**

**Q.81**

**Find the remainder we get on dividing  $3^{352}$  by 11.**

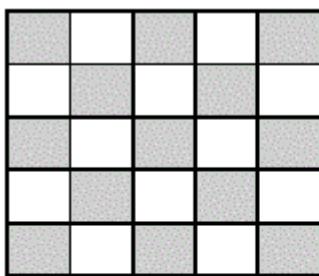
**Solution:****Correct Answer : 9**

$$\begin{aligned}\text{Rem}\left(\frac{3^{352}}{11}\right) &= \text{Rem}\left(3^2\left(\frac{(3^5)^{50}}{11}\right)\right) = \text{Rem}\left(9\left(\frac{(243)^{50}}{11}\right)\right) \\ &= \text{Rem}\left(9\left(\frac{(242+1)^{50}}{11}\right)\right) = \text{Rem}\left(9\left(\frac{242k+1^{50}}{11}\right)\right) = \text{Rem}\left(9\left(\frac{1^{50}}{11}\right)\right) = 9\end{aligned}$$

Thus  $3^{352}$  when divided by 11, will leave remainder of 9.

**Bookmark****Answer key/Solution****FeedBack****Q.82**

**The number of ways in which 12 squares can be selected from a  $5 \times 5$  chess board such that no two squares have a common side is**

1  132  153  204  14**Solution:****Correct Answer : 4****Bookmark****Answer key/Solution**

In this  $5 \times 5$  chessboard, 12 squares that do not have a common side can be selected by either selecting black squares only or white squares only.

Ways to select 12 black squares =  ${}^{13}C_{12} = 13$

Ways to select 12 white squares =  ${}^{12}C_{12} = 1$

Total ways =  $13 + 1 = 14$ .

**FeedBack**

**Q.83**

**For how many integral values of  $x$  will the function  $f(x) = |x - 1| + |x - 2| + |x - 3| + |x - 4|$  assumes the minimum value?**

**Solution:**

**Correct Answer : 5**

**Bookmark**

**Answer key/Solution**

$$\text{Given, } f(x) = |x - 1| + |x - 2| + |x - 3| + |x - 4|$$

$$\Rightarrow f(x) = |x - 1| + |x - 2| + |x - 6| + |x - 24|$$

Now  $|x - 1| + |x - 24|$  will be minimum when  $1 \leq x \leq 24$

Again  $|x - 2| + |x - 6|$  will be minimum when  $2 \leq x \leq 6$

For  $|x - 1| + |x - 2| + |x - 6| + |x - 24|$  to be minimum when  $x$  must lie in the interval  $[2, 6]$

Therefore,  $f(x)$  takes a minimum value of 27 for  $x = 2, 3, 4, 5$  or 6. So, there are 5 integral values of  $x$ .

**FeedBack**

**Q.84**

**If 6 inlet pipes and 4 outlet pipes are opened simultaneously, the tank gets filled at 6 p.m. If 12 inlet pipes and 4 outlet pipes are opened simultaneously, and at the same time as before, the tank gets filled at 2 p.m. on the same day such that the time taken is 1/3rd of the earlier time. At what time would the tank be filled if only 3 inlet pipes are opened at the same time as before?**

1  6 p.m.

2  5 p.m.

3  3 p.m.

4  7 : 30 p.m.

**Solution:**

**Correct Answer : 1**

**Bookmark**

**Answer key/Solution**

Let each inlet pipe fill 'a' litres in an hour and each outlet pipe empty 'b' litres in an hour.

Since the time taken in the second case is 1/3rd of the first case and the difference is 4 hour, it can be concluded that in both cases, all the pipes were opened at 12 noon.

Given that:  $(12a - 4b) \times t = (6a - 4b) \times 3t$  (where  $t = 2$  hrs)

$$\Rightarrow 3a = 4b$$

Let  $a = 40L$  and  $b = 30L$

So  $12a - 4b = 360L$  and  $t = 2$  hours.

Therefore, total capacity of the tank = 720 L.

So if 3 inlet pipes have to fill the tank alone, it would take  $\frac{70}{3 \times 40} = 6$  hours and the tank would be filled at 6 PM.

**FeedBack**

**Q.85**

In a triangle ABC, right-angled at B, E and F are points on AC such that E is the midpoint of AC and BF is perpendicular to AC. If  $\frac{BF}{AE} = \frac{24}{25}$ , then find  $\frac{AB}{BC} + \frac{BC}{BA}$ .

