AIMCAT 2023.

VARC

QUESTION(1 TO 5)

It's a finding that adds to Darwin's theory of natural selection. During the Mozambican Civil War – which raged from 1977 to 1992 – 90 percent of the 4,000 elephants at the nation's Gorongosa National Park were killed so that their ivory could be used to exchange for weapons and their meat to feed soldiers.

Fast forward to the present day and research conducted … [shows] that around a third of the females from the generation born after the war ended are tuskless – a trait that appears to have been passed on from the adults who survived the war and are tuskless themselves.

Normally only around two to four percent of female African elephants would be born without tusks, so this is quite the jump. Dominique D'Emille Correia Gonçalves, a PhD student from the University of Kent who is part of a team of scientists investigating the findings, told the Daily Mail: "Ivory poaching targets big tusked animals, so it removes the 'big tusk' gene out of the population."

The elephant population today is derived from most of the elephants who survived the war, where they were heavily poached for their tusks…

The key explanation is that in Gorongosa National Park, the tuskless elephants were the ones which eluded poaching during the civil war and passed this trait onto many of their daughters…

These tuskless elephants are growing from the survivors of poaching so while we are not talking about evolution yet, we could be talking about the removal of certain genes from the population.

In addition to the changes in tusk development, Joyce's research also discovered what's described as a 'culture of aggression' amongst the female elephants, which is believed to be due to their need to protect their young during the war.

Dominique described the 'culture of aggression' as 'intriguing', adding: This is a big change, as anecdotal records from people that have been in Gorongosa before the war suggest the family units used to be calm and almost indifferent to people presence.

Many of the matriarchs and lead females of the family units were alive during the slaughter and saw their families and friends being hunted…

"They are survivors and the trauma is still present, which would explain such intolerance to humans."

Despite the wave of [human-influenced] tusklessness in recent decades, elephants missing their tusks are surviving and appear healthy, according to Poole. Tusks are essentially overgrown teeth. Yet they’re typically used for most tasks of daily living: digging for water or vital minerals in the ground, debarking trees to secure fibrous food, and helping males compete for females.

The work elephants do with their tusks is vital for other animals too. Elephants’ “role as a keystone species to topple trees and dig holes to access water is important for a variety of lower species that depend on them,” Long says. Tusk action also helps create habitats. Certain lizards, for example, prefer to make their homes in trees roughed up or knocked over by browsing elephants. If elephants are changing where they live, how quickly they move, or where they go, it could have larger implications for the ecosystems around them.

Q1. The effect of poaching on elephants is that:

a) **elephants have lost their ability to grow tusks.**

b) elephants with the gene responsible for the big tusk have gone extinct.

c) elephants have evolved to avoid growing tusks.

d) elephants without tusks are evolving in number.

Consider the sentences: 'The key explanation is that in Gorongosa National Park, ***the tuskless elephants were the ones which eluded poaching*** during the civil war and passed this trait onto many of their daughters…These tuskless elephants are ***growing from the survivors of poaching so while we are not talking about evolution yet***, we could be talking about the ***removal of certain genes*** from the population.'
Option A: Elephants haven't lost their ability to grow tusks. Some elephants have tusks, and some don't. Those elephants which don't have tusks are flourishing because they haven't been hunted. Hence, Option A is not the answer.
Option B: There is no evidence to say that all the elephants with tusk-genes have gone extinct. We are only talking about percentages here, and that the numbers of the ones without tusks is on the rise. Hence, Option B is not the answer.
Option C: From the underlined parts we can see that it is not evolution yet, in the sense that elephants haven't changed themselves to avoid tusks. It is still selection, where elephants without tusks are growing in numbers, largely because elephants with tusks got hunted down. So, it is not evolution but selection, because of the tuskless elephants surviving. Hence, Option C is not the answer.
Option D: Elephants without tusks haven't been hunted much, because of which their numbers are on the rise. As a result, the tuskless gene is getting propagated. So, elephants without tusks are increasing (evolving in numbers). While we still don't know if they form the majority, we definitely know their numbers are on the rise. Hence, Option D is the answer. Choice (D)

Q2. Which of the following has NOT been mentioned by the author to highlight the impact of elephant tusklessness?

a) **Elephants without tusks unable to survive.**

b) Habitats of animal species dependent on elephants.

c) Male elephants competing for females.

d) **Dietary habits of elephants.**

Option A: Elephants are able to survive and the number of tuskless elephants is increasing in number. So, survival has not been mentioned by the author as an impact or consequence of tusklessness. Hence, Option A is the answer.
Option B: Consider the sentence: 'Tusk action also helps create habitats. Certain lizards, for example, prefer to make their homes in trees roughed up or knocked over by browsing elephants.' From this, we can see that the habitats of animal species dependent on elephants has been mentioned by the author. So, option A is not the answer.
Option C: From 'and helping males compete for females', we can understand that the author did mention competition amongst males for female elephants. Hence, Option B is not the answer.
Option D: Dietary habits have been mentioned in 'digging for water or vital minerals in the ground, debarking trees to secure fibrous food'. Hence, Option D is not the answer.

Choice (A)

Q3. The 'culture of aggression' discovered amongst the elephants points to:

a) **the adverse effect of trauma on elephant genes.**

b) an increase in the number of tuskless elephants.

c) the inherent friendly nature of elephants towards humans.

d) **the influence of trauma on elephant aggression.**

Consider the sentences: In addition to the changes in tusk development, Joyce's research also discovered what's described as a 'culture of aggression' amongst the female elephants, which is believed to be ***due to their need to protect their young during the war***…the matriarchs and lead females of the family units were alive during the slaughter and saw their families and friends being hunted…***They are survivors and the trauma is still present, which would explain such intolerance to humans***."
Option A: The change in genes hasn't been mentioned. The above para clearly indicates the trauma being present in the matriarchs that ***saw their families and friends being hunted.*** Hence, Option A is not the answer.
Option B: We cannot justify ***an increase in the number of tuskless elephants*** as associated to aggression. These are two different trends that the author has spoken about in the passage. One is the increase in the number of tuskless elephants and another is the increase in their aggression. Hence, Option B is not the answer.
Option C: Elephants were indifferent to humans in the past, in the concerned area. This doesn't necessarily point to ***an inherently friendly*** nature of elephants, in general, towards humans. Hence, Option C is not the answer.
Option D: The passage connects the natural aggression to the trauma that the elephants witnessed. Hence, we can say that the newly discovered culture of aggression points to the effects of trauma on elephant aggression. Hence, Option D is the answer.

Choice (D)

Q4. Which of the following studies is the author least likely to recommend in the future?

a) **A study of the health patterns of the tuskless elephants. (appearing healthy is different from being healthy)**

b) A study of the effect of poaching on tuskless elephants.

c) A study of the changes in ecosystems around tuskless elephants.

d) **A study of the effect of tuskless elephants on the ecosystem around them.**

Option A: The author clearly mentions in the passage that elephants without tusks continue to appear healthy. 'Despite the wave of [human-influenced] tusklessness in recent decades, elephants missing their tusks are ***surviving and appear healthy***'. Hence, Option A will be an interesting follow-up study to see whether what is a conjecture (that they appear healthy) is actually true. Hence, Option A is not the answer.
Option B: A study of the effect of poaching on tuskless elephants will not be a necessary study, as the effects of poaching were seen on the number of elephants with tusks – it decreased. Thereby, the percentage of elephants without tusks increased. No further study is required. Hence, Option B is the answer.
Option C: Consider this: If elephants are changing where they live, how quickly they move, or where they go, it could have larger implications for the ecosystems around them. So, the author may recommend a study of how the ecosystems around tuskless elephants evolve, since elephants with tusks had a substantial impact on them. Hence, Option C is not the answer.
Option D: The author discusses the effect elephants with tusks have on their surrounding ecosystems. Effects of tuskless elephants therefore could be a follow-up as it remains to be seen what elephants without tusks would do as substitute for the activities that needed tusks, and where would they get minerals from. It would be interesting to see what the effects of the new adapted tasks would be. Hence, Option D is not the answer as it is a likely study. Choice (B)

Q5. The author mentions Darwin's theory of natural selection to probably show that:

a) **tuskless elephants survived the civil war because they were the fittest.**

b) **nature propagates genes found in surviving species.**

c) animal species evolve towards the genes of the surviving species.

d) **nature selects some species to thrive and some to perish.**

The answer to this question probably lies in: '"Ivory poaching targets big tusked animals, so it removes the 'big tusk' gene out of the population. The elephant population today is derived from most of the elephants who survived the war, where they were heavily poached for their tusks…' This, according to the author, sits with Darwin's theory of natural selection.
Option A: Tuskless elephants survived not because they were fitter but because the poachers were less interested in them. Hence, Option A is not the answer.
Option B: The tuskless elephants increased in number because the survivors of the Civil War were mostly elephants without tusks and that gene was propagated whereas the gene of the elephants with tusks wasn't propagated as much because they were hunted down. This is natural selection where the survivor's genes are passed on. Hence, Option B is the answer.
Option C: The case of the increase in the number of tuskless elephants is not one of nature's intervention. It has more to do with poaching and Civil War. Hence, Option C can be eliminated.
Option D: Nature didn't select the tuskless elephants over the ones with tusks. The latter got hunted for their tusks. Hence, it wouldn't be apt to state that nature selects the species that will thrive, at least for this case. Hence, Option D is not the answer.

Choice (B)

QUESTIONS(6 TO 10)

Tokyo is the real international capital of fashion. Not Paris, which has claimed the title for decades; not New York, which clings to its market domination for the crown; not even Milan, where industrialists make the business an art.

Being the capital of fashion isn't about who has the boutiques or the runway shows… To be the true capital of fashion, fashion must dominate everything. It must be the passion of the masses and the connoisseurs. It must be the primary mode of expression beyond art, film, music. It must be a place where fashion is treated as a necessity, not a luxury. And that is Tokyo, a city where -- outside the most obscure underground shops -- lines form for the latest T-shirt. It's the only city in the world where creating fashion is treated as an intellectual pastime. Ask who the greatest living artist in Tokyo is, and a surprising number of people won't name a writer or a painter; they'll name Rei Kawakubo. Or Junya Watanabe. Fashion designers.

Tokyo is the capital of fashion because, from the cheapest pair of jeans to the most overpriced, misunderstood designer masterpiece, it inspires ‘otaku’ in the population. ‘Otaku’ is the best word to learn first before going to Tokyo. Otaku was once a derogatory term used to describe someone who is so consumed by a subject that he risks becoming a shut-in. But now otaku means "deep passion." About anything.

"Every hipster who goes to Tokyo comes back learning two words: kwaii, which means 'cute' and otaku, which means 'obsessive,'" says the pop conceptual artist Tom Sachs. "The thing that's interesting is when you combine those two things."

People who pride themselves on their otaku can discern the slightest alterations in design…[allowing] fashion designers [to] change a trim from orange to blue and sell yet another. Lines formed for days when the largest Louis Vuitton store in the world opened in Tokyo a few months ago; understanding the culture intimately, the company offered a series of limited-edition pieces for the event.

Unlike with the London punks and mods, or the New York rappers who so inspire dress in the streets of Japan's capital, there are no politics behind the Tokyo fashion movements. The punk movement, when it came, was only about fashion. The hip-hop movement has nothing to do with rebellion. ‘Boystyle’ has nothing to do with women's rights. If you ask the girls why they're wearing it, it's because "it's cute." What are all those sartorial movements without anger? Well, they're happy clothes. They're kwaii. They're divested of all of their meaning. As central as fashion is to life here, all it really says is that the person wearing it loves fashion. Even Watanabe professes distress that his spring collection of sweet florals and hippie denims was deemed comforting to the post-Sept. 11 audience. He wanted them to be judged only as the art he believes they are.

In Tokyo, fashion, after all, is used to existing without political context. There's little street crime and no visible underclass, and the only thing to rebel against is the work ethic. And the young generation has been criticized for doing just that, although their posing in the streets has become its own kind of performance art, their dress colouring the world around them and defining Japanese culture more than any other movement in the city.

Q6. Which of the following can be inferred from the penultimate para of the passage?

a) **Hip-hop and punk started more as rebellions than as fashion statements in Tokyo.**

b) **Tokyo fashion felicitates the underlying connection between Boystyle and women's rights.**

c) Watanabe was upset post-Sept. 11 audience loved his florals and denims for their art.

d) **Tokyo fashion has stripped sartorial movements of their anger.**

Option A: Consider the sentences: The punk movement, when it came, ***was only about fashion***. The ***hip-hop movement has nothing to do with rebellion***. From this, it cannot be inferred that hip-hop and punk started more as rebellions in Tokyo, whatever their significance elsewhere is. In fact, it seems to be the reverse in Tokyo. Hence, Option A is not the answer.
Option B: It is not that Tokyo disagrees with the style statements and their underlying meaning. In Tokyo, political meanings simply don't exist. Boystyle is cute and is not about women's rights, as far as Tokyo fashion is concerned. Hence, Option B is not the answer.
Option C: Watanabe wanted his clothes to be loved for the art and was distressed people found it comforting owing to the post-Sept. 11 trauma. Option C mentions the exact opposite of it. Hence, it is not the answer.
Option D: Consider the sentences: ***there are no politics behind the Tokyo fashion movements***. The punk movement, when it came, was only about fashion. The hip-hop movement has nothing to do with rebellion. 'Boystyle' has nothing to do with women's rights. If you ask the girls why they're wearing it, it's because "it's cute." ***What are all those sartorial movements without anger?*** Well, they're happy clothes. They're kwaii. ***They're divested of all of their meaning.*** As central as fashion is to life here, all it really says is that the person wearing it loves fashion. Therefore, it can be understood that Tokyo fashion was about fashion alone, not the anger that may come with various movements. Hence, Option D is a valid inference. Choice (D)

Q7. Which of the following best explains the purpose of the author's mention of Kawakubo and Watanabe in para 2 of the passage?

a) **To show that fashion designers are celebrities in Tokyo.**

b) **To debate who the greatest living artist in Tokyo is.**

c) **To demonstrate how Tokyo regards fashion designers as artists.**

d) **To prove that with artistic fashion designers, Tokyo is the capital of fashion.**

Consider the sentences: 'It's the only city in the world where ***creating fashion is treated as an intellectual pastime***. ***Ask who the greatest living artist in Tokyo is***, and a surprising number of people won't name a writer or a painter; they'll name Rei Kawakubo. Or Junya Watanabe. ***Fashion designers.***'

Option A: The author isn't discussing the celebrity status of fashion designers. The author is discussing how they are perceived. Hence, Option A is not the answer.

Option B: The discussion is not about who the greatest artist in Tokyo is. It is not about competition between fashion designers. The author was driving home a point about how fashion designers are treated with respect reserved for artists, in Tokyo. Hence, Option B is not the answer.

Option C: From the underlined sentences above, it is clear that the author wants to elucidate how Tokyo people regard fashion designers as artists. And would probably pick a fashion designer over a painter if asked who their favourite artist is. Hence, Option C is the answer.

Option D: The author doesn't distinguish between artistic and non-artistic fashion designers. The author is merely implying that fashion designers are treated like artists in Tokyo (because of which it is a strong contender for being called the capital of fashion). Option D is not the answer. Choice (C)

Q8. Which of the following, if true, least fits with the meaning of 'otaku' as explained in the passage?

a) **Fans stand in lines sometimes for days to obtain movie tickets for movies of their favourite heroes.**

b) **Comic-book fans generally do not miss even the smallest deviations in movies from the usual storylines.**

c) **Wine connoisseurs can distinguish between wines from different vineyards.**

d) **Hipsters in Tokyo trust brands and fashion designers too much to notice the detailing.**

Consider the sentences: 'Otaku was once a derogatory term used to describe someone who is so consumed by a subject that he risks becoming a shut-in. But now otaku means ***"deep passion***." About anything.' And also the sentence: '***People who pride themselves on their otaku can discern the slightest alterations in design***.' We are looking for an option that doesn't depict the passion Tokyo people have for fashion.

Option A: From 'And that is Tokyo, a city where -- outside the most obscure underground shops -- lines form for the latest T-shirt' and 'Lines formed for days when the largest Louis Vuitton store in the world opened in Tokyo a few months ago', we can understand that the author does consider standing in lines a way of expressing passion for something. Hence, Option A is not the answer.

Option B: Discerning between two close narratives is very similar to what the author points out as otaku in the passage, where a fashion-lover can discern even the slightest alteration in design. Hence, Option B is not the answer.

Option C: A wine connoisseur discerning between various wines is once again a sign of otaku, just as a fashion-lover discerns the slightest alterations. Hence, Option C is not the answer.

Option D: This is very obviously not Otaku considering those in Tokyo who love fashion can discern the alterations easily in their favourite designers' designs, despite their love for brands. Hence, Option D is the answer. Choice (D)

Q9. People of Tokyo who pride themselves on their otaku benefit the fashion designers by allowing them to:

a) **create new lines with the subtlest of changes.**

b) **cash-in on limited-edition pieces.**

c) **be more unconventional in their designs.**

d) **be more passionate about their work.**

The answer is directly available in the sentences: People who pride themselves on their otaku can discern the slightest alterations in design…***[allowing] fashion designers [to] change a trim from orange to blue and sell yet another.***

Option A: Creating new lines with the subtlest of changes is the biggest advantage designers have with discerning audience. Hence, Option A is the answer.

Option B: Limited-edition pieces haven't been discussed in this context. Louis Vuitton did release them to give the Tokyo fashion lovers exclusivity but that is not the main idea behind the author talking about Otaku of fashion-connoisseurs.

Option C: Fashion designers can create multiple designs with the slightest of alterations. But that has got nothing to do with conventionality or unconventionality of their designs. Hence, Option C is not the answer.

Option D: Once again, we are discussing the possibility of fashion designers creating more with subtle changes. We are not talking about the passion the designers may or may not have for their work. Hence, Option D is not the answer. Choice (A)

Q10. The author's main argument in the passage is contradicted by which of the following statements:

a) **It is not otaku but commerce that decides the fashion capital.**

b) **Fashion reflects a culture better than its art, film and music.**

c) **Fashion should be an intellectual pastime in the fashion capital of the world.**

d) **The fashion capital should boast of the most passionate fashionistas.**

The author's main argument in the passage can be understood from: 'Tokyo is the real international capital of fashion. Not Paris, which has claimed the title for decades; not New York, which clings to its market domination for the crown; not even Milan, where industrialists make the business an art. Being the capital of fashion isn't about who has the boutiques or the runway shows… To be the true capital of fashion, ***fashion must dominate everything. It must be the passion of the masses and the connoisseurs. It must be the primary mode of expression beyond art, film, music***.'

Option A: If commerce decides the fashion capital, then it would be New York, which has the market domination. Hence, Option A contradicts the author's central argument. Option A is the answer.

Option B: If this is true, then Tokyo will be the fashion capital as the author believes fashion must be the primary mode of expression beyond art, film and music. Hence, Option B agrees with the author. Option B is not the answer.

Option C: This statement is in line with the author's opinion that Tokyo is the fashion capital of the world and one of the reasons is that fashion is treated as an intellectual pastime. Hence, Option C is not the answer.

Option D: Passionate fashionistas add to the value of the fashion capital. In fact, the author calls Tokyo the fashion capital because people are passionate about fashion, they have otaku. Hence, Option D doesn't contradict the author's argument. Option D is not the answer.

Choice (A)

QUESTIONS(11 -15)

In a paper presented to the newly formed Royal Society… Christopher Merrett – a scientist, physician, naturalist and metallurgist [who in 1662 first documented "how to put the fizz into sparkling wine"] – …described how English winemakers had been adding sugar to wines to give them a refreshing, bubbly quality – 30 years before a monk in France's Champagne region.

"Our wine coopers of recent times use vast quantities of sugar and molasses to all sorts of wines to make them drink brisk and sparkling and to give them spirit," he wrote. It was the first time anyone had described the process or used the word "sparkling" to describe the end-product, Winchcombe historian Jean Bray said. What he was actually describing was the result of secondary fermentation…

[So], is sparkling wine better in England than France? At the Three Choirs Vineyard near Newent in Gloucestershire, winery manager Keith Shayle explained the process, which starts with fermenting the grape juice in a vat to make a conventional wine.

"To turn a still wine into a sparkling wine we put what we call the base wine into a champagne bottle with some priming sugar and yeast, put a cap on the bottle, and allow it to ferment inside," he said.

