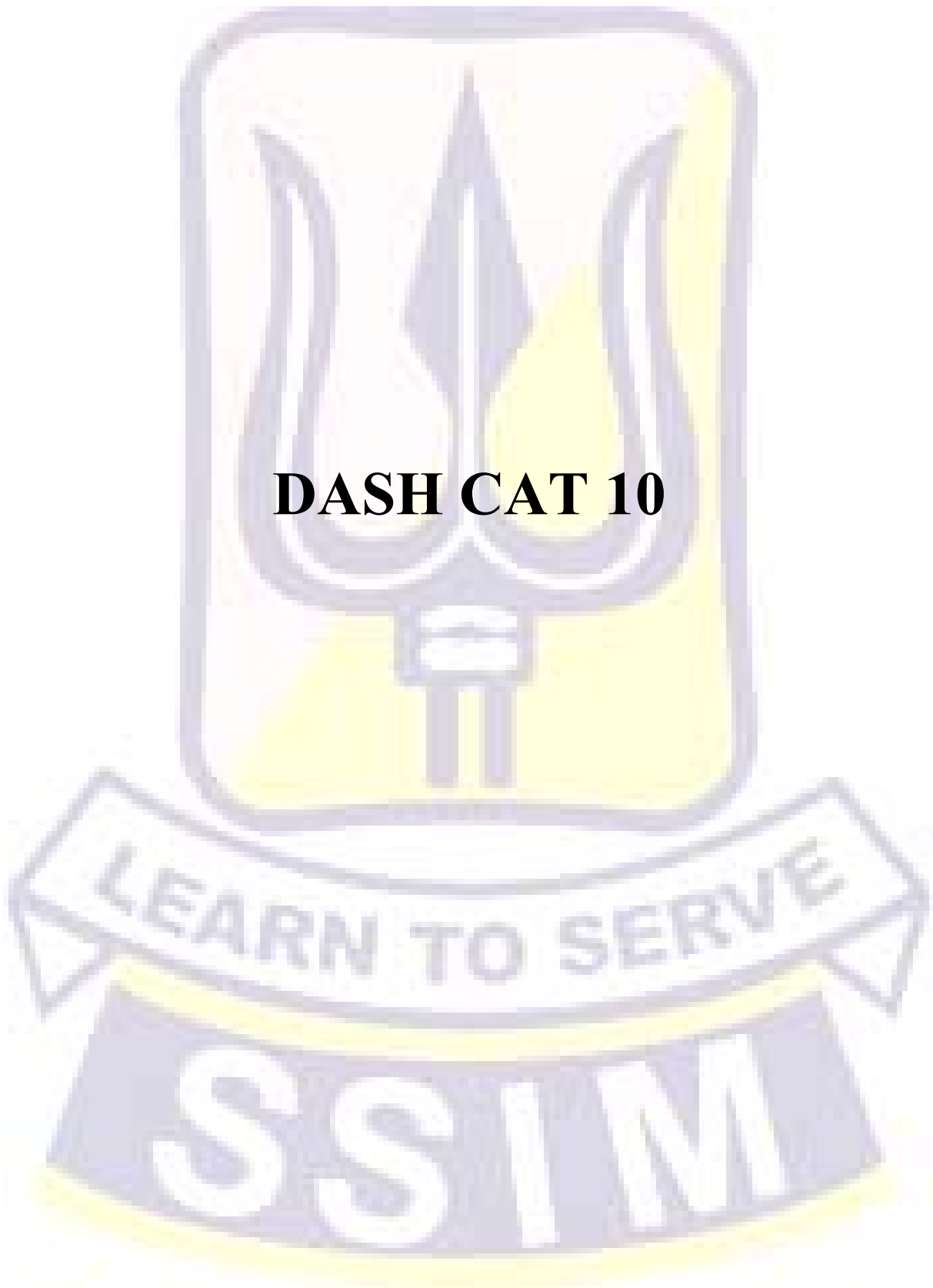




# DASH CAT 10





DASH CAT 10

Instructions

**The passage below is accompanied by a set of questions. Choose the best answer to each question.**

In European colonial literature, often the indigenous person or group is continually othered by restricting them to the margins of the story - and who they are is solely defined by the white narrator, protagonist or white characters, frequently in negative terms. In the case of Joseph Conrad's classic novella *Heart of Darkness*, that perspective comes from a seaman called Marlow who is sharing the story of his pursuit of Kurtz, a corrupted ivory trader who had gone Awol in the then recently-established Congo Free State (now the Democratic Republic of Congo). "The prehistoric man was cursing us, praying to us, welcoming us - who could tell?" Marlow says, when a tribe of Africans gather on the shore of the Congo river where his steamer is travelling. "We are accustomed to look upon the shackled form of a conquered monster, but there - there you could look at a thing monstrous and free."

Later, Marlow compares the African 'savage' who serves as the fireman on the ship to "a dog in a parody of breeches and a feather hat walking on his hind legs". It's these instances that serve to dehumanise the African people, says Adebé. "Can nobody see the preposterous and perverse arrogance in thus reducing Africa to the role of props for the break-up of one petty European mind?" he writes. "But that is not even the point. The real question is the dehumanisation of Africa and Africans which this age-long attitude has fostered and continues to foster in the world." Even the final motif of Marlow looking at the darkness of London, which is meant to mirror the darkness he associates with the African territory, suggesting the two continents are one and the same, Conrad brings down Europe to the uncivilised standard in which Africa is held in the West's perception rather than allowing for the idea that the African way of life is civilised by its own determination of the word. Thus Marlow, and by extension Conrad, never stops seeing the African people as wild savages.