1  2  $\frac{5}{9}$

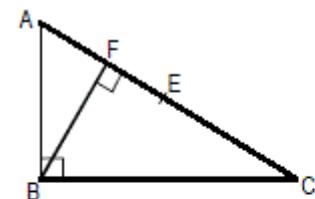
2  3  $\frac{1}{10}$

3  2  $\frac{1}{12}$

4  2

**Solution:**

**Correct Answer : 3**



$$AC = 2(AE)$$

$$\text{Now, } AB^2 + BC^2 = 4AE^2$$

$$\text{Area of } \triangle ABC = \frac{1}{2}(AB)(BC) = \frac{1}{2}(2AE)(BF)$$

$$\frac{AB}{BC} + \frac{BC}{AB} = \frac{AB^2 + BC^2}{(AB)(BC)} = \frac{4AE^2}{(2AE)(BF)} = 2 \frac{AE}{BF} = 2 \times \frac{25}{24} = 2\frac{1}{12}$$

**Bookmark**

**Answer key/Solution**

**FeedBack**

**Q.86**

If  $2a + 3b + 6c = 66$ , where a, b and c are positive real numbers, then find the maximum value of  $a^6 b^2 c^3$ .

1  2  $15 \times 3^{12}$

2  2  $14 \times 3^8 \times 1^{12}$

3  2  $12 \times 3^{14}$

4  2  $10 \times 3^{15}$

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

It is given that  $2a + 3b + 6c = 66$

$$\left(\frac{2a}{6}\right) + \left(\frac{2a}{6}\right) + \left(\frac{2a}{6}\right) + \left(\frac{2a}{6}\right) + \left(\frac{2a}{6}\right) + \left(\frac{3b}{2}\right) + \left(\frac{3b}{2}\right) + \left(\frac{6c}{3}\right) + \left(\frac{6c}{3}\right) + \left(\frac{6c}{3}\right) = 66$$

As AM  $\geq$  GM,

$$\text{So, } \frac{2a+3b+6c}{11} \geq \left[ \left( \frac{2a}{6} \right)^6 \times \left( \frac{3b}{2} \right)^2 \times \left( \frac{6c}{3} \right)^3 \right]^{\frac{1}{11}} \Rightarrow \frac{66}{11} \geq \left( \frac{2^4}{6^3 \times 3} a^6 b^2 c^3 \right)^{\frac{1}{11}}$$

$$\Rightarrow 6^{11} \geq \frac{2}{81} a^6 b^2 c^3 \Rightarrow \frac{2^{11} \times 3^{11} \times 81}{2} \geq a^6 b^2 c^3 \Rightarrow 2^{10} \times 3^{15} \geq a^6 b^2 c^3.$$

**Bookmark****Answer key/Solution****FeedBack****Q.87**

**Set A has 'a' elements and set B has 'b' elements. If the sum of the number of proper subsets of A and that of B is 142, then find the value of (a + b).**

**Solution:****Correct Answer : 11****Bookmark****Answer key/Solution**

The number of proper subsets of A is  $2^a - 1$  whereas the number of proper subsets of B is  $2^b - 1$

It is given that,  $2^a - 1 = 2^b - 1 = 142$

$$\Rightarrow 2^a + 2^b = 144$$

$$\text{Let } a < b \Rightarrow 2^a (2^{b-a} + 1) = 144$$

Now, we need to express 144 as a product of two numbers one of which is power of 2 and the other is one more than a power of 2.

As  $144 = 2^4 (2^3 + 1)$ , we can conclude  $a = 4$  and  $b - a = 3$

Therefore,  $a = 4$  and  $b = 7$

Thus the value of  $a + b = 4 + 7 = 11$ .

**FeedBack****Q.88**

**A cake is cut into three pieces, whose weights are in the ratio 1 : 2 : 3. The heaviest of these three pieces is then further cut into four pieces with their weights in the ratio 1 : 2 : 3 : 4. If at the end of this process, the lightest piece obtained weights 24 grams, then find the weight (in grams) of the original cake.**

**Solution:****Correct Answer : 480**

Let the weight of the three pieces be  $x$ ,  $2x$  and  $3x$  respectively.

Again  $3x$  is cut into 4 pieces which are in the ratio  $1 : 2 : 3 : 4$

Let the weights of these pieces be denoted by  $y$ ,  $2y$ ,  $3y$  and  $4y$  respectively.

$$\therefore 10y = 3x$$

It is given that,  $y = 24$  i.e.,  $3x = 10y = 240$

Weight of the original cake =  $6x = 480$  gm.