"This means the carbon dioxide can't escape, so it's retained in the wine in the bottle and that gives you the bubbles when we take the top off. That's the second fermentation, in the bottle itself."

These days it is a hi-tech business. Fermentation in the bottle produces not only carbon dioxide but also a yeasty sediment which has to be removed – a process known as disgorging. The bottles are stacked on their sides on a pallet, which over the space of several days is gradually rotated until the bottles are facing downwards. Sediment collects as a deposit in the neck of the bottle, which is then dipped in a glycol solution to freeze the contents, before the bottle is fed into a disgorging machine which flicks off its temporary metal closure.

Pressure from the gas inside the bottle – roughly three times higher than a car's tyres – shoots the little plug of ice containing the sediment out with a satisfying pop and a brief effervescence. The machine then adds a small amount of dosage – a sweet, syrupy wine concentrate which improves the final taste – before sealing the bottle once again with a cork in a muselet, or wire cage.

For French winemakers, secondary fermentation was a menace. The build-up of gas caused their rather flimsy glass bottles to explode – and when one went bang it could set off its neighbours as well, devastating entire cellars. But for English winemakers, secondary fermentation and the magic it added was a boon, not a burden. Their wine bottles were heavier and thicker – like modern champagne bottles – so much less likely to explode. Apparently, the Royal Navy is to thank for that. Early modern glassmakers used charcoal made from oaks to heat their furnaces, but the navy banned the use of oak for anything other than shipbuilding. English glassmakers turned to coal instead, and discovered it burned hotter and allowed them to make stronger glass.

It transpires therefore, that English sparkling wine has a long history – longer even than champagne.

Q11. Base wine is transformed into sparkling wine in England by:

a) **adding priming sugar and yeast to it.**

b) adding carbon dioxide and sealing it in a bottle.

c) adding a wine concentrate and then sealing the bottle.

d) leaving the grape juice in a vat.

Consider the sentences: 'To turn a still wine into a sparkling wine ***we put what we call the base wine into a champagne bottle with some priming sugar and yeast***, put a cap on the bottle, and allow it to ferment inside…This means the carbon dioxide can't escape, so it's retained in the wine in the bottle and that gives you the bubbles when we take the top off. That's the second fermentation, in the bottle itself.'
Option A: This represents the apt details – still wine is formed from leaving grape juice in a vat following which priming sugar and yeast are added for second fermentation. Hence, Option A is the answer.
Option B: Carbon dioxide isn't added to base wine. Rather, it is formed inside the bottle. Hence, Option B is not the answer.
Option C: From the sentence 'The machine then adds a small amount of dosage - a sweet, syrupy wine concentrate which improves the final taste - before sealing the bottle once again with a cork in a muselet, or wire cage', we can understand that this step comes later to add taste. Hence, Option C is not the answer.
Option D: This is the first step before still wine or base wine is formed. The process starts with leaving grape juice in a vat for fermenting. Hence, Option D is not the answer.
Choice (A)

Q12. The process of disgorging can best be explained as:

a) **Fermentation in the bottle to produce conventional wine.**

b) Secondary fermentation in the bottle to produce sparkling wine.

c) Collection of sediments as deposits in the neck of the bottle.

d) **Separation of yeasty sediment after secondary fermentation.**

The answer is provided in the sentence: 'These days it is a hi-tech business. Fermentation in the bottle produces not only carbon dioxide but also ***a yeasty sediment which has to be removed - a process known as disgorging***.'
Option A: The fermentation process is not disgorging. Rather, it is the removal of the yeasty sediment. Hence, Option A is not the answer.
Option B: Second fermentation is not called disgorging either. Disgorging happens after the second fermentation produces a sediment of yeast that has to be removed. Hence, Option B is not the answer.
Option C: The collection of sediments happens automatically during the second fermentation and is not something that has to be done voluntarily. Option C is not the answer.
Option D: The separation of the sediment that has been collected in the neck is known as disgorging – because the neck is removed along with the frozen sediment. Option D is the answer.
Choice (D)

Q13. The Royal Navy helped the cause of English winemakers by:

a) **enforcing the use of thicker glass that allowed better secondary fermentation.**

b) enforcing the use of coal, which helped in making stronger glass needed for secondary fermentation.

c) **banning the use of oak, resulting in coal being used in furnaces.**

d) **banning use of thinner bottles that exploded in cellars.**

The answer can be found in the following sentences: But for English winemakers, secondary fermentation and the magic it added was a boon, not a burden. ***Their wine bottles were heavier and thicker*** - like modern champagne bottles - so much less likely to explode. Apparently, ***the Royal Navy is to thank for that***. Early modern glassmakers used charcoal made from oaks to heat their furnaces, but the navy banned the use of oak for anything other than shipbuilding. ***English glassmakers turned to coal instead, and discovered it burned hotter*** and allowed them to make stronger glass.
Option A: The Royal Navy banned the use of oak for furnaces. It didn't enforce the use of thicker glass. Hence, Option A is not the answer.
Option B: The Royal Navy didn't impose the use of coal. Its banning of usage of oak for furnaces pushed glassmakers towards using coal. Hence, Option B is not the answer.
Option C: This represents the reason why the Royal Navy can be credited for the better quality of glass and hence, wine. Although unintentional, they pushed the glassmakers towards creating thicker glass by using coal, which burnt hotter. Hence, Option C is the answer.
Option D: Thinner glasses exploded in France because of carbon dioxide pressure inside the bottles. That has got nothing to do with the Royal Navy's ban on oak. Hence, Option D is not the answer. Choice (C)

Q14. The author's main argument in the passage is that:

a) **The English winemakers use a better method of producing sparkling wine than their French counterparts do.**

b) The English winemakers produced champagne long before the French did.

c) **The English knew about sparkling wine before the French made champagne.**

d) **The English winemakers created the method of producing bubbles in wine that the French now use to make champagnes**

Consider the sentence: It transpires therefore, that ***English sparkling wine has a long history - longer even than champagne***. Also, in the first para, 'In a paper presented to the newly formed Royal Society… Christopher Merrett …described how English winemakers had been adding sugar to wines to give them a refreshing, bubbly quality - ***30 years before a monk in France's Champagne region***.'
Option A: The author's argument wasn't about the method. Rather, it was about the time. Hence, Option A is not the answer.
Option B: The English produced sparkling wine, and not champagne. The option misrepresents the information in the passage. Hence, Option B is not the answer.
Option C: This seems to address the main contention, which was that the English made sparkling wine long before the French made its counterpart, champagne. Hence, Option C is the answer.
Option D: The author's main point of discussion wasn't about the method of producing sparkling wine. It was about who produced it first. Hence, Option D is not the answer.
Choice (C)

Q15. Secondary fermentation could be perilous if:

a) **glycol solution used to freeze contents is contaminated.**

b) **glass used for bottles isn't strong.**

c) **most of the effervescence is lost during disgorging.**

d) **bottles weren't strong enough to stop gas from building up inside.**

The answer can be found in the sentences: For French winemakers, ***secondary fermentation was a menace***. The ***build-up of gas caused their rather flimsy glass bottles to explode*** - and ***when one went bang it could set off its neighbours*** as well, devastating entire cellars.
Option A: The quality of the glycol solution hasn't been discussed and the chances of contamination need not be considered as wine and glycol won't mix. Hence, Option A is not the answer.
Option B: If the glass is not strong, there are chances that it will explode because of carbon dioxide build-up. This might lead to blowing off of the cellar itself. Hence, Option B is the answer.
Option C: The loss of effervescence hasn't been discussed. Also, the contents are frozen before disgorging is done. Hence, Option C is not the answer.
Option D: The carbon dioxide gas builds up anyway because of second fermentation. It has got nothing to do with whether the bottles are strong or thin. However, bottles need to be strong to not explode when the gas builds up. Hence, Option D is not the answer.
Choice (B)

QUESTIONS(16 TO 20)

I cannot resist a literary analogy. (To a close approximation), Dickens and Salinger use the same few thousand words in their respective novels *David Copperfield* and *Catcher in the Rye.* There are words that Salinger uses but not Dickens, and vice versa. But these words are few compared with the words they share. Though there is 90% lexical concordance between the two books, they are different books. The difference lies not in the use of a different set of words, but in the same set of words used in a different pattern and order. ... [Likewise], it has been known since long that some genes move from one species to other widely different species given the chance, in a process called horizontal gene transfer [eg., genes for antibiotic resistance swap freely between bacterial species].

Alastair and Boschetti [of Cambridge University] report in *Genome Biology* that humans have atleast 145 genes picked up from other species by their forebears. Though this is less than 1% of the 20,000 genes that humans have altogether, humans are (to a small degree) part bacterium, part fungus and part alga.

The researchers concluded this by looking at public databases of genetic information now available. They studied humans and nine other primates, twelve types of fruit fly and four nematode worms. The results from all three groups suggest natural transgenics is ubiquitous.

To avoid getting bogged down in the billions of base pairs of an animal genome, the researchers looked at the transcriptome [the set of messenger molecules, made of a DNA-like chemical called RNA, that pick up instructions on how to make proteins from genes in the nucleus and deliver them to the subcellular factories which turn those proteins out]. Each type of messenger RNA corresponds to a single gene. By looking at the messengers, the researchers could ascertain they were recording active genes and not stretches of nuclear DNA that had once been genes but now no longer work.

For every transcribed messenger, they searched the world's databases, looking for matches. They excluded the immediate relatives of each of the three groups of animals (i.e., no arthropods were compared with flies, no vertebrates with primates and no other nematodes with worms). They asked whether similar-looking genes to those in a transcriptome were found more often in other animals, or in non-animals. If the latter, then, a horizontal gene transfer from species to species seemed probable. On average, worms had 173 horizontally transferred genes, flies had 40 and primates had 109. Humans thus had more than the primate mean.

Many matches are to genes of unknown purpose [even 15 years after the human genome project, the functions of many genes remain obscure]. But some human transgenes appear familiar. The

ABO antigen system, which defines basic blood groups for transfusion purposes, looks bacterial. The fat-mass and obesity-associated gene comes from marine algae. Genes involved in the synthesis of hyaluronic acid originate from fungi.

The researchers found two imported genes for amino-acid metabolism, thirteen for fat metabolism, fifteen for post-manufacture modification of large molecules .... and seven immune-system genes.

Quite a catalogue! If anything similar were inserted by genetic engineers into corn or cattle, there would be an outcry (opponents of genetically modified crops complain that moving genes between species is unnatural). In humans, however, they are doing a good job. Many of them have been cohabiting with the line that led to humanity for millions of years, and both sides have had ample time to adjust.

Q16. Which of the following choices best encapsulates the author's central argument in the passage?

a) **Certain genes are interchangeable between species.**

b) **Human beings have routinely picked up genes from other species.**

c) **Horizontal gene transfer is a relatively new phenomenon in human beings.**

d) **Moving genes between species of crops or cattle is opposed by genetic engineers.**

The central idea of the passage is captured in the statement: But humans are really (to a small degree) part bacterium, part fungus and part alga.
Option A: "genes move from one species to another in a process called horizontal gene transfer". While choice A is true, it is not the central focus of the author in the passage.
Option B: Alastair and Boschetti of Cambridge University report in *Genome Biology* that humans have at least **145 genes** picked up from other species by their forebears. On average, worms had 173 horizontally transferred genes, flies had 40 and primates had **109**. Humans thus had **more than the primate mean.** Hence choice B is the correct answer. Choice B can also be confirmed from the last few lines of the passage: In humans, however, the imported genes are doing a good job. Many of them (imported genes) seem to have been cohabiting with the line that led to humanity for millions of years, and both sides have had ample time to adjust.
Option C: It has been known for a while (known since long) that some genes move from one species to other widely different species, in a process called horizontal gene transfer. Choice C is negated.
Option D: If anything similar were inserted by genetic engineers into corn or cattle, there would be an outcry (opponents of genetically modified crops complain that moving genes between species is unnatural). Though choice D is true, it fails to capture the essence that natural transgenics is widespread and is found to be occurring in humans too.
Choice (B)

Q17. If it were confirmed that "similar-looking genes to those in a transcriptome (under study) were found more often in other animals" (para 5), then the explanation for this is ...

a) **that the genes were there by common descent from animal ancestors.**

b) **that horizontal gene transfer definitely occurred from species to species.**

c) **that genes that once worked have now been converted to stretches of nuclear DNA.**

d) **not inferrable from the passage.**

Option A: They excluded the immediate relatives of each of their three groups of animals (that is, no arthropods were compared with the flies, no vertebrates with the primates and no other nematodes with the worms)..... They then asked whether similar-looking genes to those in a transcriptome were found more often in other animals, or in non-animals. Choice A sounds like an extrapolation. But whether this is a most likely explanation or not cannot be inferred from the passage.
Option B: They asked whether similar-looking genes to those in a transcriptome were found more often in other animals, or in non-animals. If the latter, then, a horizontal gene transfer from species to species seemed the most probable explanation. Choice B refers to the latter and not to the former as demanded by the question. Choice B does not pertain to the question and is not the answer.
Option C: By looking at the messengers, Alastair and Boschetti could be certain they were recording active genes and not stretches of nuclear DNA that had once been genes but now no longer work. Choice C runs tangent to the discussion and is not the answer.
The most likely explanation for the question is not inferrable from the passage.

Choice (D)

Q18. Which of the following explains the purpose for the author's mention of the examples of the ABO antigen system and other genes in para 6?

a) **To point out that the role of several transgenes still remains unclear.**

b) **To reiterate that peculiarities of lesser organisms have now been found in humans too.**

c) **To demonstrate that certain transgenes swapped from other species to humans in exchange for non-active genes.**

d) **To indicate that certain transgenes associated with familiar functions have moved from other species to humans.**

d) **A study indicating the necessity of labelling or tightly regulating the use of genetically modified organisms in agriculture and industry.**

Even though the examples of the ABO antigen system, the fat-mass and obesity-associated gene and the hyaluronic acid synthesizing genes have been mentioned in para 6, we need to review the previous para to answer the question.
Option A: Many of the matches are to genes of unknown purpose – for, even 15 years after the human genome project, the jobs of many genes remain obscure. But some human transgenes are **familiar.** So choice A is negated and is not the reason for the question.
Option B: The focus is not so much on the peculiarities or the behaviour associated with the unnatural genes or imported genes. The focus is on the genes themselves being widely spread among different species. Choice B is not the exact or precise answer.
Option C: While the first part of choice C is true, the second part is not. "in exchange for non-active genes" is incorrect. The genes mentioned as examples in the question are active genes in both humans and non-human species (bacteria, fungi, algae). Choice C is not the answer.
Option D: ... A horizontal gene transfer from species to species seemed the most probable explanation. On average, worms had 173 horizontally transferred genes, flies had 40 and primates had 109. Humans (145 genes) thus had more than the primate mean. The ABO antigen system, which defines basic blood groups for transfusion purposes, looks bacterial. The fat-mass and obesity-associated gene seems to come from marine algae. And genes involved in the synthesis of hyaluronic acid originate from fungi. Choice D is the answer to the question. Choice (D)

Q19. Which of the following would undermine the main finding of the passage?

a) **A study affirming that natural transgenics is quite widespread in the human and non-human worlds.**

b) **A study highlighting the criticality of transgenes in evolutionary mechanisms.**

c) **A study confirming that all the genes of humans have been transferred and preserved intact from the genomes of their long-extinct ancestors.**

d) **A study indicating the necessity of labelling or tightly regulating the use of genetically modified organisms in agriculture and industry.**

Option A: It has been known since long that some genes move from one species to other widely different species, in a process called horizontal gene transfer, eg., genes for antibiotic resistance swap freely between bacterial species. ....They studied humans and nine other primate species, 12 types of fruit fly and four nematode worms. The results from all three groups suggest natural transgenics is ubiquitous. Choice A strengthens the finding of the passage and is not the answer.
Option B: 'evolutionary mechanisms' is not the focus of the passage. A study highlighting the criticality of transgenes would only add support to the passage, it will not undermine or invalidate the finding of the passage. Choice B is not the answer.
Option C: The study mentioned in choice C would strengthen the case for vertical gene transfer and would undermine the case of horizontal gene transfer. Choice C is parallel to the experimental procedure mentioned in para 5: For every transcribed messenger, they searched the world's databases, looking for matches. They excluded the immediate relatives of each of their three groups of animals (i.e., no arthropods were compared with the flies, no vertebrates with the primates and no other nematodes with the worms). They then asked whether similar-looking genes to those in a transcriptome were found more often in other animals, or in non-animals. Choice C answers the question.
Option D: This option sounds an alarm about genetically modified organisms. ... In humans, however, they are doing a good job. Many of them have been cohabiting with the line that led to humanity for millions of years, and both sides have had ample time to adjust. Choice D does not negate the main message of the passage.

Choice (C)

Q20. Based on information provided in the passage, all of the following choices can be refuted EXCEPT?

a) **The transcriptome has stretches of non-nuclear DNA code that activates certain genes and it plays an instructional role in species.**

b) **The difference between Dicken's novel and Salinger's novel is because of the lexical concordance between the two books.**

c) **Immigrant genes from non-human species have started cohabiting with the line that led to humanity in the recent past.**

d) **Dickens and Salinger have, in the novels mentioned, made use of a large number of same words in different contexts to different effect.**

All of the following choices can be refuted EXCEPT? ==> Which of the following choices is true?
Option A: The transcriptome is the set of messenger molecules, made of a *DNA-like chemical* called RNA, that pick up instructions on how to make proteins from genes in the nucleus and deliver them to the subcellular factories which turn those proteins out. Choice A which refers to "non-nuclear DNA code" is distorted and it can be refuted. Choice A is not the answer.
Option B: There is 90 percent lexical concordance between the two books, yet they are different books. The difference lies not in the use of a different set of words, but in the same set of words used in a different pattern and order. This means that the difference between Dicken's novels and Salinger's novel is NOT because of the lexical concordance between the two books but because of the variation of the use of words. Choice B is incorrect. Note that the *similarity (not difference)* between Dicken's novel and Salinger's novel is because of the lexical concordance between the two books.
Option C: Some genes move from one species to other widely different species given the chance, in a process called horizontal gene transfer. ..... Refer to the last para. In humans, however, they are doing a good job. Many of them seem to have been cohabiting with the line that led to humanity for millions of years, and both sides have had ample time to adjust. So, "in the recent past" in choice C is incorrect.
Option D: There are words that Salinger uses but not Dickens, and vice versa. But these words are few compared with the words they share (which are more). There is 90 percent lexical concordance between the two books, yet they are different books. The difference lies not in the use of a different set of words, but in the same set of words used in a different pattern and order. Choice D is the answer. Choice (D)

QUESTIONS(21-24)

The wealthiest Americans have grown wealthier since the Great Recession, and many are investing their wealth in art. Especially with bonds and other assets offering rock-bottom yields, the art market — where reports of record-high sales now emerge regularly — has an obvious appeal. According to a survey last year by Deloitte and ArtTactic, an art-research firm, 76 percent of art buyers viewed their acquisitions as investments, compared with 53 percent in 2012. And with more collectors viewing art as a financial investment, storage can become an artwork's permanent fate.

Benefiting from this is an upstart art-storage company called Uovo. Uovo is built from scratch, a modern facility with "Mission: Impossible"-grade security and bespoke technology for cataloguing artworks that makes information about them readily available to interested buyers. The complex will be packed with thousands of works of art, from old masters to contemporary rising stars. But unlike at a museum, few will ever see the works that live inside it.

Largely hidden from public view, an ecosystem of service providers has blossomed too, as Wall Street-style investors and other new buyers have entered the market. These service companies, profiting on the heavy volume of deals while helping more deals take place, include not only art handlers and advisers but also tech start-ups like ArtRank, which uses an algorithm to place emerging artists into buckets including “buy now,” “sell now” and “liquidate.”

Collectors have not always been so willing to consign their new acquisitions to storage. Near the end of his life, Henry Clay Frick, the 19th-century industrialist, built a mansion on Fifth Avenue in Manhattan to house his art collection. In 1945, the oil baron J. Paul Getty bought a seaside home near Malibu that he filled with art, later opening the house periodically to the public. To be sure, these men weren’t inviting the masses into their homes while they were alive — but they did hang their art, which was the fruit of their wealth, not its source.

One prominent artist, who insisted on anonymity, says that the growth of art-storage companies demonstrates “something about the way art is functioning, which is less about the artwork saying something or doing something and more about the artwork representing a value.”

Q21. The last line of the penultimate para (‘To be sure…not its source’) summarises the paradigm shift in perception towards art by stating:

a) **Earlier, people earned money from art; now they earn money to buy art.**

b) **Art was a reward for earning wealth; now art can be a source of wealth.**

c) **Earlier, art had an aesthetic appeal; now it does not.**

d) **Art was rewarding earlier, but not anymore.**

Consider the sentence: To be sure, these men weren't inviting the masses into their homes while they were alive — but they did hang their art, which was ***the fruit of their wealth, not its source***. The author intends to say that art was the fruit earlier – something one earned and enjoyed; now art is the source, something that can help them make money.
Option A: This is the reverse of the stated inference. Earlier, people bought art when they had money. Hence, Option A is not the answer.
Option B: Earlier, art was a reward, and now it is a source. This is what the author was alluding to by using the words 'fruit' and 'source'. Hence, Option B is the answer.
Option C: The aesthetic appeal of art hasn't been brought into consideration and neither has been the connect between the value of art with its visual appeal . Hence, Option C is not the answer.
Option D: Whether art was rewarding (we are not sure in terms of money, or metaphorically either) or not isn't being discussed. We are discussing how art was perceived earlier and how art is being perceived now. Option D is not the answer.

Choice (B)

Q22. Storage can become an artwork's permanent fate, according to the author, because:

a) **Art is not pursued for the value it represents but for what it says.**

b) **Art collectors view artwork as financial investments.**

c) **Investing in the art market is extremely lucrative.**

d) **There has been an increase in the intrinsic value of art.**

Consider the sentences: 'Especially with bonds and other assets offering rock-bottom yields, ***the art market — where reports of record-high sales now emerge regularly — has an obvious appeal.*** According to a survey last year by Deloitte and ArtTactic, an art-research firm, 76 percent of art buyers viewed their acquisitions as investments, compared with 53 percent in 2012. And with more collectors viewing ***art as a financial investment, storage can become an artwork's permanent fate***.'

Option A: We are discussing the importance of storage and not about ***what art says or represents***, which is not as important anymore. Now, the intrinsic value is important, not the intrinsic message. Art is being discussed as an investment, which is why, the author talks about the growing importance of storage. Hence, Option A is not the answer.

Option B: The author implies storage is important because art is now an investment, something which should be stored carefully. When art collectors view artwork as investment, then the art is more likely to be safeguarded in storage than displayed openly. Hence, Option B is the answer.

Option C: While the statement may be true that the artwork is lucrative, that is not the reason why the author thinks art's permanent fate will be storage. Hence, Option C can be eliminated.

Option D: There has been a change in the perception towards art. Whether the value of art has changed or not, we cannot be sure about. Hence, Option D is not the answer.

Choice (B)

Q23. All the following support the sentiment of 'artwork representing a value' (as mentioned in the last line of the passage) EXCEPT:

a) **J. Paul Getty bought a seaside home near Malibu that he filled with art.**

b) **ArtRank places emerging artists into buckets including "buy now," "sell now" and "liquidate."**

c) **Uovo has built a modern facility with bespoke technology for cataloguing artworks.**

d) **76 percent of art buyers viewed their acquisitions as investments, compared with 53 percent in 2012.**

Consider the sentence: the growth of art-storage companies demonstrates "something about the way art is functioning, which is ***less about the artwork saying something*** or doing something and ***more about the artwork representing a value***."
Option A: Paul Getty didn't do so because he felt he was investing. Rather, it was as a fruit of his wealth. He didn't intend to place a value on the art, from the passage. The house was even open periodically to the public. Hence, Option A is the answer.
Option B: This shows that Art is now traded, because it is considered an investment, with a good time to buy and sell. Hence, Option B is not the answer.
Option C: Uovo has made a business out of the need for art-collectors to store their art somewhere, because artworks are now investments. Hence, this is definitely a signal for art representing a value rather than art saying something. Hence, Option C is not the answer.
Option D: The numbers here clearly show art is more about representing a value now as an investment rather than what it says or does. Hence, Option D is not the answer.
Choice (A)

Q24. The author's central argument in the passage can be confirmed by which of the following hypothetical statements:

a) **It is impossible to put a price tag on every artwork existing currently.**

b) **The valuation of art is an extremely subjective affair.**

c) **Fewer and fewer art works are put up for public display and are, instead, stored in vaults.**

d) **Those who invest in art are reluctant to let others enjoy it.**

The author's central argument in the passage can be clearly understood from the first and last paras of the passage where it is said – art now represents a value, an investment rather than being considered for saying something.
Option A: If this were true, then artworks wouldn't be traded and stored like investments, which the author portrays is happening. Hence, Option A is not the answer.
Option B: Once again, the option presents art as subjective affair, which means it cannot be priced. That would contradict the central argument of the passage. Hence, Option B is not the answer.
Option C: Fewer and fewer art being put up on public display for what it says or does, and instead stored somewhere, is representative of the author's central point about art, about the paradigm shift in the perception towards art, from one of expression to one of value. Hence, Option C is the answer.
Option D: This goes on a tangent from the main argument. If those who invest in art are reluctant to let others enjoy it, we cannot understand if that is because for them art represents a meaning, or art represents a value. Hence, Option D doesn't confirm the author's central argument. Option D is not the answer. Choice (C)

QUESTION 25

Q25. DIRECTIONS *for question 25*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. For an awful moment I have no idea where I am, then it comes to me in a sick, fearful wave.
2. I am not sure if I dreamed it.
3. I work my way up against pillows and can tell through drawn curtains that the sun is aloof again, offering nothing but grey.
4. I wake up the following morning to voices in the house and have the unsettling sensation that the telephone rang all night.

Sentence 1: Statement 1 has the clue "no idea where I am".
Sentence 2: Statement 2 has the clue "not sure I dreamed" and the pronoun "it".
Sentence 3: Statement 3 has the author's action and time.
Sentence 4: Statement 1 has the clue "I wake up" and "unsettling sensation".
Sentence 4 is a general sentence that can begin the para. It mentions the first event. Sentence 4 is followed by sentence 2. Sentences 4 and 2 form a mandatory pair. "unsettling sensation that the telephone rang all night" in sentence 4 links with "not sure if I dreamed it" in sentence 2. Sentence 2 is followed by sentence 1. "I am not sure" in sentence 2 links with "For an awful moment I have no idea" in sentence 1. Sentence 1 is followed by sentence 3. Sentence 3 cannot be followed by sentence 1, which talks about 'an awful moment'. "I work my way up against pillows" in sentence 3 follows "then it comes to me in a sick, fearful wave" in sentence 1. "can tell through drawn curtains that the sun is aloof again, offering nothing but grey" in sentence 3 is parallel to " then it comes to me in a sick, fearful wave" in sentence 1. So, 4213. Ans: (4213)

QUESTION 26

Q26. DIRECTIONS *for question 26*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. People may not at first appreciate the honest confrontational experiences such a stance might generate.
2. When you defend those who are absent, you retain the trust of those present.
3. Confrontation takes considerable courage, and many people would prefer to take the course of least resistance – belittling, criticizing, betraying confidences and gossiping.
4. Integrity in an interdependent reality is simply this: you treat everyone by the same set of principles.
5. But in the long run, people will trust and respect you if you are honest, open and kind with them.

Sentence 1: Sentence 1 has the demonstrative adjective "such a stance" and the clue "honest confrontational experiences".
Sentence 2: Sentence 2 mentions a tactic for "retaining trust".
Sentence 3: Sentence 3 has the clue "confrontation".
Sentence 4: Sentence 4 tells us what integrity is.
Sentence 5: Sentence 5 has the contrast conjunction "but" and the clue "in the long run".
Sentence 4 is a general sentence that begins the para. It introduces the background of the topic of discussion. Sentence 4 is followed by sentence 1. "Such a stance" in sentence 1 points to "you treat everyone by the same set of principles" in sentence 4. Sentences 1 and 3 form a logical block. "Confrontation" in sentence 3 points to "honest confrontational experiences" in sentence 1. "many people would prefer to take the course of least resistance" in sentence 3 links with "people may not at first appreciate" in sentence 1. So sentence 3 follows sentence 1. Sentence 3 is followed by sentence 5. "people will trust and respect you" in sentence 5 is opposite to "many people would prefer to take the course of least resistance" in sentence 3. Also "But in the long run" in sentence 5 contrasts "people may not at first appreciate" in sentence 1. "honest, open and kind" in sentence 5 points to "honest confrontational experiences" in sentence 1 and "integrity" in sentence 4. So, 4135. Sentence 2 is the odd sentence out. It talks about "defending those who are absent" which is different from "honest confrontation". Sentence 2 needs a precedent and more substantiation and it can be a part of another paragraph. Ans: (2)

QUESTION 27

Q27. DIRECTIONS *for question 27*: The paragraph given below is followed by four summaries. Choose the option that best captures the author's position.

In agriculture, as in other sectors, policies should promote the efficient use of resources and ensure that prices reflect their scarcity and the cost of environmental impacts. An area requiring urgent action is removal or reform of incentives harmful to biodiversity (for e.g. tax reduction or exemption on fuels for fishing vessels or subsidies for products driving forest cover loss). So far, few countries have taken steps towards identifying incentives to be tackled.

a) **Only a few countries are trying to preserve biodiversity through immediate identification of incentives for the efficient use of resources.**

b) **Tax reduction or exemption, on fuels for fishing vessels, and subsidies for products driving forest cover loss, should be avoided to preserve biodiversity.**

c) **Governments must immediately curtail incentives which prove to be a threat to scarce resources.**

d) **Governments aren't taking steps to reform agriculture incentives harmful to biodiversity.**

The para has three aspects. The first idea is about promoting efficient use of scanty resources and making sure prices reflect that. The second idea is a plea to fix any incentives which may deplete scanty resources (with examples). The third idea is about how no countries (mark the difference between 'few' and 'a few') have taken any steps.
Option A: This is a positive summary indicating countries are taking steps to preserve biodiversity by identifying how to incentivise it. ***The para talks about negative incentives and not the positive ones***. Hence, this option can be eliminated.
Option B: This option ignores the ideas and ***zeroes in purely on the examples*** provided in the para. While couple of steps were suggested the main idea about incentives was important in the para and is missing in this particular option. Hence, this choice can be eliminated.
Option C: While this option is closer in mentioning what governments ***could do***, it ignores the idea of biodiversity and the kind of incentives which are creating the crisis. It also ignores the negativity about inaction. Hence, Option C is not the answer.
Option D: This option includes the idea about negative incentives, while talking about governments' inaction and biodiversity, closely representing the main idea of the para. Hence, Option D is the answer. Choice (D)

QUESTIONS 28

Q28. DIRECTIONS *for question 28*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. Moreover, Germany has not escaped the trends that other Western economies have experienced during the past several decades – in particular a dramatic rise in inequality.
2. In reality, it is as imbalanced as most other advanced economies and it has significant weaknesses.
3. To the extent that the German economy has been successful, it is partly because it has benefited from an undervalued currency since the creation of the euro.
4. During the past decade, the German economy has been widely seen as a model.

Sentence 1 starts with a positive connector, moreover. It is followed by negative information about Germany, as indicated by the words 'rise in inequality'. Hence, this statement will follow a negative sentence.
Sentence 2 starts with 'in reality' which expresses contrast. It is followed by negative information. 'It' probably refers to Germany. Hence, this sentence should come after something positive about Germany.
Sentence 3 talks about Germany's success, but credits that to the undervalued currency, a disclaimer of sorts. So, it is not outright positive.
Sentence 4 talks positive about Germany.
So, it can be understood that 42 is a couple, 4 giving positive info, and 2 negative, connected by a negative connector. 21 is a couple with moreover in 1 acting like a positive connective. 421 therefore, is a block.
Since 3 is not entirely positive and has a disclaimer it cannot come in between 4 and 2. It cannot come ahead of 4 which is outright positive. So, the only position available is at the end. Ans: (4213)

QUESTIONS 29

Q29. DIRECTIONS *for question 29*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. Sovereign democracies must constantly change their minds in foreign relations, economics, and national security to make these policies align with the domestic necessities of the moment rather than more unmoving national interests.
2. The main flaw of the sovereign democracy model is the rampant inbuilt corruption and erosion of institutions, which ultimately leads to stagnation and decay.
3. This is the main reason it is hard for Turkey to remain a strategic partner of the United States.
4. As long as the United States has no strategic interest in the survival of the regime in Turkey, it remains impossible for these two countries to share a common language of cooperation.
5. Turkey's parameters are constantly changing, and there is no long-term predictability.

Sentence 1 centrally depicts how sovereign democracies must be concerned firstly about immediate domestic necessities rather than long-term national interests.
Sentence 2 depicts a flaw in the sovereign democracy model – negative.
Sentence 3 depicts why Turkey and USA cannot be long-term partners – in sync with the first sentence.
Sentence 4 continues the line of thought in Sentence 3, more like an elaboration as to why Turkey and USA cannot be long-term friends.
Sentence 5 (Turkey's changing parameters) further connects Sentence 1 (ever-changing policies of sovereign democracies) with Sentence 3 (why Turkey cannot be a long-term partner for the USA).
So, it is easy to see how 1, 3, 4 and 5 are all talking about one idea – ever-changing policies of sovereign democracies with Turkey and USA as examples. Sentence 2 is talking about a flaw in the model but there is no other connecting elaboration.

Ans: (2)

QUESTION 30

Q30. DIRECTIONS *for question 30:* The paragraph given below is followed by four summaries. Choose the option that best captures the author's position.

Circadian rhythms influence important bodily functions. The suprachiasmatic nucleus (SCN) of the brain hypothalamus is the master clock that controls the internal clocks of different cell types. Microscopic imaging of astrocytes – star-shaped cells that surround and support neurons of the SCN – and neurons of the SCN have shown that although both types of cells have their own circadian clocks, they are differently regulated and are seen to be active at different times of the day. This delicate interplay is critical in keeping the entire SCN clockwork ticking. Scientists also found that mice genetically altered to silence their internal body clock showed disruption to their SCN function and behaviour. They now observe that restoration of a genetically functional clock in astrocytes alone enabled the mice to regulate their daily activity. Astrocytes could restart the circadian function of neurons. This meant that even when astrocytes were the only cell in an animal with a working internal clock, they were capable of controlling animal behaviour to their own cell-specific tune.

a) **Astrocytes were thought to be mere support cells to neurons but they can actually control human behaviour.**

b) **Microscopic imaging to observe the internal molecular clock timing of the SCN astrocytes and neurons show that working astrocytes convey time cues to their clockless neuronal partners.**

c) **The discovery that the star-shaped astrocytes can be as effective as neurons in generating and transmitting a circadian timing signal across an animal has surprised scientists.**

d) **Astrocytes, which support neurons of the SCN in regulating circadian rhythms, can lead the tempo of the body's internal clock and can solely control patterns of daily behaviour in mice.**

Option A: Choice A goes wrong in saying "astrocytes were thought to be mere support cells to neurons". Also, the experiment was conducted on mice. So "can actually control human behaviour" would be farfetched. Choice A is also incomplete as a summary.
Option B: "time cues are conveyed from the working astrocytes to their clockless neuronal partners" in choice B is slightly out of scope. The implication of the finding is also not mentioned in this choice.
Option C: "astrocytes can be as effective as neurons" is incorrect. Astrocytes play a much more important role in circadian rhythms. Also "surprised scientists" as given in choice C need not be mentioned in the summary.
Option D: Choice D is the apt summary of the para. Choice D (Astrocytes ... support neurons in regulating circadian rhythms) is the only choice which points to the critical and delicate interplay between the astrocytes and neuron in keeping the entire SCN clockwork ticking. It is also the only choice to correctly point to the inference mentioned in the last sentence of the para. Choice (D)

QUESTION 31

Q31. DIRECTIONS *for question 31*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. But its raw material, too, comes from a mine in Congo, majority-owned by a Chinese firm, China Molybdenum.
2. It is widely known that more than half of the world's cobalt reserves and production are in one dangerously unstable country, the Democratic Republic of Congo.
3. Much of the other one-fifths is processed in Finland.
4. What is less well known is that four-fifths of the cobalt sulphates and oxides used to make the all-important cathodes for lithium-ion batteries are refined in China.

Sentence 1: Sentence 1 has the contrast conjunction 'but' and the clue 'too'.
Sentence 2: Sentence 2 has the introductory words "It is widely known that". It introduces the topic of discussion: more than half of the world's cobalt reserves and production are in the Democratic Republic of Congo.
Sentence 3: Sentence 3 has the clue 'the other'.
Sentence 4: Sentence 4 again mentions some quantity of cobalt compounds and the location they are refined in.
Sentence 2 is a general sentence that begins the para. Sentences 2 and 4 form a mandatory pair. "It is widely known that" in sentence 2 links with "what is less well known" in sentence 4. "more than half of the world's cobalt reserves and production" in sentence 2 links with "four-fifths of the cobalt sulphates and oxides" in sentence 4. Sentence 4 is followed by sentence 3. "four-fifths of the cobalt sulphates and oxides" in sentence 4 is complemented by "Much of the other one-fifths" in sentence 3. Sentences 3 and 1 form another mandatory pair. "Much of the other one-fifths is processed in Finland" in sentence 3 is contrasted by "But its raw material comes from a mine in Congo" in sentence 1. "majority-owned by a Chinese firm, China Molybdenum" links with "refined in China" in sentence 4. So, 2431. Ans: (2431)

QUESTION 32

Q32. DIRECTIONS *for question 32*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. And finally, Tokyo Chutei Iki from Japan created a buzz beyond Asia with its restless ten-person baritone saxophone-only group.
2. Then we have ADHD, a band from Iceland, which has found fans in faraway places by weaving rock influences into its compositions featuring saxophone, organ and guitar.
3. While New York and New Orleans remain established centres for jazz, new voices can emerge from just about anywhere.
4. Today's nonconformists and mavericks also incorporate elements of hip-hop, rock or classical music into their jazz works.
5. Maurin Auxemery, a programmer for the Montreal festival, says that London has emerged as a hotbed for edgy jazz artists such as The Comet is Coming.

Sentence 1: Sentence 1 has the clue "and finally". It mentions a group from Japan.
Sentence 2: Sentence 2 has the clue "then we have" and mentions a band from Iceland which has found fans in faraway places.
Sentence 3: Sentence 3 sounds like a general opening sentence. It has the background: new voices (related to jazz) can emerge from just about anywhere.
Sentence 4: Sentence 4 mentions nonconformists and mavericks. It has the clue 'also'.
Sentence 5: Sentence 5 mentions that London has emerged as a hotbed for edgy jazz artists.
So, sentence 3 is the opening sentence of the paragraph. "new voices can emerge from just about anywhere" in sentence 3 is exemplified in sentences 5, 2 and 1, in that order. Sentence 3 is followed by sentence 5. "London has emerged as a hotbed for edgy jazz artists such as The Comet is Coming" is the first sentence to contradict "New York and New Orleans remain established centres for jazz" and to support "new voices can emerge from just about anywhere" in sentence 3. Sentence 5 is followed by sentence 2 (Then we have ADHD ....) which provides the second example of how "new voices can emerge from just about anywhere" mentioned in sentence 3. Sentence 1 follows sentence 2. Sentence 1 (And finally ....) provides the final example of how new voices can emerge from just about anywhere (sentence 3). So, 3521.
Sentence 4 is a general sentence that can begin another paragraph. It refers to what nonconformists and mavericks are incorporating in their music but does not specifically relate to how new voices (in jazz) can emerge from just about anywhere. Sentence 4 is the odd sentence out and is the answer. Ans: (4)

QUESTION 33

Q33. DIRECTIONS *for question 33*: The paragraph given below is followed by four summaries. Choose the option that best captures the author's position.