**Bookmark****Answer key/Solution****FeedBack****Q.89**

If in an infinite Geometric Progression, the sum of the squares of all the terms equals twice the square of sum of all the terms, then find the common ratio of the progression.

1  -1/32  -1/23  34  1/2**Solution:****Correct Answer : 1**

Let the series be  $a, ar, ar^2, \dots$

$$\text{Sum of infinite geometric progression} = S = \frac{a}{1-r}$$

$$\text{The sum of all the squares terms i.e., } a^2 + (ar)^2 + (ar^2)^2 + \dots = \frac{a^2}{1-r^2}$$

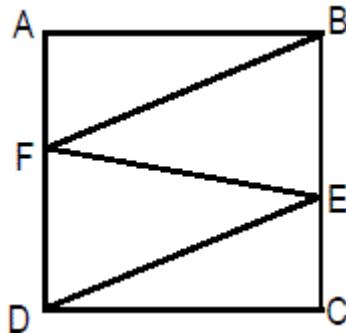
It is given that,

$$2\left(\frac{a}{1-r}\right)^2 = \frac{a^2}{1-r^2} \Rightarrow \frac{2a^2}{(1-r)^2} = \frac{a^2}{(1+r)(1-r)} \Rightarrow 2(1+r) = (1-r) \Rightarrow 3r = -1 \Rightarrow r = -\frac{1}{3}$$

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

**Q.90**

In the figure given below, ABCD is a square. If BF = FE = ED = 20 cm, then find the area (in sq.cm) of the square.

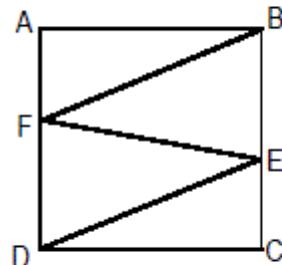


**Solution:**

**Correct Answer : 360**

Since  $BF = FE$ ,  $\triangle BFE$  is isosceles and  $AF = \frac{BE}{2}$  and

Similarly,  $EC = \frac{FD}{2} = \frac{BE}{2}$  ( $\triangle BFE \cong \triangle FED$ )



Let the side of the square be  $3y$ .

$$BF = \sqrt{(3y)^2 + (y)^2} = \sqrt{10y^2} = 20 \Rightarrow 10y^2 = 400 \Rightarrow y^2 = 40$$

$$\text{Area of the square} = (3y)^2 = 9y^2 = 9(40) = 360 \text{ sq.cm.}$$

**Bookmark**

**Answer key/Solution**

**FeedBack**

**Q.91**

Find the ratio in which water should be mixed with a Pepsi concentrate costing Rs. 16/litre to make a profit of 40% by selling the resultant drink at Rs. 20/litre.

1  **3 : 25**

2  **1 : 8**

3  **23 : 3**

4  **25 : 3**

## Solution:

## **Correct Answer : 1**

$$\text{Cost price to get 40% profit at Rs. 20/litre} = \frac{20}{1.4} = \frac{100}{7}$$

Therefore, applying alligation method:

$$\begin{array}{r} \text{Water} \\ 0 \\ \hline \frac{100}{7} \\ 16 - \frac{100}{7} \\ = \frac{12}{7} \end{array} \qquad \begin{array}{r} \text{Pepsi} \\ 16 \\ \hline \frac{100}{7} - 0 \\ = \frac{100}{7} \end{array}$$

$$\therefore \text{Ratio} = 3 : 25.$$

## FeedBack



**Q.92**

If the two quadratic equations,  $x^2 - ax + 3 = 0$  and  $x^2 + ax - 5 = 0$ , have one positive root in common, then find the value of  $a$ .

## Solution:

**Correct Answer : 4**

Let the root common to both the equations be denoted by  $t$ .

$$t^2 - at + 3 = 0 \text{ and } t^2 + at - 5 = 0$$

$$t^2 - at + 3 = t^2 + at - 5$$

$$\Rightarrow 2at = 8$$

$$\Rightarrow at = 4$$

Substituting  $\frac{4}{a}$  for  $t$  in  $x^2 - ax + 3 = 0$ , we get

$$\frac{16}{a^2} - 4 + 3 = 0$$

$$\Rightarrow a = \pm 4$$

Only for  $a = 4$ , we get a positive root (i.e., 1) in common . Hence, the value of ' $a$ ' is 4.