Many affecting photographs have been made during the huge waves of international migration of the past few years. These pictures issue, as usual, from the presumed rights of photographers to depict the suffering of people "out there" for the viewing of those "back home." But in looking at these images — images of war, of starvation, of capsized boats and exhausted caravans — we must go beyond the usual frames of pity and abjection. Every picture of suffering should elicit a question stronger than "Why is this happening?" The question should be "Why have I allowed this to happen?"

a) **Photographs of war, starvation and wrecked caravans spread the message of suffering migrants to the rest of the world.**

b) **Individuals looking at photographs of the miseries of migrants should feel responsible for their plight.**

c) **Instead of pity, a good photograph brings out guilt as to why the individual has allowed the suffering to happen.**

d) **Photographers have the responsibility to depict the suffering of people, but those looking at the images also have a responsibility beyond hypocritical indignation.**

The paragraph has two ideas. The first half talks about how the 'presumed' photographers' rights allow them to depict suffering of people and bring those images to those away from the places of suffering. This is the minor idea. The bigger one is what follows. These pictures shouldn't evoke sympathy or pity. Rather, they should evoke a sense of responsibility as to why we have allowed such suffering to even happen.
Option A: This option covers the first idea, but leaves out the more important central idea about the responsibility of the person gazing at the affecting photographs. Hence, Option A is not the answer.
Option B: This covers the second and central idea of the para about the kind of emotion the photographs of the suffering caused by international migration should evoke. That shouldn't be one of pity. Rather it should be about the individual questioning why he or she has allowed such a thing to happen. Hence, Option B is a good choice for the author's main idea.
Option C: This option focusses on the idea of a good photograph, rather than focusing on the subject of the photography – migration – which is the central idea in this case. Hence, Option C is not the answer.
Option D: While, this option is close, the para doesn't talk about the responsibilities of the photographers. Secondly, the feeling evoked shouldn't be one of pity. The para doesn't really talk about the hypocrisy of the one gazing at the photograph. Hence, Option D doesn't accurately depict the author's viewpoint. Choice (B)

QUESTION 34

Q34. DIRECTIONS *for question 34:* The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. Melting permafrost in Greenland and the Arctic tundra is releasing vast amounts of methane, a potent climate-altering gas.
2. But some see an Arctic with navigable seas in the summer and newly accessible fossil fuels as an irresistible opportunity.
3. A less icy Arctic is coming, and generally speaking, that's not a good thing.
4. Climate change is warming this region twice as fast as the global average, threatening wildlife and indigenous communities.

Sentence 1 talks about the consequences of melting permafrost. It is an independent sentence.
Sentence 2 starts with a negative connector 'but' and goes on to talk about an opportunity, a positive note. So, it should be preceded by something negative.
Sentence 3 is outright negative. It is the cause.
Sentence 4 talks about negative consequences of climate change. However, it is not an independent sentence. It includes a demonstrative pronoun 'this'.
4 and 1 both talk about climate alterations. However, 4 is a more generic sentence and 1 gives specifics, like why the temperature change could happen. So, 41 must follow 3, as 'this' is the Arctic region. 2 has a 'but' in the beginning followed by a positive angle, so it should follow the 341 block. Ans: (3412)

DILR

QUESTION(1 TO 4)

Four persons, Amit, Kiran, Pranav and Gaurav, went to a market to buy some vegetables. Exactly one of them purchased potatoes, exactly two of them purchased cauliflowers, exactly three of them purchased tomatoes and all of them purchased onions.

The following is known about the number of vegetables that they purchased:

i. The total number of potatoes that they purchased was the same as the number of tomatoes that Gaurav purchased.
ii. The total number of cauliflowers that they purchased was the same as the total number of vegetables that Pranav purchased.
iii. The number of onions that Gaurav purchased was the same as the number of tomatoes that Amit purchased.
iv. The total number of tomatoes that they purchased was 15 more than the total number of cauliflowers that they purchased, which, in turn, was 25 more than the total number of onions that they purchased.
v. Amit, Kiran and Gaurav purchased four cauliflowers, five tomatoes and six onions respectively (along with other vegetables that they may have purchased).

Q1. DIRECTIONS *for question 1:* Type in your answer in the input box provided below the question.d
What is the minimum number of tomatoes that the four of them could have purchased?

Let the total number of potatoes that they purchased be a. From (i), the number of tomatoes that Gaurav purchased is also a.
From (v), Amit purchased four cauliflowers; Kiran purchased five tomatoes; Gaurav purchased six onions.
From (iii), Amit must have purchased six tomatoes.
Since only 3 persons purchased tomatoes, the total number of tomatoes that they purchased must be $a + 5 + 6 = a + 11$.
From (iv), the number of cauliflowers they purchased must be $a - 4$ and the number of onions they purchased must be $a - 29$.
From (ii), total number of vegetables that Pranav purchased must be $a - 4$.
Also, Pranav did not purchase any tomatoes (since three persons, Amit, Kiran and Gaurav, purchased tomatoes)
Pranav could not have purchased any potatoes either. This is because if he had purchased potatoes, it must have been a potatoes (since only one person purchased potatoes). But the total number of vegetables that Pranav purchased is only $a - 4$.
Hence, Pranav could have purchased either cauliflowers and onions or only onions. If Pranav purchased only Onions, he must have purchased $a - 4$ onions. But the total number of onions that the four of them purchased is only $a - 29$, which is less than $a - 4$. Hence, Pranav must have purchased both cauliflowers and onions.
Since the total number of cauliflowers purchased is $a - 4$ and Amit purchased four cauliflowers, Pranav must have purchased $a - 8$ cauliflowers. This implies that he must have purchased 4 onions.
The table below provides the number of vegetables that each person purchased. An 'X' indicates that the person did not purchase that type of vegetable.

	Potatoes	Cauliflower	Tomatoes	Onions	TOTAL
Amit		4	6		
Kiran		X	5		
Pranav	X	$a - 8$	X	4	$a - 4$
Gaurav		X	a	6	
TOTAL	a	$a - 4$	$a + 11$	$a - 29$	

The minimum number of onions that they could have purchased is $6 + 4 + 1 + 1 = 12$.
Hence, $a - 29 \geq 12 \Rightarrow a \geq 41$
The minimum number of tomatoes that they could have purchased = $a + 11 = 52$.
Ans: (52)

Q2. DIRECTIONS *for questions 2 and 3:* Select the correct alternative from the given choices.
What best can be said about the number of onions that Pranav purchased?

a) **It is definitely greater than 6.**

b) **It is definitely lesser than 4.**

c) **It lies between 3 and 6.**

d) **It lies between 5 and 10.**

Let the total number of potatoes that they purchased be a. From (i), the number of tomatoes that Gaurav purchased is also *a*.
From (v), Amit purchased four cauliflowers; Kiran purchased five tomatoes; Gaurav purchased six onions.
From (iii), Amit must have purchased six tomatoes.
Since only 3 persons purchased tomatoes, the total number of tomatoes that they purchased must be $a + 5 + 6 = a + 11$.
From (iv), the number of cauliflowers they purchased must be $a - 4$ and the number of onions they purchased must be $a - 29$.
From (ii), total number of vegetables that Pranav purchased must be $a - 4$.
Also, Pranav did not purchase any tomatoes (since three persons, Amit, Kiran and Gaurav, purchased tomatoes)
Pranav could not have purchased any potatoes either. This is because if he had purchased potatoes, it must have been *a* potatoes (since only one person purchased potatoes). But the total number of vegetables that Pranav purchased is only $a - 4$.
Hence, Pranav could have purchased either cauliflowers and onions or only onions. If Pranav purchased only Onions, he must have purchased $a - 4$ onions. But the total number of onions that the four of them purchased is only $a - 29$, which is less than $a - 4$. Hence, Pranav must have purchased both cauliflowers and onions.
Since the total number of cauliflowers purchased is $a - 4$ and Amit purchased four cauliflowers, Pranav must have purchased $a - 8$ cauliflowers. This implies that he must have purchased 4 onions.
The table below provides the number of vegetables that each person purchased. An 'X' indicates that the person did not purchase that type of vegetable.

	Potatoes	Cauliflower	Tomatoes	Onions	TOTAL
Amit		4	6		
Kiran		X	5		
Pranav	X	$a - 8$	X	4	$a - 4$
Gaurav		X	a	6	
TOTAL	a	$a - 4$	$a + 11$	$a - 29$	

The number of onions that Pranav purchased is 4. This lies between 3 and 6.
Choice (C)

Q3. DIRECTIONS *for questions 2 and 3:* Select the correct alternative from the given choices.

It is known that one of the four persons purchased all the types of vegetables.

Who purchased the highest total number of vegetables?

a) **Amit**

b) **Kiran**

c) **Gaurav**

d) **Cannot be determined**

Let the total number of potatoes that they purchased be a. From (i), the number of tomatoes that Gaurav purchased is also a.
From (v), Amit purchased four cauliflowers; Kiran purchased five tomatoes; Gaurav purchased six onions.
From (iii), Amit must have purchased six tomatoes.
Since only 3 persons purchased tomatoes, the total number of tomatoes that they purchased must be $a + 5 + 6 = a + 11$.
From (iv), the number of cauliflowers they purchased must be $a - 4$ and the number of onions they purchased must be a – 29.
From (ii), total number of vegetables that Pranav purchased must be $a - 4$.
Also, Pranav did not purchase any tomatoes (since three persons, Amit, Kiran and Gaurav, purchased tomatoes)
Pranav could not have purchased any potatoes either. This is because if he had purchased potatoes, it must have been a potatoes (since only one person purchased potatoes). But the total number of vegetables that Pranav purchased is only $a - 4$.
Hence, Pranav could have purchased either cauliflowers and onions or only onions. If Pranav purchased only Onions, he must have purchased $a - 4$ onions. But the total number of onions that the four of them purchased is only $a - 29$, which is less than $a - 4$. Hence, Pranav must have purchased both cauliflowers and onions.
Since the total number of cauliflowers purchased is $a - 4$ and Amit purchased four cauliflowers, Pranav must have purchased $a - 8$ cauliflowers. This implies that he must have purchased 4 onions.
The table below provides the number of vegetables that each person purchased. An 'X' indicates that the person did not purchase that type of vegetable.

	Potatoes	Cauliflower	Tomatoes	Onions	TOTAL
Amit		4	6		
Kiran		X	5		
Pranav	X	$a - 8$	X	4	$a - 4$
Gaurav		X	a	6	
TOTAL	a	$a - 4$	$a + 11$	$a - 29$	

The only person who could have purchased all the four types of vegetables is Amit.
Hence, Amit must have purchased a potatoes. Kiran and Gaurav could not have purchased any potatoes.
Kiran and Amit must have purchased a total of $a - 39$ onions.
If Amit purchased $a - 40$ onions and Kiran purchase 1 onion, then the total number of vegetables purchased by Amit will be $2a - 30$, by Kiran will be 6, by Pranav will be $a - 4$, by Gaurav will be $a + 6$.
If Amit purchased 1 onion and Kiran purchased $a - 40$ onions, then the total number of vegetables purchased by Amit will be $a + 11$, by Kiran will be $a - 35$, by Pranav will be $a - 4$, by Gaurav will be $a + 6$.
Since a must be greater than 41, in both the cases, Amit would have purchased the highest number of vegetables. Choice (A)

Q4. DIRECTIONS *for question 4:* Type in your answer in the input box provided below the question.

It is known that one of the four persons purchased all the types of vegetables.

What is the minimum possible number of vegetables that Amit could have purchased?

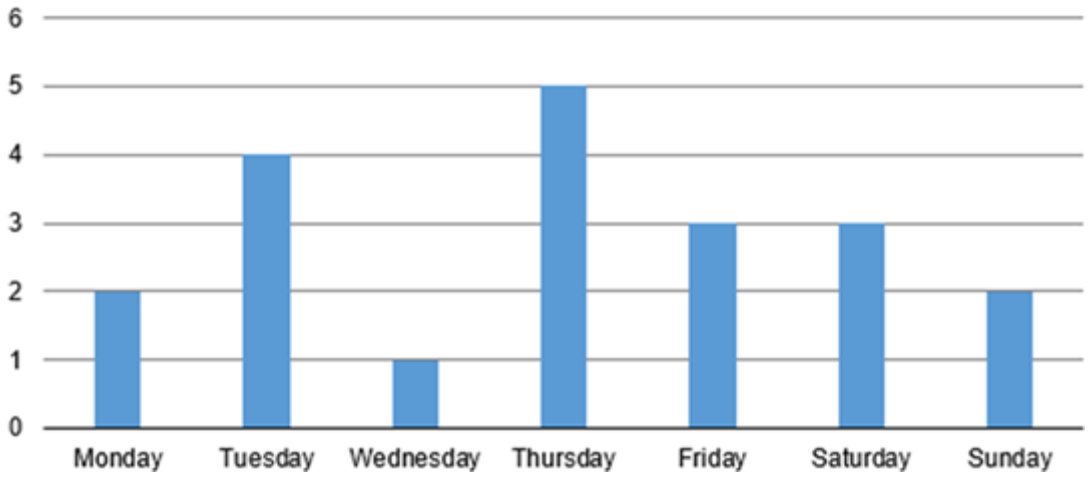
Let the total number of potatoes that they purchased be a. From (i), the number of tomatoes that Gaurav purchased is also a.
From (v), Amit purchased four cauliflowers; Kiran purchased five tomatoes; Gaurav purchased six onions.
From (iii), Amit must have purchased six tomatoes.
Since only 3 persons purchased tomatoes, the total number of tomatoes that they purchased must be $a + 5 + 6 = a + 11$.
From (iv), the number of cauliflowers they purchased must be $a - 4$ and the number of onions they purchased must be $a - 29$.
From (ii), total number of vegetables that Pranav purchased must be $a - 4$.
Also, Pranav did not purchase any tomatoes (since three persons, Amit, Kiran and Gaurav, purchased tomatoes)
Pranav could not have purchased any potatoes either. This is because if he had purchased potatoes, it must have been a potatoes (since only one person purchased potatoes). But the total number of vegetables that Pranav purchased is only $a - 4$.
Hence, Pranav could have purchased either cauliflowers and onions or only onions. If Pranav purchased only Onions, he must have purchased $a - 4$ onions. But the total number of onions that the four of them purchased is only $a - 29$, which is less than $a - 4$. Hence, Pranav must have purchased both cauliflowers and onions.
Since the total number of cauliflowers purchased is $a - 4$ and Amit purchased four cauliflowers, Pranav must have purchased $a - 8$ cauliflowers. This implies that he must have purchased 4 onions.
The table below provides the number of vegetables that each person purchased. An 'X' indicates that the person did not purchase that type of vegetable.

	Potatoes	Cauliflower	Tomatoes	Onions	TOTAL
Amit		4	6		
Kiran		X	5		
Pranav	X	$a - 8$	X	4	$a - 4$
Gaurav		X	a	6	
TOTAL	a	$a - 4$	$a + 11$	$a - 29$	

If Amit purchased a total of $2a - 30$ vegetables, then the minimum number of vegetables $= 2 \times 41 - 30 = 52$
If Amit purchased a total of $a + 11$ vegetables, then the minimum number of vegetables $= 41 + 11 = 52$
Hence, the minimum number of vegetables that Amit purchased = 52. Ans: (52)

QUESTIONS(5 TO 8)

ix persons, Amit, Kishore, Lalit, Hari, Gaurav and Ranjit, went to the gym on different days of a particular week, from Monday to Sunday. On any day, no person went to the gym more than once. The following graph provides the number of persons that went to the gym on each day of the week:



It is also known that

i. no person went to the gym for more than four days.
ii. each of Gaurav and Hari went to the gym only twice.
iii. Ranjit went to the gym on neither Saturday nor Friday.
iv. Kishore did not go to the gym on any two consecutive days.

Q5. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

On which of the following days did Lalit not go to the gym?

a) **Tuesday**

b) **Sunday**

c) **Friday**

d) **Saturday**

The total number of instances that the six persons went to the gym during the given period = 20
From (ii), Gaurav and Hari went to the gym on two days. Hence, the other four persons must have visited the gym 16 times. From (i), no person went to the gym for more than four days. Hence, each of the other four persons must have visited the gym on exactly 4 days.
From (iv), Kishore did not go on any two consecutive days.
For Kishore to have visited the gym on four days, he must have visited on Monday, Wednesday, Friday and Sunday.
Since 5 persons visited on Thursday, and Kishore did not visit on this day, all the other five persons must have visited the gym on Thursday.
From (iii), Ranjit did not go to the gym on Friday and Saturday. He could not have gone to the gym on Wednesday (since only one person went on Wednesday and it was Kishore). Hence, he must have gone to the gym on Monday Tuesday and Sunday.
Amit and Lalit must have gone to the gym on 3 more days (apart from Thursday). The only days on which they could have gone are Tuesday, Friday and Saturday.
One of Gaurav and Hari went to the gym on Tuesday and the other on Saturday.
The following table provides details about the persons who visited the gym on each day of the week:

Day	Persons
Monday	Kishore, Ranjit
Tuesday	Ranjit, Amit, Lalit, Gaurav/Hari
Wednesday	Kishore
Thursday	Amit, Lalit, Ranjit, Gaurav, Hari
Friday	Kishore, Amit, Lalit
Saturday	Amit, Lalit, Hari/Gaurav
Sunday	Kishore, Ranjit

Lalit did not go to the gym on Sunday. Choice (B)

Q6. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

What is the maximum number of consecutive days that any person went to the gym?

a) **2**

b) **3**

c) **4**

d) **No person went on any two consecutive days.**

The total number of instances that the six persons went to the gym during the given period = 20
From (ii), Gaurav and Hari went to the gym on two days. Hence, the other four persons must have visited the gym 16 times. From (i), no person went to the gym for more than four days. Hence, each of the other four persons must have visited the gym on exactly 4 days.
From (iv), Kishore did not go on any two consecutive days.
For Kishore to have visited the gym on four days, he must have visited on Monday, Wednesday, Friday and Sunday.
Since 5 persons visited on Thursday, and Kishore did not visit on this day, all the other five persons must have visited the gym on Thursday.
From (iii), Ranjit did not go to the gym on Friday and Saturday. He could not have gone to the gym on Wednesday (since only one person went on Wednesday and it was Kishore). Hence, he must have gone to the gym on Monday Tuesday and Sunday.
Amit and Lalit must have gone to the gym on 3 more days (apart from Thursday). The only days on which they could have gone are Tuesday, Friday and Saturday.
One of Gaurav and Hari went to the gym on Tuesday and the other on Saturday.
The following table provides details about the persons who visited the gym on each day of the week:

Day	Persons
Monday	Kishore, Ranjit
Tuesday	Ranjit, Amit, Lalit, Gaurav/Hari
Wednesday	Kishore
Thursday	Amit, Lalit, Ranjit, Gaurav, Hari
Friday	Kishore, Amit, Lalit
Saturday	Amit, Lalit, Hari/Gaurav
Sunday	Kishore, Ranjit

Both Amit and Lalit went to the gym on three consecutive days. Choice (B)

Q7. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
On how many days did both Kishore and Ranjit go to the gym?

a) **0**

b) **1**

c) **2**

d) **3**

The total number of instances that the six persons went to the gym during the given period = 20
From (ii), Gaurav and Hari went to the gym on two days. Hence, the other four persons must have visited the gym 16 times. From (i), no person went to the gym for more than four days. Hence, each of the other four persons must have visited the gym on exactly 4 days.
From (iv), Kishore did not go on any two consecutive days.
For Kishore to have visited the gym on four days, he must have visited on Monday, Wednesday, Friday and Sunday.
Since 5 persons visited on Thursday, and Kishore did not visit on this day, all the other five persons must have visited the gym on Thursday.
From (iii), Ranjit did not go to the gym on Friday and Saturday. He could not have gone to the gym on Wednesday (since only one person went on Wednesday and it was Kishore). Hence, he must have gone to the gym on Monday Tuesday and Sunday.
Amit and Lalit must have gone to the gym on 3 more days (apart from Thursday). The only days on which they could have gone are Tuesday, Friday and Saturday.
One of Gaurav and Hari went to the gym on Tuesday and the other on Saturday.
The following table provides details about the persons who visited the gym on each day of the week:

Day	Persons
Monday	Kishore, Ranjit
Tuesday	Ranjit, Amit, Lalit, Gaurav/Hari
Wednesday	Kishore
Thursday	Amit, Lalit, Ranjit, Gaurav, Hari
Friday	Kishore, Amit, Lalit
Saturday	Amit, Lalit, Hari/Gaurav
Sunday	Kishore, Ranjit

Both Kishore and Ranjit went to the gym on two days. Choice (C)

Q8. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
Which of the following statements is sufficient to determine all the persons who went to the gym on Tuesday?

a) **Hari and Ranjit went to the gym together on at most one day.**

b) **Lalit and Hari went to the gym together on exactly two days.**

c) **Kishore and Gaurav did not go the gym together on any day.**

d) **Gaurav and Ranjith went to the gym together on at least one day.**

The total number of instances that the six persons went to the gym during the given period = 20
From (ii), Gaurav and Hari went to the gym on two days. Hence, the other four persons must have visited the gym 16 times. From (i), no person went to the gym for more than four days. Hence, each of the other four persons must have visited the gym on exactly 4 days.
From (iv), Kishore did not go on any two consecutive days.
For Kishore to have visited the gym on four days, he must have visited on Monday, Wednesday, Friday and Sunday.
Since 5 persons visited on Thursday, and Kishore did not visit on this day, all the other five persons must have visited the gym on Thursday.
From (iii), Ranjit did not go to the gym on Friday and Saturday. He could not have gone to the gym on Wednesday (since only one person went on Wednesday and it was Kishore). Hence, he must have gone to the gym on Monday Tuesday and Sunday.
Amit and Lalit must have gone to the gym on 3 more days (apart from Thursday). The only days on which they could have gone are Tuesday, Friday and Saturday.
One of Gaurav and Hari went to the gym on Tuesday and the other on Saturday.
The following table provides details about the persons who visited the gym on each day of the week:

Day	Persons
Monday	Kishore, Ranjit
Tuesday	Ranjit, Amit, Lalit, Gaurav/Hari
Wednesday	Kishore
Thursday	Amit, Lalit, Ranjit, Gaurav, Hari
Friday	Kishore, Amit, Lalit
Saturday	Amit, Lalit, Hari/Gaurav
Sunday	Kishore, Ranjit

From the statement given in option A, we can infer that Gaurav went to the gym on Tuesday. Choice (A)

QUESTION(9 TO 12)

Rahul visited each of five cities, Ahmadabad, Bangalore, Kolkata, Lucknow and Indore, exactly once, during a particular month. In each city, he spent a certain amount of money which is an integral multiple of Rs.1000. The amounts of money that he spent in the first three cities that he visited, taken in that order, are in the ratio 1 : 3 : 4. The amounts of money that he spent in the four cities in which he spent the four highest amounts are in the ratio 20 : 12 : 9 : 4.

Q9. DIRECTIONS *for questions 9 and 10:* Select the correct alternative from the given choices.
If he spent Rs.80,000 in the fourth city that he visited, what is the highest amount that he could have spent in any city?

a) **Rs.1,00,000**

b) **Rs.80,000**

c) **Rs.8,00,000**

d) **Rs.4,00,000**

Let the amount that Rahul spent in the four cities where he spent the four highest amounts be 20x, 12x, 9x and 4x.
In the first three cities that he visited, let the amounts that he spent be y, 3y and 4y.
At least two of these three values must correspond to the four highest amounts (since there are only five cities in total).
If y and 3y are two of the values in 20x, 12x, 9x and 4x, then y must be 4x and 3y must be 12x. In this case, 4y will be 16x. However, this implies that 16x is the second highest amount that he spent in any city, which violates the given ratio. Hence, this is not possible.
y and 4y cannot be the two values in 20x, 12x, 9x and 4x, as no two terms in these four numbers are in the ratio 1:4.
If 3y and 4y are two of the four values in 20x, 12x, 9x and 4x, then 3y must be 9x and 4y must be 12x. In the other city, he must have spent y, which is 3x.
This is the only possible case.
He must have spent 20x, 12x, 9x, 4x and 3x in the five cities.
Since in the first three cities he spent in the ratio 1:3:4, he must have spent 3x, 9x and 12x in the first three cities. In the fourth and fifth cities that he visited, he would have spent 20x and 4x in any order.

If he spent 80000 in the fourth city that he visited, x can be 4000 or 20000. To find the highest amount that was spent we can take x = 20000. The highest amount in any city will be 20 × 20000 = 400000. Choice (D)

Q10. DIRECTIONS *for questions 9 and 10:* Select the correct alternative from the given choices.

If the least amount that he spent in any city is x, which of the following can best be said about the minimum possible value of x?

a) **It lies between Rs.4,000 and Rs.6,000.**

b) **It is exactly Rs.3,000.**

c) **It is less than Rs.2,000.**

d) **It lies between Rs.6,000 and Rs.10,000.**

Let the amount that Rahul spent in the four cities where he spent the four highest amounts be 20x, 12x, 9x and 4x.
In the first three cities that he visited, let the amounts that he spent be y, 3y and 4y.
At least two of these three values must correspond to the four highest amounts (since there are only five cities in total).
If y and 3y are two of the values in 20x, 12x, 9x and 4x, then y must be 4x and 3y must be 12x. In this case, 4y will be 16x. However, this implies that 16x is the second highest amount that he spent in any city, which violates the given ratio. Hence, this is not possible.
y and 4y cannot be the two values in 20x, 12x, 9x and 4x, as no two terms in these four numbers are in the ratio 1:4.
If 3y and 4y are two of the four values in 20x, 12x, 9x and 4x, then 3y must be 9x and 4y must be 12x. In the other city, he must have spent y, which is 3x.
This is the only possible case.
He must have spent 20x, 12x, 9x, 4x and 3x in the five cities.
Since in the first three cities he spent in the ratio 1:3:4, he must have spent 3x, 9x and 12x in the first three cities. In the fourth and fifth cities that he visited, he would have spent 20x and 4x in any order.

The minimum amount that he could have spent in any city is ₹3000 (since in all the cities, he spent multiples of ₹1000). Choice (B)

Q11. DIRECTIONS *for question 11 and 12:* Type in your answer in the input box provided below the question.
Rahul visited Kolkata before he visited Ahmadabad, where he spent Rs.24,000. Further, he spent Rs.10,000 less in Indore than what he spent in Lucknow, and Indore was not the last city that he visited.

How much did Rahul spend (in Rs.) in the last city that he visited?

Let the amount that Rahul spent in the four cities where he spent the four highest amounts be 20x, 12x, 9x and 4x.
In the first three cities that he visited, let the amounts that he spent be y, 3y and 4y.
At least two of these three values must correspond to the four highest amounts (since there are only five cities in total).
If y and 3y are two of the values in 20x, 12x, 9x and 4x, then y must be 4x and 3y must be 12x. In this case, 4y will be 16x. However, this implies that 16x is the second highest amount that he spent in any city, which violates the given ratio. Hence, this is not possible.
y and 4y cannot be the two values in 20x, 12x, 9x and 4x, as no two terms in these four numbers are in the ratio 1:4.
If 3y and 4y are two of the four values in 20x, 12x, 9x and 4x, then 3y must be 9x and 4y must be 12x. In the other city, he must have spent y, which is 3x.
This is the only possible case.
He must have spent 20x, 12x, 9x, 4x and 3x in the five cities.
Since in the first three cities he spent in the ratio 1:3:4, he must have spent 3x, 9x and 12x in the first three cities. In the fourth and fifth cities that he visited, he would have spent 20x and 4x in any order.

Rahul spent ₹40000 in the last city that he visited. Ans: (40000)

Q12. DIRECTIONS *for question 11 and 12:* Type in your answer in the input box provided below the question.
Rahul visited Kolkata before he visited Ahmadabad, where he spent Rs.24,000. Further, he spent Rs.10,000 less in Indore than what he spent in Lucknow, and Indore was not the last city that he visited.

What is the difference (in Rs.) between the amounts that he spent in the third city that he visited and Lucknow?

Let the amount that Rahul spent in the four cities where he spent the four highest amounts be 20x, 12x, 9x and 4x.
In the first three cities that he visited, let the amounts that he spent be y, 3y and 4y.
At least two of these three values must correspond to the four highest amounts (since there are only five cities in total).
If y and 3y are two of the values in 20x, 12x, 9x and 4x, then y must be 4x and 3y must be 12x. In this case, 4y will be 16x. However, this implies that 16x is the second highest amount that he spent in any city, which violates the given ratio. Hence, this is not possible.
y and 4y cannot be the two values in 20x, 12x, 9x and 4x, as no two terms in these four numbers are in the ratio 1:4.
If 3y and 4y are two of the four values in 20x, 12x, 9x and 4x, then 3y must be 9x and 4y must be 12x. In the other city, he must have spent y, which is 3x.
This is the only possible case.
He must have spent 20x, 12x, 9x, 4x and 3x in the five cities.
Since in the first three cities he spent in the ratio 1:3:4, he must have spent 3x, 9x and 12x in the first three cities. In the fourth and fifth cities that he visited, he would have spent 20x and 4x in any order.

The difference between the amounts that he spent in the third city that he visited and Lucknow = 6000 Ans: (6000)

QUESTIONS(13 TO 16)

DIRECTIONS *for questions 13 to 16:* Answer the questions on the basis of the information given below.

The following table provides the GDP (G), GDP per capita (PG), i.e., the GDP divided by the total population, Number of literates (L) and the Literacy rate (LR), i.e., the number of literates as a percentage of the total population, for six different countries – Country A through Country F:

Country	G (in USD bn)	PG (in USD)	L (in mn)	LR
Country A	2.5			11%
Country B		300	4	
Country C	5		5	
Country D	7.5	250		
Country E			3	15%
Country F		500		25%

It is also known that

i. the GDP of each of the six countries is at least USD 1 bn.

ii. the total number of literates in Country A and Country B combined is the same as the total number of illiterates in Country D and Country E combined.
iii. the GDP per capita of Country C is USD 50 more than that of Country A.
iv. the number of literates in Country A is 1 mn more than that in Country D.
v. the Literacy Rate of Country B is not more than 20%.
vi. the GDP of Country B and Country E combined is USD 2 bn more than that of Country C.
vii. the GDP of Country F is twice the GDP of Country E.

Q13. DIRECTIONS *for questions 13 and 14:* Select the correct alternative from the given choices. What is the GDP per capita of the country which has the highest Literacy Rate?

a) **USD 250**

b) **USD 300**

c) **USD 12.5**

d) **USD 50**

Let the number of literates in Country A be a and the number of literates in Country D be d.
The total population of Country E = 3/0.15 = 20 mn.
Number of illiterates in Country E = 17 mn.
Also, Total population of Country D = $\frac{\text{GDP}}{\text{GDP per capita}} = \frac{7.5\text{bn}}{250} = 30$ mn
From (ii), a + 4 = 17 + 30 – d ⇒ a + d = 43
From (iv), a = d + 1.
Hence, 2d + 1 = 43 ⇒ d = 21 and a = 22.
The number of literates in Country A = 22 mn and the total population of Country A = 200 mn.
The GDP per capita of Country A = USD 12.5
From (iii), the GDP per capita of Country C = USD 62.5
Total Population of Country C = 5 bn/62.5 = 80 mn
From (vi), GDP of B + GDP of E = USD 7 bn
From (v), the Literacy rate of B must not be more than 20%.
Since there are 4 mn literates in Country B, the population of Country B must be greater than 20 mn.
Since the GDP per capita of B is USD 300, the GDP of B must be at least USD 6 bn.
However, from (i), the GDP of E must also be at least 1.
Since GDP of B + GDP of E = USD 7 bn, GDP of B must be USD 6 bn and GDP of E must be 1 bn.
From (vii), the GDP of Country F must be USD 2 bn.

The following table provides the details of all the six countries:

Country	G (in USD bn)	PG (in USD)	L (in mn)	LR	Population (in mn)
Country A	2.5	12.5	22	11%	200
Country B	6	300	4	20%	20
Country C	5	62.5	5	6.25%	80
Country D	7.5	250	21	70%	30
Country E	1	50	3	15%	20
Country F	2	500	1	25%	4

Country D has the highest Literacy Rate. Its GDP per capita is USD 250.

Choice (A)

Q14. DIRECTIONS *for questions 13 and 14:* Select the correct alternative from the given choices.
For how many countries is the GDP per capita at least twice that of Country E?

a) **1**

b) **3**

c) **4**

d) **2**

Let the number of literates in Country A be a and the number of literates in Country D be d.
The total population of Country E = 3/0.15 = 20 mn.
Number of illiterates in Country E = 17 mn.
Also, Total population of Country D = $\frac{\text{GDP}}{\text{GDP per capita}} = \frac{7.5\text{bn}}{250} = 30$ mn
From (ii), a + 4 = 17 + 30 – d ⇒ a + d = 43
From (iv), a = d + 1.
Hence, 2d + 1 = 43 ⇒ d = 21 and a = 22.
The number of literates in Country A = 22 mn and the total population of Country A = 200 mn.
The GDP per capita of Country A = USD 12.5
From (iii), the GDP per capita of Country C = USD 62.5
Total Population of Country C = 5 bn/62.5 = 80 mn
From (vi), GDP of B + GDP of E = USD 7 bn
From (v), the Literacy rate of B must not be more than 20%.
Since there are 4 mn literates in Country B, the population of Country B must be greater than 20 mn.
Since the GDP per capita of B is USD 300, the GDP of B must be at least USD 6 bn.
However, from (i), the GDP of E must also be at least 1.
Since GDP of B + GDP of E = USD 7 bn, GDP of B must be USD 6 bn and GDP of E must be 1 bn.
From (vii), the GDP of Country F must be USD 2 bn.

The following table provides the details of all the six countries:

Country	G (in USD bn)	PG (in USD)	L (in mn)	LR	Population (in mn)
Country A	2.5	12.5	22	11%	200
Country B	6	300	4	20%	20
Country C	5	62.5	5	6.25%	80
Country D	7.5	250	21	70%	30
Country E	1	50	3	15%	20
Country F	2	500	1	25%	4

For three countries, Country B, Country D and Country F, the GDP per capita is at least thrice that of Country E. Choice (B)

Q15. DIRECTIONS *for question 15 and 16:* Type in your answer in the input box provided below the question.
`What is the GDP (in USD bn) of Country F?

Let the number of literates in Country A be a and the number of literates in Country D be d.
The total population of Country E = 3/0.15 = 20 mn.
Number of illiterates in Country E = 17 mn.
Also, Total population of Country D = $\frac{\text{GDP}}{\text{GDP per capita}} = \frac{7.5\text{bn}}{250} = 30$ mn
From (ii), a + 4 = 17 + 30 – d ⇒ a + d = 43
From (iv), a = d + 1.
Hence, 2d + 1 = 43 ⇒ d = 21 and a = 22.
The number of literates in Country A = 22 mn and the total population of Country A = 200 mn.
The GDP per capita of Country A = USD 12.5
From (iii), the GDP per capita of Country C = USD 62.5
Total Population of Country C = 5 bn/62.5 = 80 mn
From (vi), GDP of B + GDP of E = USD 7 bn
From (v), the Literacy rate of B must not be more than 20%.
Since there are 4 mn literates in Country B, the population of Country B must be greater than 20 mn.
Since the GDP per capita of B is USD 300, the GDP of B must be at least USD 6 bn.
However, from (i), the GDP of E must also be at least 1.
Since GDP of B + GDP of E = USD 7 bn, GDP of B must be USD 6 bn and GDP of E must be 1 bn.
From (vii), the GDP of Country F must be USD 2 bn.

The following table provides the details of all the six countries:

Country	G (in USD bn)	PG (in USD)	L (in mn)	LR	Population (in mn)
Country A	2.5	12.5	22	11%	200
Country B	6	300	4	20%	20
Country C	5	62.5	5	6.25%	80
Country D	7.5	250	21	70%	30
Country E	1	50	3	15%	20
Country F	2	500	1	25%	4

The GDP of Country F is USD 2 bn. Ans: (2)

Q16. DIRECTIONS *for question 15 and 16:* Type in your answer in the input box provided below the question.
What is the total number of literates (in mn) across the six countries combined?

Let the number of literates in Country A be a and the number of literates in Country D be d.
The total population of Country E = 3/0.15 = 20 mn.
Number of illiterates in Country E = 17 mn.
Also, Total population of Country D = $\frac{\text{GDP}}{\text{GDP per capita}} = \frac{7.5\text{bn}}{250} = 30$ mn
From (ii), a + 4 = 17 + 30 – d ⇒ a + d = 43
From (iv), a = d + 1.
Hence, 2d + 1 = 43 ⇒ d = 21 and a = 22.
The number of literates in Country A = 22 mn and the total population of Country A = 200 mn.
The GDP per capita of Country A = USD 12.5
From (iii), the GDP per capita of Country C = USD 62.5
Total Population of Country C = 5 bn/62.5 = 80 mn
From (vi), GDP of B + GDP of E = USD 7 bn
From (v), the Literacy rate of B must not be more than 20%.
Since there are 4 mn literates in Country B, the population of Country B must be greater than 20 mn.
Since the GDP per capita of B is USD 300, the GDP of B must be at least USD 6 bn.
However, from (i), the GDP of E must also be at least 1.
Since GDP of B + GDP of E = USD 7 bn, GDP of B must be USD 6 bn and GDP of E must be 1 bn.
From (vii), the GDP of Country F must be USD 2 bn.

The following table provides the details of all the six countries:

Country	G (in USD bn)	PG (in USD)	L (in mn)	LR	Population (in mn)
Country A	2.5	12.5	22	11%	200
Country B	6	300	4	20%	20
Country C	5	62.5	5	6.25%	80
Country D	7.5	250	21	70%	30
Country E	1	50	3	15%	20
Country F	2	500	1	25%	4

The total number of literates across the six countries combined is 56 mn.

Ans: (56)

QUESTIONS(17 TO 20)

Six children, A through F, had a certain number of chocolates with them at the beginning of a certain day. During the day, each of the six children ate at least one chocolate from the ones that they had and, then, exchanged some chocolates between themselves. It is known that each child ate the same number of chocolates. Further, each child exchanged chocolates with (i.e., gave a certain number of chocolates to and took a certain number of chocolates from) exactly one child. The

following table provides the number of chocolates with each child at the beginning of the day and at the end of the day:

Child	Number of Chocolates	
	Beginning of the day	End of the day
A	24	20
B	18	5
C	32	10
D	16	18
E	18	11
F	24	8

Q17. DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.
With which child did B exchange chocolates?

a) **A**

b) C

c) D

d) None of the above

At the beginning of the day, the number of chocolates with the six children combined = 132
At the end of the day, the number of chocolates with the six children combined = 72
Total number of chocolates that each child ate = $\frac{(132-72)}{6} = 10$
Hence, after eating 10 chocolates, the number of chocolates left with A through F are 14, 8, 22, 6, 8 and 14 respectively.
After exchanging chocolates, the number of chocolates with A increased by 6.
Similarly, the change in the number of chocolates with B, C, D, E and F are –3, –12, +12, +3 and –6 respectively.
Since each child exchanged with only one child, the increase in chocolates of one of the children must be the same as the decrease in the chocolates of the other.
Hence, A and F exchanged with each other, B and E exchanged with each other, C and D exchanged with each other.

B exchanged chocolates with E. Choice (D)

Q18. DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.
What is the maximum increase in the number of chocolates with any child because of exchanging chocolates?

a) **12**

b) 9

c) 15

d) 6

At the beginning of the day, the number of chocolates with the six children combined = 132
At the end of the day, the number of chocolates with the six children combined = 72
Total number of chocolates that each child ate = $\frac{(132-72)}{6} = 10$
Hence, after eating 10 chocolates, the number of chocolates left with A through F are 14, 8, 22, 6, 8 and 14 respectively.
After exchanging chocolates, the number of chocolates with A increased by 6.
Similarly, the change in the number of chocolates with B, C, D, E and F are –3, –12, +12, +3 and –6 respectively.
Since each child exchanged with only one child, the increase in chocolates of one of the children must be the same as the decrease in the chocolates of the other.
Hence, A and F exchanged with each other, B and E exchanged with each other, C and D exchanged with each other.

The maximum increase in the number of chocolates was 12 (for D).

Choice (A)

Q19. DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.
What is the number of chocolates at the beginning of the day with the child with whom A exchanged chocolates?

a) **16**

b) 18

c) 32

d) None of the above

At the beginning of the day, the number of chocolates with the six children combined = 132
At the end of the day, the number of chocolates with the six children combined = 72
Total number of chocolates that each child ate = $\frac{(132-72)}{6} = 10$
Hence, after eating 10 chocolates, the number of chocolates left with A through F are 14, 8, 22, 6, 8 and 14 respectively.
After exchanging chocolates, the number of chocolates with A increased by 6.
Similarly, the change in the number of chocolates with B, C, D, E and F are –3, –12, +12, +3 and –6 respectively.
Since each child exchanged with only one child, the increase in chocolates of one of the children must be the same as the decrease in the chocolates of the other.
Hence, A and F exchanged with each other, B and E exchanged with each other, C and D exchanged with each other.

A exchanged chocolates with F. The number of chocolates with F at the beginning of the day is 24. Choice (D)

Q20. DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.
On the next day, the children did not eat any chocolates but once again exchanged chocolates, in the same manner as the previous day, such that the difference between the number of chocolates with any two children is the minimum possible.