## FeedBack



**Q.93**

A person, "A" starts descending from the first floor of a building to the ground floor on a descending escalator, while another person, B simultaneously starts ascending from the ground floor of the building to the first floor, using the same escalator. If the speed of B is twice that of A, and A and B take 30 steps and 120 steps to reach their respective destinations, then find the possible number of steps that are visible on the escalator when it is stationary.

1 50

2 60

3  704  80**Solution:****Correct Answer : 2**

Let the speed at which the escalator is descending be 'e' steps per second.

Let the time taken by A be 't' seconds.

$30 + te = \text{total number of steps in the escalator}$

In the time A covers 30 steps, B would cover 60 steps.

As B has covered 120 steps so the time taken must be  $2t$ .

$120 - 2te = \text{Total number of steps in the escalator}$

$$\therefore 30 + te = 120 - 2te$$

$$\Rightarrow 3te = 90 \Rightarrow te = 30$$

Thus the total number of steps in the escalator =  $30 + te = 60$ .

**Bookmark****Answer key/Solution****FeedBack****Q.94**

A and B are two points with coordinates (0, 0) and (16, 64) respectively.  $M_1$  is the midpoint of the line joining A and B,  $M_2$  is the midpoint of that joining  $M_1$  and A,  $M_3$  is the midpoint of that line joining  $M_2$  and A, and so on. If the coordinates of  $M_{10}$  are  $(h, k)$ , then find the value of  $(1/h + 1/k)$ .

**Solution:****Correct Answer : 80**

$$\text{Co-ordinates of } M_1 = \left( \frac{0+16}{2}, \frac{0+64}{2} \right) = (8, 32)$$

$$\text{Co-ordinates of } M_2 = \left( \frac{0+8}{2}, \frac{0+32}{2} \right) = (4, 16)$$

$$\text{Co-ordinates of } M_3 = \left( \frac{0+4}{2}, \frac{0+16}{2} \right) = (2, 8)$$

$$\text{Proceeding similarly co-ordinates of } M_{10} = \left( \frac{1}{64}, \frac{1}{16} \right)$$

We can conclude that the coordinates of  $M_i$  will be  $\left( \frac{16}{2^i}, \frac{64}{2^i} \right)$  i.e.,  $M_{10} = \left( \frac{1}{2^6}, \frac{1}{2^4} \right)$

Therefore, the sum of the reciprocal of the co-ordinates of  $M_{10}$  is  $(64 + 16) = 80$ .

**Bookmark****Answer key/Solution****FeedBack****Q.95**

If it takes 50% more time to row a boat upstream, over a certain distance, than what it takes to row the boat downstream over the same distance, then how many times the speed of the stream is the speed of the boat upstream?

1  3

2  43  5/24  7**Solution:****Correct Answer : 2** **Bookmark** **Answer key/Solution**

Let the distance under consideration, the speed of the boat in still water and the speed of the stream are  $d$ ,  $u$  and  $v$  respectively.

$$\text{Time taken to travel upstream} = \frac{d}{u-v}$$

$$\text{Time taken to travel downstream} = \frac{d}{u+v}$$

It is given that,

$$\frac{d}{u-v} = \frac{3}{2} \left( \frac{d}{u+v} \right) \Rightarrow 2(u+v) = 3(u-v) \Rightarrow u = 5v$$

$$\text{Speed of the boat upstream} = u - v = 5v - v = 4v$$

Therefore, the speed of the boat upstream is four times the speed of the stream.

 **FeedBack**
**Q.96**

Find the range of  $x$  that satisfies the inequality  $\frac{1}{x-2} > \frac{3}{x-3}$ .

1  (1, 4) - {2, 3}2  (2, 3)3   $\left(-\infty, \frac{3}{2}\right) \cup (2, 3)$ 4   $(-\infty, 1) \cup (1, 4)$

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

$$\frac{1}{x-2} > \frac{3}{x-3} \Rightarrow \frac{1}{x-2} - \frac{3}{x-3} > 0 \Rightarrow \frac{x-3-3(x-2)}{(x-2)(x-3)} > 0 \Rightarrow \frac{(2x-3)}{(x-2)(x-3)} < 0$$

Multiplying both the numerator and denominator by  $(x-2)(x-3)$  we get,

$$\frac{(2x-3)(x-2)(x-3)}{(x-2)^2(x-3)^2} < 0$$

As  $(x-2)^2 (x-3)^2$  is positive, so it can be ignored.

$$\therefore (2x-3)(x-2)(x-3) < 0$$

The critical points are  $x = \frac{3}{2}$ ,  $x = 2$  and  $x = 3$

The above inequality holds, if  $x < \frac{3}{2}$  or  $2 < x < 3$  i.e.,  $x \in \left(-\infty, \frac{3}{2}\right) \cup (2, 3)$ .