What is the maximum possible difference between the chocolates with any two children?

a) **4**

b) 5

c) 3

d) 2

At the beginning of the day, the number of chocolates with the six children combined = 132
At the end of the day, the number of chocolates with the six children combined = 72
Total number of chocolates that each child ate = $\frac{(132-72)}{6} = 10$
Hence, after eating 10 chocolates, the number of chocolates left with A through F are 14, 8, 22, 6, 8 and 14 respectively.
After exchanging chocolates, the number of chocolates with A increased by 6.
Similarly, the change in the number of chocolates with B, C, D, E and F are –3, –12, +12, +3 and –6 respectively.
Since each child exchanged with only one child, the increase in chocolates of one of the children must be the same as the decrease in the chocolates of the other.
Hence, A and F exchanged with each other, B and E exchanged with each other, C and D exchanged with each other.

The chocolates with the six children are 20, 5, 10, 18, 11 and 8.
The total number of chocolates is 72.
To minimize the required difference, we can try to make the number of chocolates with all the children equal, i.e., 12 each. However, for this to happen, the sum of the chocolates with three pairs of children must be 24 (only then can these pairs of children exchange chocolates and end up with 12 chocolates each).
Hence, this is not possible.
The top three numbers are 20, 18 and 11. The bottom three numbers are 5, 8 and 10.
We need to get all these numbers as close to 12 as possible.
We can pair 20 and 5 – after exchange, we get 12 and 13.
We can pair 18 and 8 – after exchange, we get 13 and 13.
We can pair 10 and 11 – after exchange, we remain with 10 and 11.
If we pair 10 with higher numbers, we cannot increase either 5 or 8 to higher numbers.
Hence, this is the optimal way to exchange the chocolates between the six children.
The maximum possible difference in the number of chocolates between any two children, in this case, is 3. Choice (C)

QUESTION(21 TO 24)

Each of five persons, Jack, Gene, Kevin, Martin and Ronin, visited exactly two out of five different countries, Spain, Argentina, Brazil, Russia and Madagascar, in the years 2017 and 2018. In each year, each person visited a different country and no person visited the same country twice.

It is also known that

i. during the two years, any person who visited Russia did not visit Spain.
ii. the country that Kevin visited in 2018 is the same as the one that Martin visited in 2017.
iii. the person who visited Madagascar in 2017 visited Argentina in 2018.
iv. Ronin visited Spain in 2017, but did not visit Brazil in 2018.

v. Kevin did not visit Madagascar in 2017 and Martin visited Spain in one of the years.

Q21. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Which country did Kevin visit in 2017?

a) **Argentina**

b) Brazil

c) **Russia**

d) Spain

From (v), Ronin visited Spain in 2017. In 2018, he did not visit Brazil. From (iv), he could not have visited Argentina in 2018. From (i), he could not have visited Russia in 2018. He must have visited Madagascar in 2018.
From (ii), the country that Kevin visited in 2018 and the one that Martin visited in 2017 cannot be Spain and also cannot be Madagascar (since Ronin visited these two countries).
From (vi), Martin must have visited Spain in 2018 (as Ronin visited Spain in 2017). Since Martin visited Spain in 2018, he could not have visited Russia in 2017. Hence, the country mentioned in (ii) cannot be Russia. From (vi), Kevin did not visit Madagascar in 2017. Hence, one of Jack and Gene must have visited Madagascar in 2017. This person must have visited Argentina in 2018.
Hence, the country mentioned in (ii) cannot be Argentina as well. Hence, the country that Kevin visited in 2018 and Martin visited in 2017 must be Brazil. In 2017, Kevin must have visited Russia.
In 2018, Jack and Gene must have visited Russia and Argentina in any order.
The following table provides the country that each person visited in each year:

Person	2017	2018
Jack	Madagascar/Argentina	Argentina/Russia
Gene	Argentina/Madagascar	Russia/Argentina
Kevin	Russia	Brazil
Martin	Brazil	Spain
Ronin	Spain	Madagascar

Kevin visited Russia in 2017. Choice (C)

Q22. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.

Which of the following countries did Martin visit in any of 2017 or 2018?

a) **Brazil**

b) Argentina

c) **Madagascar**

d) Russia

From (v), Ronin visited Spain in 2017. In 2018, he did not visit Brazil. From (iv), he could not have visited Argentina in 2018. From (i), he could not have visited Russia in 2018. He must have visited Madagascar in 2018.
From (ii), the country that Kevin visited in 2018 and the one that Martin visited in 2017 cannot be Spain and also cannot be Madagascar (since Ronin visited these two countries).
From (vi), Martin must have visited Spain in 2018 (as Ronin visited Spain in 2017). Since Martin visited Spain in 2018, he could not have visited Russia in 2017. Hence, the country mentioned in (ii) cannot be Russia. From (vi), Kevin did not visit Madagascar in 2017. Hence, one of Jack and Gene must have visited Madagascar in 2017. This person must have visited Argentina in 2018.
Hence, the country mentioned in (ii) cannot be Argentina as well. Hence, the country that Kevin visited in 2018 and Martin visited in 2017 must be Brazil. In 2017, Kevin must have visited Russia.
In 2018, Jack and Gene must have visited Russia and Argentina in any order.
The following table provides the country that each person visited in each year:

Person	2017	2018
Jack	Madagascar/Argentina	Argentina/Russia
Gene	Argentina/Madagascar	Russia/Argentina
Kevin	Russia	Brazil
Martin	Brazil	Spain
Ronin	Spain	Madagascar

Martin visited Brazil in 2017. Choice (A)

Q23. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Which of the following countries did Jack definitely visit in either 2017 or 2018?

a) **Madagascar**

b) Argentina

c) **Russia**

d) Spain

From (v), Ronin visited Spain in 2017. In 2018, he did not visit Brazil. From (iv), he could not have visited Argentina in 2018. From (i), he could not have visited Russia in 2018. He must have visited Madagascar in 2018.
From (ii), the country that Kevin visited in 2018 and the one that Martin visited in 2017 cannot be Spain and also cannot be Madagascar (since Ronin visited these two countries).
From (vi), Martin must have visited Spain in 2018 (as Ronin visited Spain in 2017). Since Martin visited Spain in 2018, he could not have visited Russia in 2017. Hence, the country mentioned in (ii) cannot be Russia. From (vi), Kevin did not visit Madagascar in 2017. Hence, one of Jack and Gene must have visited Madagascar in 2017. This person must have visited Argentina in 2018.
Hence, the country mentioned in (ii) cannot be Argentina as well. Hence, the country that Kevin visited in 2018 and Martin visited in 2017 must be Brazil. In 2017, Kevin must have visited Russia.
In 2018, Jack and Gene must have visited Russia and Argentina in any order.
The following table provides the country that each person visited in each year:

Person	2017	2018
Jack	Madagascar/Argentina	Argentina/Russia
Gene	Argentina/Madagascar	Russia/Argentina
Kevin	Russia	Brazil
Martin	Brazil	Spain
Ronin	Spain	Madagascar

Jack definitely visited Argentina in one of the years. Choice (B)

Q24. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Which of the following is definitely false?

a) **The person who visited Russia in 2018 visited Argentina in 2017.**

b) The person who visited Brazil in 2017 visited Spain in 2018.

c) **The person who visited Russia in 2017 visited Spain in 2018.**

d) The person who visited Spain in 2017 visited Madagascar in 2018.

From (v), Ronin visited Spain in 2017. In 2018, he did not visit Brazil. From (iv), he could not have visited Argentina in 2018. From (i), he could not have visited Russia in 2018. He must have visited Madagascar in 2018.
From (ii), the country that Kevin visited in 2018 and the one that Martin visited in 2017 cannot be Spain and also cannot be Madagascar (since Ronin visited these two countries).
From (vi), Martin must have visited Spain in 2018 (as Ronin visited Spain in 2017). Since Martin visited Spain in 2018, he could not have visited Russia in 2017. Hence, the country mentioned in (ii) cannot be Russia. From (vi), Kevin did not visit Madagascar in 2017. Hence, one of Jack and Gene must have visited Madagascar in 2017. This person must have visited Argentina in 2018.
Hence, the country mentioned in (ii) cannot be Argentina as well. Hence, the country that Kevin visited in 2018 and Martin visited in 2017 must be Brazil. In 2017, Kevin must have visited Russia.
In 2018, Jack and Gene must have visited Russia and Argentina in any order.
The following table provides the country that each person visited in each year:

Person	2017	2018
Jack	Madagascar/Argentina	Argentina/Russia
Gene	Argentina/Madagascar	Russia/Argentina
Kevin	Russia	Brazil
Martin	Brazil	Spain
Ronin	Spain	Madagascar

The statement given in option C is definitely false. Choice (C)

QUESTION(25 TO 28) During a year, a total of 100 tennis tournaments were conducted. Four players, Ankit, Phani, Kalyan and Tarun, participated in some of these tournaments. It is known that, among the four players, the number of players who participated in any tournament was 1 or 3 or 4 but neither 0 nor 2.
It is also known that

i. the number of tournaments in which only Ankit participated is thrice the number of tournaments in which only Kalyan participated, which, in turn, is twice the number of tournaments in which only Tarun participated.
ii. all the four players participated in 8 tournaments.

iii. the number of tournaments in which both Phani and Kalyan participated is 22 more than that in which only Kalyan and Ankit participated in.
iv. the number of tournaments in which Ankit and Phani participated is the same as that in which Tarun and Kalyan participated, which, in turn, is the same as that in which Tarun and Ankit participated.
v. the number of tournaments in which only Phani participated is the same as that in which only Ankit, Kalyan and Tarun participated.

Q25. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
What is the maximum number of tournaments in which only Kalyan participated?

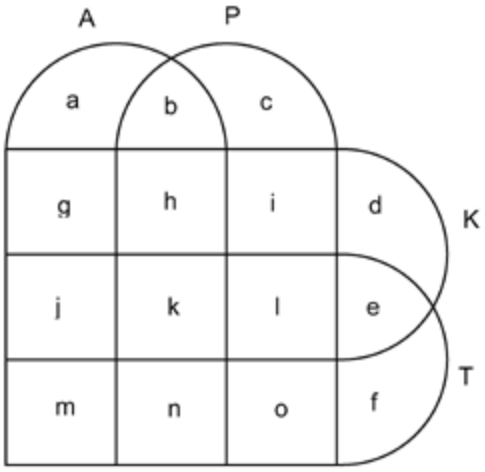
a) **10**

b) 14

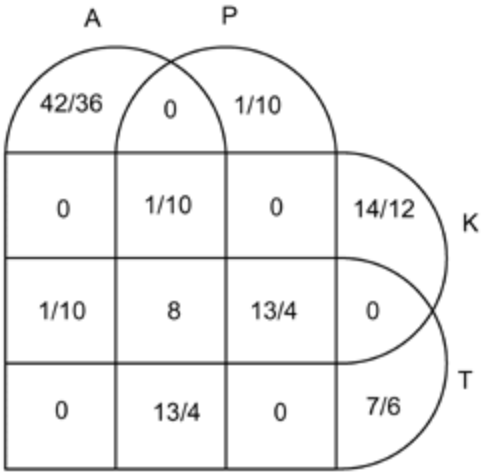
c) **12**

d) 16

Let the following Venn diagram represent the number of tournaments in which the four players participated:



From the given information, b = e = g = i = m = o = 0 (since the number of players who participated in any tournament was not 2).
From (i), d = 2f and a = 6f.
From (ii), k = 8.
From (iii), h + k + l +i = 22 + g. Since i = g = 0 and k = 8, h + l = 14.
From (iv), h + k + n = j + k + l = j + k + n ⇒ n = l and h = j.
From (v), c = j.
We know that the total number of tournaments is 100.
Hence, a + c + d + f + h + j + k + l + n = 100
Since k = 8, a = 6f, d = 2f, c = j, n = l, h = j and h + l = 14,
6f + j + 2f + f + (h + l) + (h + l) + 8 = 100 ⇒ 9f + j = 64
Since h + l = 14, j + n = 14.
For f to be an integer, j can only be 1 or 10. Hence, two cases are possible, which are presented in the diagram below:



. The maximum number of tournaments in which only Kalyan participated is 14.

Choice (B)

Q26. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.

If the number of tournaments in which only Ankit participated is at least 30 more than that in which only Phani participated, in how many tournaments did Tarun participate?

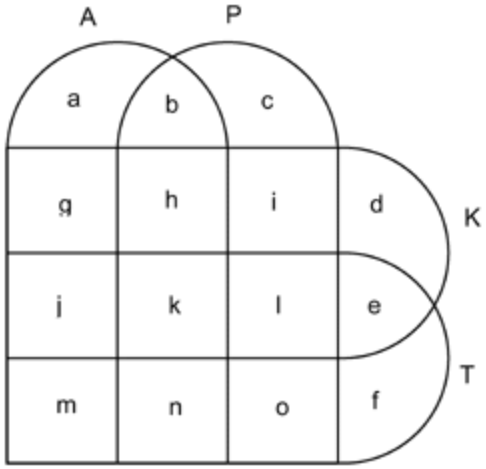
a) **42**

b) 36

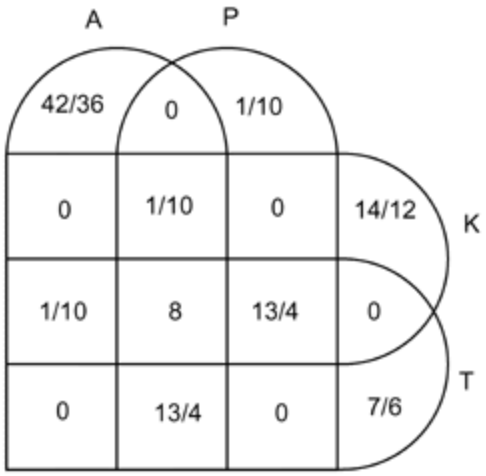
c) **32**

d) Cannot be determined

Let the following Venn diagram represent the number of tournaments in which the four players participated:



From the given information, b = e = g = i = m = o = 0 (since the number of players who participated in any tournament was not 2).
From (i), d = 2f and a = 6f.
From (ii), k = 8.
From (iii), h + k + l +i = 22 + g. Since i = g = 0 and k = 8, h + l = 14.
From (iv), h + k + n = j + k + l = j + k + n ⇒ n = l and h = j.
From (v), c = j.
We know that the total number of tournaments is 100.
Hence, a + c + d + f + h + j + k + l + n = 100
Since k = 8, a = 6f, d = 2f, c = j, n = l, h = j and h + l = 14,
6f + j + 2f + f + (h + l) + (h + l) + 8 = 100 ⇒ 9f + j = 64
Since h + l = 14, j + n = 14.
For f to be an integer, j can only be 1 or 10. Hence, two cases are possible, which are presented in the diagram below:



. For the given information, only Ankit must have participated in 42 tournaments.
In this case, the number of tournaments in which Tarun participated
= 1 + 8 + 13 + 13 + 7 = 42 . Choice (A)

Q27. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.

In each of the 100 tournaments, one of the four players was the winner of the tournament and Ankit was the winner of the tournament in exactly 38 tournaments.

What is the minimum number of tournaments in which Kalyan would have been the winner?

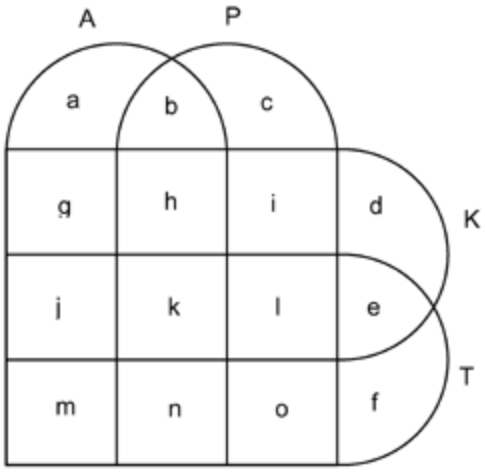
a) **8**

b) 10

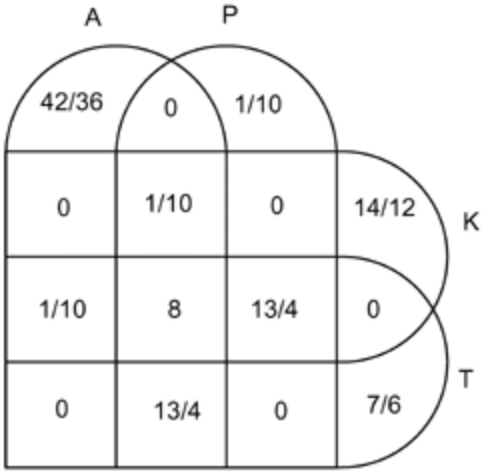
c) **14**

d) 12

Let the following Venn diagram represent the number of tournaments in which the four players participated:



From the given information, b = e = g = i = m = o = 0 (since the number of players who participated in any tournament was not 2).
From (i), d = 2f and a = 6f.
From (ii), k = 8.
From (iii), h + k + l +i = 22 + g. Since i = g = 0 and k = 8, h + l = 14.
From (iv), h + k + n = j + k + l = j + k + n ⇒ n = l and h = j.
From (v), c = j.
We know that the total number of tournaments is 100.
Hence, a + c + d + f + h + j + k + l + n = 100
Since k = 8, a = 6f, d = 2f, c = j, n = l, h = j and h + l = 14,
6f + j + 2f + f + (h + l) + (h + l) + 8 = 100 ⇒ 9f + j = 64
Since h + l = 14, j + n = 14.
For f to be an integer, j can only be 1 or 10. Hence, two cases are possible, which are presented in the diagram below:



. In each tournament, one of the four players won the tournament. Since Ankit won 38 tournaments, Ankit alone must have played less than 38 tournaments. If he alone played 42 tournaments, he could not have won in all the 42 tournaments, and none of the others played in (and won) these tournaments, which will violate the given condition.
Hence, Ankit must have played 36 tournaments.
In this case, Kalyan must have been the winner of all the tournaments in which he alone played, i.e., in 12 tournaments. Choice (D)

Q28. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
In each of the 100 tournaments, one of the four players was the winner of the tournament and Ankit was the winner of the tournament in exactly 38 tournaments.

If Tarun was the winner in at least 20 tournaments, what is the maximum number of tournaments in which Phani would have been the winner?

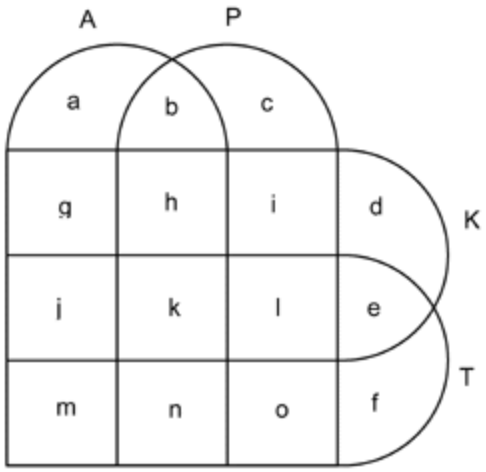
a) **30**

b) 24

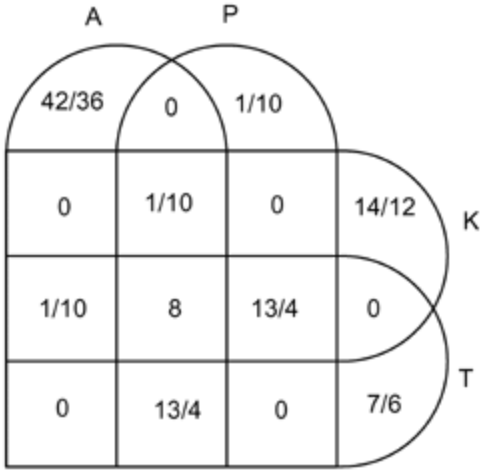
c) **36**

d) 42

Let the following Venn diagram represent the number of tournaments in which the four players participated:



From the given information, b = e = g = i = m = o = 0 (since the number of players who participated in any tournament was not 2).
From (i), d = 2f and a = 6f.
From (ii), k = 8.
From (iii), h + k + l +i = 22 + g. Since i = g = 0 and k = 8, h + l = 14.
From (iv), h + k + n = j + k + l = j + k + n ⇒ n = l and h = j.
From (v), c = j.
We know that the total number of tournaments is 100.
Hence, a + c + d + f + h + j + k + l + n = 100
Since k = 8, a = 6f, d = 2f, c = j, n = l, h = j and h + l = 14,
6f + j + 2f + f + (h + l) + (h + l) + 8 = 100 ⇒ 9f + j = 64
Since h + l = 14, j + n = 14.
For f to be an integer, j can only be 1 or 10. Hence, two cases are possible, which are presented in the diagram below:



. We need to maximize the number of tournaments in which Phani won.
Ankit could have won the 36 tournaments that he alone played and 2 tournaments in which Ankit, Kalyan and Tarun played (out of the 10).
Tarun would have won the 6 tournaments that he alone played and the remaining 8 tournaments that Ankit, Kalyan and Tarun played.
But Tarun has to win in 6 more tournaments and these should be the ones in which Phani participated.
Hence, Phani could have won all the tournaments that he played except 6.
The maximum number of tournaments in which Phani could have won
= 10 + 10 + 8 + 4 + 4 – 6 = 30 Choice (A)

QUESTIONS(29 TO 32)

In a class, six students, A through F, were sitting in six chairs from left to right, all facing the same direction, not necessarily in the same order. Karthik, the teacher of the class, handed over a certain number of blank sheets to the student at the extreme left. Karthik asked each student to take as many blank sheets as he wants and pass the remaining to the student to his immediate right. After the sixth student (i.e., the student sitting at the extreme right) took the sheets, Karthik collected the remaining sheets from him.

It is also known that

i. the number of sheets that the first student took was twice the number of sheets that C took.
ii. no two students took the same number of sheets and each student took at least one sheet.
iii. B, who was not sitting at the extreme right, took two sheets more than the student who was sitting two places to his left.
iv. D, who was sitting to the immediate left of B, took 15 sheets and the number of sheets that any other student took was either greater than 20 or less than 10.
v. E, who was sitting two places to the right of the student sitting at the extreme left, took 6 sheets.
vi. Karthik gave 60 sheets to the student sitting at the extreme left and collected 18 sheets from F.

Q29. DIRECTIONS *for question 29:* Type in your answer in the input box provided below the question.
How many sheets did C take?

Let the positions of the chairs be numbered from 1 to 6 from left to right.
From (v), E must be in the 3rd place and took 6 sheets.
From (iii), B cannot be in the 6th place. B also cannot be in the 1st or 2nd place (since there must be a student sitting two places to B's left). Since E is in 3rd place, from (iv), B cannot be in 4th place (as D has to be to B's immediate left).
Hence, B must be in the 5th place and D must be in the 4th place.
From (vi), Karthik collected sheets from F. Hence, F must be in the sixth place.
From (i), C cannot be in the first place. Hence, A must be in the first place and C must be in the second place.
From (iii), (iv) and (v), we know that E, D and B have taken 6, 15 and 8 sheets respectively.
Let the number of sheets taken by A, C and F be 2x, x and y respectively.
Since Karthik gave 60 sheets and took 18 sheets, the students must have taken 60 – 18 = 42 sheets in total.
Hence, $2x + x + y + 6 + 15 + 8 = 42 \Rightarrow 3x + y = 13$
From (iv), x, 2x and y must be greater than 20 or must be less than 10.
From the equation, none of them can be greater than 20.
Hence, all three must be less than 10.
If x = 1, 2x = 2 and y = 10. This is not possible.
If x = 2, 2x = 4 and y = 7. This is possible.
If x = 3, 2x = 6 and y = 4. This is not possible as E took 6 sheets.
If x = 4, 2x = 8. This is not possible as B took 8 sheets.
x cannot be 5 or greater as 2x will fall in the range of 10 to 20.
Hence, only one case is possible: A took 4 sheets, C took 2 sheets and F took 7 sheets.
The following table provides the number of sheets that each student took and the order in which they are sitting:

Student	A	C	E	D	B	F
Number of Sheets	4	2	6	15	8	7

C took 2 sheets. Ans: (2)

Q30. DIRECTIONS *for question 30:* Select the correct alternative from the given choices.
Who was sitting to the immediate left of the person who took the lowest number of sheets?

a) **A** ✓ **Your answer is correct**

b) E

c) **D**

d) C

Let the positions of the chairs be numbered from 1 to 6 from left to right.
From (v), E must be in the 3rd place and took 6 sheets.
From (iii), B cannot be in the 6th place. B also cannot be in the 1st or 2nd place (since there must be a student sitting two places to B's left). Since E is in 3rd place, from (iv), B cannot be in 4th place (as D has to be to B's immediate left).
Hence, B must be in the 5th place and D must be in the 4th place.
From (vi), Karthik collected sheets from F. Hence, F must be in the sixth place.
From (i), C cannot be in the first place. Hence, A must be in the first place and C must be in the second place.
From (iii), (iv) and (v), we know that E, D and B have taken 6, 15 and 8 sheets respectively.
Let the number of sheets taken by A, C and F be 2x, x and y respectively.
Since Karthik gave 60 sheets and took 18 sheets, the students must have taken 60 – 18 = 42 sheets in total.
Hence, $2x + x + y + 6 + 15 + 8 = 42 \Rightarrow 3x + y = 13$
From (iv), x, 2x and y must be greater than 20 or must be less than 10.
From the equation, none of them can be greater than 20.
Hence, all three must be less than 10.
If x = 1, 2x = 2 and y = 10. This is not possible.
If x = 2, 2x = 4 and y = 7. This is possible.
If x = 3, 2x = 6 and y = 4. This is not possible as E took 6 sheets.
If x = 4, 2x = 8. This is not possible as B took 8 sheets.
x cannot be 5 or greater as 2x will fall in the range of 10 to 20.
Hence, only one case is possible: A took 4 sheets, C took 2 sheets and F took 7 sheets.
The following table provides the number of sheets that each student took and the order in which they are sitting:

Student	A	C	E	D	B	F
Number of Sheets	4	2	6	15	8	7

A was sitting to the immediate left of C, the student who took the lowest number of sheets. Choice (A)

Q31. DIRECTIONS *for question 31:* Type in your answer in the input box provided below the question.
What is the difference between the number of sheets that A and D took?

Let the positions of the chairs be numbered from 1 to 6 from left to right.
From (v), E must be in the 3rd place and took 6 sheets.
From (iii), B cannot be in the 6th place. B also cannot be in the 1st or 2nd place (since there must be a student sitting two places to B's left). Since E is in 3rd place, from (iv), B cannot be in 4th place (as D has to be to B's immediate left).
Hence, B must be in the 5th place and D must be in the 4th place.
From (vi), Karthik collected sheets from F. Hence, F must be in the sixth place.
From (i), C cannot be in the first place. Hence, A must be in the first place and C must be in the second place.
From (iii), (iv) and (v), we know that E, D and B have taken 6, 15 and 8 sheets respectively.
Let the number of sheets taken by A, C and F be 2x, x and y respectively.
Since Karthik gave 60 sheets and took 18 sheets, the students must have taken 60 – 18 = 42 sheets in total.
Hence, $2x + x + y + 6 + 15 + 8 = 42 \Rightarrow 3x + y = 13$
From (iv), x, 2x and y must be greater than 20 or must be less than 10.
From the equation, none of them can be greater than 20.
Hence, all three must be less than 10.
If x = 1, 2x = 2 and y = 10. This is not possible.
If x = 2, 2x = 4 and y = 7. This is possible.
If x = 3, 2x = 6 and y = 4. This is not possible as E took 6 sheets.
If x = 4, 2x = 8. This is not possible as B took 8 sheets.
x cannot be 5 or greater as 2x will fall in the range of 10 to 20.
Hence, only one case is possible: A took 4 sheets, C took 2 sheets and F took 7 sheets.
The following table provides the number of sheets that each student took and the order in which they are sitting:

Student	A	C	E	D	B	F
Number of Sheets	4	2	6	15	8	7

The difference between the number of sheets that A and D took = 11 Ans: (11)

Q32. DIRECTIONS *for question 32:* Select the correct alternative from the given choices.
Which of the following statements is definitely true?

a) **The student sitting at the extreme right took the highest number of sheets.**

b) The student sitting at the extreme left took the highest number of sheets.

c) **The student sitting to the immediate right of B took the highest number of sheets.**

d) The student sitting to the immediate left of E took the lowest number of sheets.

Let the positions of the chairs be numbered from 1 to 6 from left to right.
From (v), E must be in the 3rd place and took 6 sheets.
From (iii), B cannot be in the 6th place. B also cannot be in the 1st or 2nd place (since there must be a student sitting two places to B's left). Since E is in 3rd place, from (iv), B cannot be in 4th place (as D has to be to B's immediate left).
Hence, B must be in the 5th place and D must be in the 4th place.
From (vi), Karthik collected sheets from F. Hence, F must be in the sixth place.
From (i), C cannot be in the first place. Hence, A must be in the first place and C must be in the second place.
From (iii), (iv) and (v), we know that E, D and B have taken 6, 15 and 8 sheets respectively.
Let the number of sheets taken by A, C and F be 2x, x and y respectively.
Since Karthik gave 60 sheets and took 18 sheets, the students must have taken 60 – 18 = 42 sheets in total.
Hence, $2x + x + y + 6 + 15 + 8 = 42 \Rightarrow 3x + y = 13$
From (iv), x, 2x and y must be greater than 20 or must be less than 10.
From the equation, none of them can be greater than 20.
Hence, all three must be less than 10.
If x = 1, 2x = 2 and y = 10. This is not possible.
If x = 2, 2x = 4 and y = 7. This is possible.
If x = 3, 2x = 6 and y = 4. This is not possible as E took 6 sheets.
If x = 4, 2x = 8. This is not possible as B took 8 sheets.
x cannot be 5 or greater as 2x will fall in the range of 10 to 20.
Hence, only one case is possible: A took 4 sheets, C took 2 sheets and F took 7 sheets.
The following table provides the number of sheets that each student took and the order in which they are sitting:

Student	A	C	E	D	B	F
Number of Sheets	4	2	6	15	8	7

The statement given in option D is true. Choice (D)

QUANT

Q1. DIRECTIONS *for questions 1 and 2:* Type in your answer in the input box provided below the question.

If *a* and *b* are both natural numbers, and $\log_2 (a \log_3 b) = 1$, how many ordered pairs (*a*, *b*) exist?

Given, $\log_2 (a \log_3 b) = 1$
$\Rightarrow \log_3 b^a = 2$
$\Rightarrow b^a = 9$
Since a and b are both natural numbers, the only possibilities for this are when b = 3, a = 2 and when b = 9, a = 1.
Therefore, the number of ordered pairs (a, b) that satisfy the given equation are 2.

Ans: (2)

Q2. DIRECTIONS *for questions 1 and 2:* Type in your answer in the input box provided below the question.

If $36a^2 + \frac{1}{9a^2} = 4$, what is the value of $216a^3 - \frac{1}{27a^3}$.

Given that $36a^2 + \frac{1}{9a^2} = 4$

$(6a)^2 + \left(\frac{1}{(3a)}\right)^2 = 4$

$(6a)^2 + \left(\frac{1}{(3a)}\right)^2 - 2.6a.\frac{1}{(3a)} = 4 - 2.6a.\frac{1}{(3a)}$

$\left(6a - \frac{1}{3a}\right)^2 = 4 - 4 = 0$

$\left(6a - \frac{1}{3a}\right) = 0$, i.e., $6a = \frac{1}{(3a)}$

$(6a)^3 - \left(\frac{1}{(3a)}\right)^3 = 0$

$216a^3 - \frac{1}{27a^3} = 0$

Ans: (0)

Q3. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.
If P(a^2, 2a) is a point on the line segment joining the points A(2, 0) and B(0, 4), what is the ratio of the distances AP and PB ?

a) $\sqrt{2}$ **: 1**

b) 1 : 1

c) **2 : 1**

d) 1 : $\sqrt{3}$

Equation of the line joining A and B will be $y - 4 = \left[\frac{(0-4)}{(2-0)}\right](x - 0)$
i.e. $2x + y = 4$.
Substituting $P(a^2, a)$ in the above equation, we have $2a^2 + 2a - 4 = 0$
$a^2 + a - 2 = 0$
$(a + 2)(a - 1) = 0$.
$a = -2$ or $a = 1$.
If $a = -2$, then the point P will be in the fourth quadrant but it is given that P is on the line segment AB, which is in the first quadrant. Therefore, the coordinates of P are (1, 2).

Now,
distance $AP = \sqrt{[(1 - 2)^2 + (2 - 0)^2]} = \sqrt{5}$
distance $PB = \sqrt{[(1 - 0)^2 + (2 - 4)^2]} = \sqrt{5}$
Therefore, AP/PB = 1

Alternatively, once we know that P = (1, 2) and that P lies on AB ,where A = (2, 0) and B = (0, 4), then the ratio of the lengths AP and PB is simply the ratio of the distances considered along the x-axis alone (or the y-axis alone), without having to calculate the actual distances.
Therefore, AP:PB = (2 – 1) : (1 – 0) = (0 – 2) : (2 – 4) = 1 : 1

Choice (B)

Q4. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.
A student was asked to first divide a number by 7, then add 6 to the result and write down the sum as the answer. He, however, first added 6 to the number and then divided the sum by 7, getting 25 as the result, which he wrote down as the answer. Which of the following should have been the correct answer?

a) $\frac{211}{7}$

b) $\frac{169}{7}$

c) $\frac{127}{7}$

d) $\frac{169}{6}$

Let the number be *x*. The student first added 6 to the number and then divided it by 7.
Hence $\frac{(x+6)}{7} = 25$
$x = 25 \times 7 - 6 = 169$
Correct answer should have been $\frac{169}{7} + 6 = \frac{211}{7}$ Choice (A)

Q5. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.

If $x \neq 0$, what is the product of the roots of the equation $\frac{(4x^{4001} + 5x^{4000})}{(6x^{3999})} = 4$?

a) **4**

b) –24

c) **12**

d) –6

$\frac{(4x^{4001} + 5x^{4000})}{(6x^{3999})} = 4$
$\left(\frac{4x^{4001}}{x^{3999}}\right) + \left(\frac{5x^{4000}}{x^{3999}}\right) = 24$
$4x^2 + 5x - 24 = 0$
Product of roots of the equation $= \frac{-24}{4} = -6$ Choice (D)

Q6. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.
The ratio of the number of apples that each of Adam, Eve and Pikachu have is 3 : 4 : 7. If they had 126 apples in total, what is the difference between the number of apples that Adam and Eve have?

a) **7**

b) **8**

c) **9**

d) 14

Let Adam, Eve and Pikachu have 3k, 4k and 5k apples respectively.
Given that 3k + 4k + 7k = 126
14k = 126. Therefore, k = 9
No. of apples with Adam and Eve are 27 and 36 respectively.
Hence, the difference between the no. of apples that Adam and Eve have = 36 – 27 = 9
Choice (C)

Q7. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.
What is the largest three-digit number that leaves a remainder 2 when divided by 5 and leaves a remainder 4 when divided by 7?

a) **987**

b) **977**

c) **967**

d) 997

Let the number be N
N will be of the form: k(LCM of 5 and 7) – (5 – 2)
N = 35k – 3 < 1000
N is maximum when k = 28
N = 35 × 28 – 3 = 977 Choice (B)

Q8. DIRECTIONS *for questions 3 to 8:* Select the correct alternative from the given choices.
If the sum of the units digits in P^Q and 5^P is Q, where P and Q are natural numbers, such that P < 4 and Q < 7, how many possible values exist for Q^P?

a) **3**

b) **2**

c) **1**

d) 0

Given P and Q are natural numbers, the units digit in 5^P is always 5, irrespective of P. Since Q is less than 7, in order to satisfy the given condition, the units digit in P^Q can be 0 or 1. Further, Since P is a natural number less than 4, the units digit in P^Q cannot be 0. Therefore, the units digit in P^Q is 1. Therefore, the sum of the units digits in P^Q and 5^P, i.e. Q = 6, i.e., the units digit of P^Q = 1.
This is possible only when P = 1 or P = 3.
If P = 1, the sum of the units digits 1^Q and 5^1 will be 6, i.e. Q = 6. This is consistent.
If P = 3, for the units digit in 3^Q to be 1, Q should be equal to 4. But Q = 6. This is not consistent.
Therefore, P = 1 and Q = 6 is the only possibility and Q^P i.e. 6^1 = 6 is the only possible value for Q^P. Choice (C)

Q9. DIRECTIONS *for question 9:* Type in your answer in the input box provided below the question.
A speedboat is travelling in a river. The speed of the boat in still water is 25 kmph and the rate of flow of the river is 5 kmph. Moving with the stream, the boat travelled 150 km in a certain amount of time. What distance (in km) will the boat cover in the same amount of time, if it were going against the stream?

Speed of the boat goes when it is going along the stream will be 25 + 5 = 30 kmph and when it is going against the stream, it will be 25 – 5 = 20 kmph. Given the same amount of time, the ratio of the distances travelled downstream and upstream = ratio of the speeds downstream and upstream = 30 : 20 = 3 : 2
Hence, the boat will travel a distance of
100 km (i.e., 150 x $\frac{2}{3}$) against the stream Ans: (100)

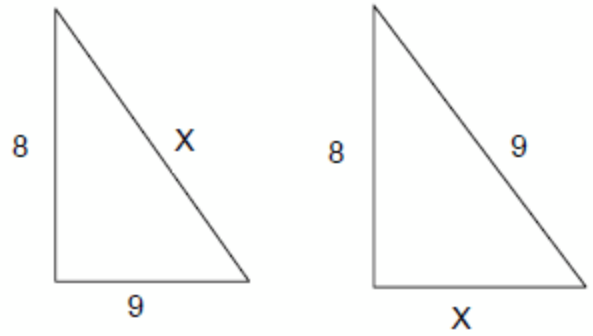
Q10. DIRECTIONS *for question 10:* Select the correct alternative from the given choices.
The lengths of two sides of a triangle are 8 cm and 9 cm respectively. If one of the angles of the triangle is 90°, which of the following can be the length (in cm) of the third side?

a) $\sqrt{145}$

b) $\sqrt{17}$

c) $\sqrt{168}$

d) **More than one of the above**



Let the third side of the triangle be x.
We have two possible cases.
Case I: x is the hypotenuse
$x = \sqrt{(82 + 92)}$
$= \sqrt{145}$
Case II: x is not the hypotenuse.
In that case, x is not the longest side and therefore, the length of the hypotenuse will be 9 cm.
$X^2 + 8^2 = 9^2$
$x = \sqrt{17}$ Choice (D)

Q11. DIRECTIONS *for question 11:* Type in your answer in the input box provided below the question.

How many values of x satisfy the equation $\log_3 \sqrt{(x+2)} + \log_3 \sqrt{(x-2)} = \log_9 \sqrt{x^4 - 16}$?

$\log_3 \sqrt{(x + 2)} + \log_3 \sqrt{(x - 2)} = \log_9 \sqrt{(x^4 - 16)}$
$\Rightarrow 2\log_9 \sqrt{(x+2)} + 2\log_9 \sqrt{(x-2)} = \log_9 \sqrt{(x^4 - 16)}$
$\Rightarrow \log_9 (x^2 - 4) = \frac{1}{2}\log_9 (x^4 - 16)$
$\Rightarrow (x^2 - 4)^2 = (x^4 - 16)$
$\Rightarrow (x^2 - 4)^2 = (x^2 - 4)(x^2 + 4)$
Either $x^2 - 4 = 0$ or $x^2 - 4 = x^2 + 4$
If $x = \pm 2$, then the logarithm part of the given equation will become undefined.
Hence, $x \neq \pm 2$.
Further, $x^2 - 4 = x^2 + 4$ is also not valid.
Therefore, no value of x will satisfy the given equation. Ans: (0)

Q12. DIRECTIONS *for question 12:* Select the correct alternative from the given choices.

How many tiles, each having a length and breadth of 6 cm and 4 cm respectively, are required to completely cover a rectangular region having a length and breadth of 72 cm and 50 cm respectively?

a) **120**

b) **150**

c) **180**

d) **240**

Total area of the rectangular region = $72 \times 50 = 3600$ cm^2 Area of a single tile $= 6 \times 4 = 24$ cm^2 Therefore, number of tiles required to fill in the rectangular region $= \frac{3600}{24} = 150$ Choice (B)

Note: Sometimes it may not be possible to completely cover a given region with the given size of tiles without breaking any tile. However, since it is not mentioned that a tile cannot be broken, we can calculate the answer directly, as above.