**Bookmark**
**Answer key/Solution**
**Q.97**

The value of  $\log_{0.0256} \sqrt{2.5} + \log_{\frac{\sqrt{2}}{\sqrt{3}}} \frac{16}{81} - \frac{15}{2}$  is equal to

1   $-\frac{1}{2}$

2   $\frac{5}{8}$

3   $\frac{3}{2}$

4   $\frac{3}{8}$

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

$$\log_{0.0256} \sqrt{2.5} + \log_{\frac{\sqrt{2}}{\sqrt{3}}} \frac{16}{81} - \frac{15}{2}$$

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

$$= \log_{\left(\frac{2}{5}\right)^4} \left(\frac{5}{2}\right)^{\frac{1}{2}} + \log_{\left(\frac{2}{3}\right)^2} \left(\frac{2}{3}\right)^4 - \frac{15}{2} = -\frac{1}{8} + 8 - \frac{15}{2} = -\frac{1}{8} + \frac{1}{2} = \frac{3}{8}.$$

**Q.98**

All the students in a QA class took a 100-point mock test. Six students scored 99, each student scored at least 65, and the average score was 78. Find the smallest possible number of students in the class.

**Solution:****Correct Answer : 16**

Let  $n$  be the number of students in the class.

Then, the sum of their scores =  $78n$

If the six scores of 99 are excluded, the sum of the remaining scores =  $78n - 594$ .

Since each student scored at least 65, the sum is at least  $65(n - 6)$ .

Therefore,  $78n - 594 \geq 65(n - 6)$

Implies  $n \geq 15.69$

Since  $n$  must be an integer,  $n \geq 16$ .

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

**Q.99**

$P = \{1, 2, 3, 4, 5, \dots, 24\}$ .  $N$  proper disjoint subsets are made out of this such that their union is  $P$ . If the sum of the elements in each of these subsets is same, then find the number of values that  $N$  can take.

1  18

2  7

3  17

4  8

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

$$\text{Sum of the elements of } P = 300 \left( \text{Sum} = \frac{24 \times 25}{2} \right)$$

Hence,  $N$  can take all factors which are less than or equal to 12. (Since the largest number is 24, the sum of the elements of each of the sets cannot be less than 24)

This is because  $N \times (\text{sum of each set}) = 300$ , since the union of all the sets is equal to  $P$ .

So the values of  $N$  are 1, 2, 3, 4, 5, 6, 10, 12

However we cannot take  $N = 1$ , since we need proper and disjoint subsets.

So the answer is 7.

**Q.100**

A boy, while reading a story book, realized that a certain number of consecutive leaves were missing from the book. Each leaf is numbered on both sides and is considered as two pages. When he added all the page numbers, that were missing, he got a sum of 180. The number of leaves that were missing from the book was

1  3

2  4

3  5

4  6

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

Let the first page number be  $a$  and the number of page numbers whose sum was 180 be  $n$ .

$$\text{Now, } (a) + (a + 1) + (a + 2) + \dots + (a + n - 1) = 180$$

$$\Rightarrow \frac{n}{2}(2a + n - 1) = 180$$

$$\Rightarrow n(2a + n - 1) = 360$$

As, on every leaf, there are two page numbers so  $n$  must be even. Again, if  $n$  is even,  $(2a + n - 1)$  will be odd, and  $(2a + n - 1) > n$  ( $\because 2a - 1 > 0$ )

Now, if  $n = 2m$  (where  $m$  is the number of leaves) we have

$$2m \times (\text{odd number}) = 360$$

$$\Rightarrow m \times (\text{odd number}) = 180$$

Where, odd number  $> 2m$

Now, the only odd factors of 180 are 1, 3, 5, 9, 15 and 45

But only for  $= 4$  i.e.,  $4 \times 45$ , is the odd factor greater than  $2m$ .

Therefore, the number of leaves that were missing was 4.

 **FeedBack**