Q13. DIRECTIONS *for question 13:* Type in your answer in the input box provided below the question.
Three filling pipes can fill a tank in 12, 18 and 24 minutes respectively. There is another drain pipe, connected to the tank, that can empty the tank at the rate of three gallons per minute. All the four pipes, working together, can fill the tank in six minutes. Find the capacity of the tank.

Let the waste pipe take x minutes to empty the tank.

$$\frac{1}{12}+\frac{1}{18}+\frac{1}{24}-\frac{1}{x}=\frac{1}{6}.$$

$$\frac{1}{x}=\frac{13}{72}-\frac{1}{6}=\frac{1}{72}$$

Therefore, the waste pipe can empty the tank in 72 minutes. Given that it can empty 3 gallons per minute, the total capacity of the tank will be $72 \times 3 = 216$ gallons.

Ans: (216)

Q14. DIRECTIONS *for questions 14 to 17:* Select the correct alternative from the given choices.

P1 and P2 are two sets of parallel lines, such that the number of lines in P2 is greater than that in P1. If they intersect at a total of 18 points, the total number of parallelograms formed by P1 and P2 cannot be

a) **36.**

b) **45.**

c) 54.

d) All the above

Let there be x lines in P1 and y lines in P2. The number of points of intersection will be equal to xy. Given xy = 18 and x < y.
The possibilities are x = 3, y = 6 and x = 2, y = 9
Case I: x = 3, y = 6
The number of parallelograms that can be formed will be equal to ${}^{3}C_{2} \times {}^{6}C_{2} = 45$
Case II: x = 2, y = 9
The number of parallelograms that can be formed will be equal to ${}^{2}C_{2} \times {}^{9}C_{2} = 36$
Therefore, the number of parallelograms formed by P1 and P2 will either be 45 or 36, but definitely not 54. Choice (C)

Q15. DIRECTIONS *for questions 14 to 17:* Select the correct alternative from the given choices.

What the greatest possible rational number that divides the fractions $\frac{2}{5}$, $\frac{4}{15}$ and $\frac{8}{10}$?

a) $\frac{2}{5}$

b) $\frac{4}{5}$

c) $\frac{2}{15}$

d) $\frac{1}{15}$

The 3 fractions are $\frac{2}{5}, \frac{4}{15}$ and $\frac{4}{5}$ ($\frac{8}{10}$ must first be expressed in its simplest form)

HCF of the three fractions = $\frac{\text{HCF of the numerators}}{\text{LCM of the denominators}}$

$= \frac{\text{HCF } (2,4,4)}{\text{LCM } (5,15,5)} = \frac{2}{15}$ Choice (C)

Q16. DIRECTIONS *for questions 14 to 17:* Select the correct alternative from the given choices.
If $|x - 3|.(y^2 - 4x + 4) < 0$, which of the following is definitely true?

a) **$-2 < x < 3$**

b) **$y > 2$**

c) **$-2 < y < 1$**

d) $x > 1$

Given that $|x - 3|.(y^2 - 4x + 4) < 0$
Since $|x - 3|$ cannot be less than zero, $y^2 - 4x + 4$ should definitely be less than 0.
$y^2 - 4x + 4 < 0$
$y^2 + 4 < 4x$
$1 + y^2/4 < x$
Since the minimum value of $y^2/4$ is 0, x is definitely greater than 1. Choice (D)

Q17. DIRECTIONS *for questions 14 to 17:* Select the correct alternative from the given choices.
A target board is made up of three concentric circles, of radii 4 cm, 6 cm, and 9 cm respectively. The region inside the circle of radius 4 cm is painted entirely in red; the region between the circle of radius 4 cm and the circle of radius 6 cm is painted in green and the region in between the circle of radius 6 cm and the circle of radius 9 cm is painted in yellow. If an arrow that was fired randomly hit the target board, what is the probability that it hit the region that is yellow?

a) $\frac{20}{81}$

b) $\frac{16}{81}$

c) $\frac{4}{9}$

d) $\frac{5}{9}$

Area of the region painted in red = 16π
Area of the region painted in green = $36\pi - 16\pi = 20\pi$
Area of the region painted in yellow = $81\pi - 36\pi = 45\pi$
Total area of the target = 81π
Probability that the arrow will hit the yellow region

$$= \frac{\text{Area of the green region}}{\text{Total area of the target}}$$

$$= \frac{45\pi}{81\pi}$$

$$= \frac{5}{9}$$

Choice (D)

Q18. DIRECTIONS *for question 18:* Type in your answer in the input box provided below the question.

The sum of the first 12 terms of a geometric progression is six times the sum of the next six terms. If the first term of the progression is 32, what is the seventh term of the progression?

Let the first term and the common ratio of the geometric progression be a and r.

Sum of the first 12 terms $= \frac{[a(r^{12}-1)]}{(r-1)}$

Sum of the next 6 terms will be = Sum of the first 18 terms – Sum of the first 12 terms.

$= \frac{[a(r^{18}-1)]}{(r-1)} - \frac{[a(r^{12}-1)]}{(r-1)}$

$= \frac{[a(r^{18}-r^{12})]}{(r-1)}$

Given that $\frac{[a(r^{12}-1)]}{(r-1)} = \frac{6[a(r^{18}-r^{12})]}{(r-1)}$

$r^{12} - 1 = 6(r^{18} - r^{12})$

$(r^6 - 1)(r^6 + 1) = 6r^{12}(r^6 - 1)$

$(r^6 + 1) = 6r^{12}$

$6r^{12} - r^6 - 1 = 0$

Solving for r^6, we get $r^6 = \frac{1}{2}$ or $\frac{-1}{3}$.

However, since $r^6 > 0$, $r^6 \neq \frac{-1}{3}$

∴ Seventh term of the series is $ar^6 = 32 \times \frac{1}{2} = 16$. Ans: (16)

Q19. DIRECTIONS *for question 19:* Select the correct alternative from the given choices.

Two vessels, A and B, contain spirit and water, mixed in the ratio 7 : 3 and 4 : 9 respectively. Find the ratio in which the contents of A and B should be mixed so as to obtain a new mixture, containing spirit and water in the ratio 5 : 8?

a) **12 : 49**

b) **11 : 45**

c) **10 : 41**

d) 9 : 37

Spirit in 1 litre mix of A = $\frac{7}{10}$ litre.

Spirit in 1 litre mix of B = $\frac{4}{13}$ litre.

Spirit in 1 litre mix of C = $\frac{5}{13}$ litre.

Let the required ratio be x : 1

$$\frac{\left(\frac{7}{10} \times x + \frac{4}{13} \times 1\right)}{(x+1)} = \frac{5}{13}$$

$$x = \frac{10}{41}$$

Therefore, the required ratio is 10 : 41 Choice (C)

Q20. DIRECTIONS *for question 20:* Type in your answer in the input box provided below the question.

The total age of a few eight-year-old children and a few seven-year-old children is 70 years. If there is at least one eight-year-old and at least one seven-year-old, in how many ways can a team be selected from these children, such that the sum of the ages of the children in the team is 54?

Let the number of children who are 8 years old and 7 years old be a and b respectively.
Given that 8a + 7b = 70.
The only values of a and b which satisfy the above equation are a = 7 and b = 2.
A team should be selected from among these children such that the total sum of their ages is 54.
i.e 8x + 7y = 54
x can be a maximum of 7 and y can be a maximum of 2.
Based on the above, the only values of x and y that satisfy the given equation are x = 5 and y = 2.
This means that five 8 year-olds and both the two 7 year-olds must be selected.
The number of ways of doing so will be ${}^{7}C_{5} \times {}^{2}C_{2} = 21$ ways.

Ans: (21)

Q21. DIRECTIONS *for questions 21 and 22:* Select the correct alternative from the given choices.

N is a positive integer at most equal to 100. If (N− 1)! is not divisible by N, how many different values can N assume?

a) **25**

b) **26**

c) **30**

d) 22

A is any positive integer such that (A – 1)! is not divisible by A, ∴ A cannot be 1. Now, A is either prime or composite. It can be verified that for any prime value of A, the condition mentioned is satisfied. The only composite value of A satisfying the condition mentioned is 4.
Given, N is at most 100.
N equals 4 or any prime number upto 100. There are 25 prime numbers upto 100.
∴ N has a total of 26 possible values. Choice (B)

Q22. DIRECTIONS *for questions 21 and 22:* Select the correct alternative from the given choices.
The length, breadth and height of a room are in the ratio 2 : 3 : 4. If the length and breadth of the room are doubled, while the height is halved, what is the percentage change in the area of the four walls of the room?

a) **No change**

b) **Decreases by 16.67%**

c) **Increases by 30%**

d) Decreases by 33.33%

Let the initial length, breadth and height of the room be 2k, 3k and 4k respectively. Area of the four walls of the room = $2h(l + b) = 2 \times 4k\ (2k + 3k) = 40k^2$
New length, breadth and height will be 4k, 6k and 2k respectively.
Area of four walls = $2 \times 2k(4k + 6k) = 40k^2$
The area of the four walls of the room did not change.

Alternative solution:

The area of the four walls of the room = perimeter × height.
Given perimeter is doubled and height is halved, there will be no change in the area required. Choice (A)

Q23. DIRECTIONS *for question 23:* Type in your answer in the input box provided below the question.
In Hitami theatre, the price of a ticket, which is paid for just before exiting the theatre, varies as P = Ax + By + C, where P is the price of the ticket, x is the number of hours spent inside the theatre and y is the number of popcorns purchased, with A, B and C being constants. Today, Ram spent three

hours inside the theatre and purchased seven popcorns. He would have spent Rs.300 less on the ticket had he either spent 2.5 hours less and bought three popcorns more OR spent 1.5 hours more and purchased five popcorns less.

What is the maximum number of hours that Ram could have spent inside the theatre with the amount that he spent?

Given Ram spent 3 hours and bought 7 popcorns.
Price he pays = 3A + 7B + C
He would have spent ₹300 less had he spent 2.5 hours less and bought 3 popcorns more $\Rightarrow$ 3A + 7B + C – 0.5A – 10B – C = 300 $\Rightarrow$ 2.5A – 3B = 300 $\rightarrow$ (1)
He would have spent ₹300 less had he spent 1 hour more and bought 6 popcorns less $\Rightarrow$ 3A + 7B + C – 4.5A – 2B – C = 300 $\Rightarrow$ 5B – 1.5A = 300 $\rightarrow$ (2)
2.5A – 3B = 5B – 1.5A $\Rightarrow$ 4A = 8B $\Rightarrow$ A = 2B
The amount spent on every two popcorns is the same as that on staying one hour in the theatre. Hence, if Ram had spent all the money on staying, he could have stayed for $\left(\frac{7}{2}\right)$ = 3.5 hours more, i.e., he could have spent a total of 6.5 hours in the theatre.

Ans: (6.5)

Q24. DIRECTIONS *for question 24:* Select the correct alternative from the given choices.
PQRS is a quadrilateral whose diagonals are perpendicular to each other. If PQ =16 cm, QR = 12 cm and RS = 20 cm, find PS.

a) $12\sqrt{2}$ **cm.**

b) $8\sqrt{2}$ **cm.**

c) $16\sqrt{2}$ **cm.**

d) $24\sqrt{2}$ cm.

Let I be the point of intersection of the diagonals.
The diagonals are perpendicular to each other.
$\therefore \angle PIS = \angle PIQ = \angle SIR = \angle RIQ = 90°$
$PS^2 + QR^2 = PI^2 + IS^2 + IQ^2 + IR^2$
$\Rightarrow (PI^2 + IQ^2) + (IS^2 + IR^2) = PQ^2 + RS^2$
$PS^2 + 12^2 = 16^2 + 20^2$
$\Rightarrow PS = 16\sqrt{2}$

Choice (C)

Q25. DIRECTIONS *for question 25:* Type in your answer in the input box provided below the question.
The average weight of A, B and C is 20 kg. If the average weight of B, C and D is 18 kg, and the weight of D is 14 kg, find the weight of A.

Let the weights of A, B, C and D be a, b, c, and d respectively.
Given, $a + b + c = 20 \times 3 = 60$
$b + c + d = 18 \times 3 = 54$
From this, $a - d = 6$
Given that $d = 14$.
Therefore, $a = d + 6 = 20$ Ans: (20)

Q26. DIRECTIONS *for questions 26 to 29:* Select the correct alternative from the given choices.
On a certain day, a fruit vendor sells 40 percent of the avocados she had and throws away 25 percent of the remainder. The next day, she sells 60 percent of the remaining avocados and throws away the rest. What percentage of the total avocados did she throw away?

a) **12%**

b) **33%**

c) **16.67%**

d) 45%

Let the total number of avocados be 100.
On Day 1, 25% of (100 – 40) = 15 avocados were thrown away.
On Day 2, 40% of 75% of 60 = 18 avocados were thrown away.
∴ 15 + 18 = 33 avocados were thrown away, i.e., 33%. Choice (B)

Q27. DIRECTIONS *for questions 26 to 29:* Select the correct alternative from the given choices.
In a cricket club, 75% of the players are batsmen and 12% of the players are neither batsmen nor bowlers. If 64% of the players are bowlers, what percentage of players are both batsmen and bowlers?

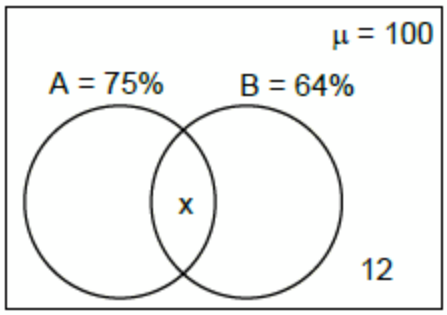
a) **51%**

b) **24%**

c) **13%**

d) 27%

Consider the following venn diagram: $\mu = 100$



Let A → Batsmen; B → Bowlers and given neither = 12.
Now, $A \cup B = 100 - \text{neither} = 88$
$\Rightarrow 75 + 64 - x = 88$
$\Rightarrow x = 51$

Choice (A)

Q28. DIRECTIONS *for questions 26 to 29:* Select the correct alternative from the given choices.
At how many points do the graphs $y = 4x^2 + 5$ and $y = 5x + 4$ intersect?

a) **3**

b) **0**

c) **2**

d) None of the above

To find out the points of intersection, equate both the expressions, i.e. $4x^2 + 5 = 5x + 4$

$4x^2 - 5x + 1 = 0$

$x = \frac{[5 \pm \sqrt{(25 - 4 \times 4)}]}{8} = \frac{[5 \pm 3]}{8} = 1 \text{ or } \frac{1}{4}$

When $x = 1$, $y = 4.1 + 5 = 5.1 + 4 = 9$

When $x = \frac{-1}{4}$, $y = 4\left(\frac{1}{4}\right)^2 + 5 = \frac{1}{4} + 5 = 5\left(\frac{1}{4}\right) + 4 = \frac{21}{4}$

Therefore, there exist two points of intersection. Choice (C)

Q29. DIRECTIONS *for questions 26 to 29:* Select the correct alternative from the given choices.
If f(x) = f(x – 1) – f(x + 1), while f(1) = 3 and f(4) = 1, what is the value of f(7)?

a) **–1**

b) **–2**

c) **0**

d) 2

f(1) = f(0) – f(2) = 3
f(3) = f(2) – f(4) = f(2) – 1
f(2) = f(1) – f(3) = f(1) – f(2) + 1
2f(2) = 4. Hence f(2) = 2
f(3) = f(2) – 1 = 1
Now f(4) = f(3) – f(5). From this, we can say that the value of f(5) = 0
f(4) = 1 = f(3) – [f(4) – f(6)] = 1 – 1 + f(5) – f(7)
From this, f(7) = –1 Choice (A)

Q30. DIRECTIONS *for questions 30 and 31:* Type in your answer in the input box provided below the question.
There are 13 persons – four Slytherins, three Ravenclaws, and six Gryffindors – in a magic club. A team of six people should be selected (from the above persons) for a competition such that there are exactly three Gryffindors in the team and at least one person each from among Ravenclaws and Slytherins. In how many ways can the team be selected?

Three Gryffindors can be selected in ${}^{6}C_{3}$ ways i.e. 20 ways.
Since at least one Ravenclaw and one Slytherin should be selected, the remaining three members can be (2 Slytherins and 1 Ravenclaw) or (2 Ravenclaws and 1 Slytherin).
The number of ways in which 2 Slytherins and 1 Ravenclaw can be selected is ${}^{4}C_{2} \times {}^{3}C_{1} = 18$ ways
The number of ways in which 1 Slytherin and 2 Ravenclaws can be selected is ${}^{4}C_{1} \times {}^{3}C_{2} = 12$ ways
Therefore, the total number of ways in which the team can be selected is $20 \times (18 + 12)$ = 600 ways. Ans: (600)

Q31. DIRECTIONS *for questions 30 and 31:* Type in your answer in the input box provided below the question.
Montex bought a book that had 144 pages, numbered from 1 to 144. He took a pen and circled all the 4's that appeared in the page numbers. How many circles did he draw in all?

The number of circles he drew is equal to the number of times the digit 4 appears in numbers from 1 to 143.
The digit four appears once in 4, 14, 24, 34, 40, 41, 42, 43, 45, 46, 47, 48, 49, 54, 64, 74, 84, 94, 104, 114, 124, 134, 140, 141, 142 and 143. It appears twice in 44 and 144.
Therefore, the number of circles drawn by Montex = $26 \times 1 + 2 \times 2 = 30$.

Alternative Solution:

Considering the numbers 1 to 100
The digit 4 appears in the units place exactly 10 times and in the tens place also a exactly. 10 times. Similarly, considering from 101 to 144, the digit 4 appears in the units place exactly 5 times and in the tens place also exactly 5 times.
$\therefore$ A total of (10 + 10) + (5 + 5) = 30 times. Ans: (30)

Q32. DIRECTIONS *for question 32:* Select the correct alternative from the given choices.
Krish gave Santy a certain amount of money everyday, for not more than a week, such that the amount that he gave Santy was Rs.2 more than what he gave her the previous day. At the end of each day, Santy counted the total amount that she had with her and when that amount became a perfect square, she bought a doll. If Krish gave her either Rs.12 or Rs.13 on the first day, what is the price (in Rs.) of the doll?

a) **64**

b) **121**

c) **100**

d) Cannot be determined

Case 1: Krish gave Santy ₹12 on the first day.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total amount with Santy at the end of that day	12	26	42	60	80	102	126

Since the cumulative sum on any day is not a perfect square, we can infer that Krish did not give Santy ₹12 on Day 1.
Hence, Krish gave Santy ₹13 on Day 1.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Total amount with Santy at the end of that day	13	28	45	64			

The cumulative sum became a perfect square i.e. 64, on Day 4.
Therefore, the price of the doll is ₹64. Choice (A)

Q33. DIRECTIONS *for question 33:* Type in your answer in the input box provided below the question.
S is an arithmetic progression with 40 elements, such that the first two terms are 4 and 9 respectively. R is another arithmetic progression with 50 elements, such that the first two terms are 8 and 11 respectively. How many elements do R and S have in common?

Common difference of the arithmetic progression S is 9 – 4 = 5. Therefore, any element in S will be of the form $t_{a+1} = 4 + 5a$.
Similarly, any element in R will be of the form $t_{b+1} = 8 + 3b$. To find the common elements in both the progressions equate the general terms, i.e. $4 + 5a = 8 + 3b$
$a = \frac{(4+3b)}{5}$
Since a and b have to be integers, 4 + 3b should be a multiple of 5.
Possible values of b are 2, 7, 12, 17, ..., 47.
But R has only 50 terms, $b \leq 49$ (and also $a \leq 39$)
Hence, b = 2, 7, 12, … 47 are the only common terms, i.e., a total of ten terms.

Ans: (10)

Q34. DIRECTIONS *for question 34:* Select the correct alternative from the given choices.
How many integral values of x satisfy the equation $3^{\sqrt{x}} + 4^{\sqrt{x}} = 5^{\sqrt{x}}$?

a) **0**

b) **1**

c) **2**

d) 3

The only value of $\sqrt{x}$ for which this equation will be valid is when $\sqrt{x} = 2$, since $3^2 + 4^2 = 5^2$.
Hence, $\sqrt{x} = 2$. Therefore x = 4. Choice (B)

Note: For any real number, a, $3^a + 4^a > 5$, for $a < 2$ and $3^a + 4^a < 5^a$, for $a > 2$.