This perception and marginalisation was copied and pasted onto the Vietnamese people by Francis Ford Coppola in *Apocalypse Now* [...] The film, set during the Vietnam War, follows an American soldier (Captain Willard, played by Martin Sheen) sent into the warzone to take out a rogue colonel. Coppola portrayed Vietnam in the same way as Conrad presented the former Belgian Congo: an endless wilderness filled with savages who use arrows, spears and were primitive enough to be hoodwinked into thinking Marlon Brando's Colonel Kurtz, like literary Kurtz, was a god-like leader to be worshipped [...] By painting one ethnic group with the stereotypical traits of another ethnic group located 10,000km (6,213 miles) away and more than 50 years earlier, Coppola serves up a classic example of Orientalism. This term was coined by Edward W Said in his book of the same name, published a year before the release of *Apocalypse Now*, which offers a critique of the West's commonly held view of Africa, Asia and the Middle East as 'the Orient', a negative portrayal that continues to be reinforced in the "electronic, post-modern world". "Television, the films, and all the media's resources have forced information into more standardised molds," Said writes.

**1. The statements made by Marlow have been cited in the first paragraph**

A. to elicit a feeling of repulsion towards white characters in European colonial literature who marginalise and mistreat indigenous groups.



- B. to showcase the flawed perceptions of white European characters regarding the monstrous nature of indigenous individuals or groups.
- C. to highlight the bigotry of white characters in European colonial literature who almost always portray indigenous groups with great disdain and dehumanise them.
- D. to point out the racist description of non-white groups by white European characters, who perceived others as culturally inferior.

**Sol.** *In European colonial literature, often the indigenous person or group is continually othered by restricting them to the margins of the story - and who they are is solely defined by the white narrator, protagonist or white characters, frequently in negative terms. In the case of Heart of Darkness, that perspective comes from a seaman called Marlow...*

We infer from the above that Marlow's opinion has been cited to highlight the biased and condescending treatment of the indigenous people in European colonial literature. As Adebé mentions subsequently, such portrayal reflects the "preposterous and perverse arrogance (of such characters/authors) in thus reducing Africa to the role of props for the break-up of one petty European mind". Hence, Option C is the correct answer.

The other options are not in line with what the author is trying to say:

Option A contains a distortion; the focus is not simply on how white characters mistreat indigenous groups but on the impact of such depictions on perceptions about the latter [the outcome: it dehumanises such groups]. Furthermore, we cannot definitively say that the intention is to elicit a feeling of repulsion; a broader point is being made.

Option B strays from the core idea: the author does not discuss whether indigenous people are monstrous or not, i.e. the author does not set out to correct the perceptions of the white characters. The depiction of indigenous people in such a manner merely reflects the contempt that white characters in European colonial literature possess.

Option D introduces the idea of cultural inferiority, which has not been implied or discussed. Hence, Option C is the correct choice.

**2. The simile mentioned in the second paragraph becomes a point of contention primarily because:**

- A. it allows and fosters the enduring discriminatory practice of dehumanising indigenous groups
- B. it entrenches the belief that Africans are wild savages incapable of matching the West's civilised standards.
- C. it continues to reinforce the West's perception of Africa and Africans being uncivilised.
- D. it justifies the marginalisation of indigenous groups by asserting that the African way of life is uncivilised.

**Sol.** *Later, Marlow compares the African 'savage' who serves as the fireman on the ship to "a dog in a parody of breeches and a feather hat walking on his hind legs". It's these instances that serve to dehumanise the African people, says Adebé. "Can nobody see the preposterous and perverse arrogance in thus reducing Africa to the role of props for the break-up of one*



*petty European mind?” he writes. “But that is not even the point. The real question is the dehumanisation of Africa and Africans which this age-long attitude has fostered and continues to foster in the world.”*

The simile mentioned in the above paragraph is the comparison of the African 'savage' in a dehumanizing manner. However, the main reason why Adebé raises an objection is that this fosters an age-long attitude of dehumanization of Africa and Africans, thus propagating a discriminatory practice. Thus, Option A is the correct answer.

**3. Based on the passage, the author is most likely to agree with which of the following statements?**

- A. Conrad’s dehumanised representation of African people merely stemmed from the need to entertain and cater to the perceptions of contemporary Europeans.
- B. Electronic media has enabled the propagation of skewed information and thereby facilitated further stereotyping of the Orient.
- C. The metaphorical comparison of London to the African territory in the novella Heart of Darkness lays charges against the Europeans for their prejudice.
- D. Marlow’s outright contempt for the Africans is not unlike that of Colonel Kurtz’s perception of Vietnamese savages in Apocalypse Now.

**Sol. Option A:** We cannot substantiate this claim. There is no reference to the motive being 'a need to entertain and cater to the perceptions of contemporary Europeans.'

**Option B:** We can infer this from the following excerpt: {*...a negative portrayal that continues to be reinforced in the “electronic, post-modern world”. “Television, the films, and all the media’s resources have forced information into more standardised molds,” Said writes...*}

**Option C:** The intention of comparing the darkness in London to the darkness associated with the African territory is presented differently. Far from highlighting prejudice of any kind, such a comparison merely tarnishes the way in which Africa and Africans are viewed. {*... Conrad brings down Europe to the uncivilised standard in which Africa is held in the West’s perception rather than allowing for the idea that the African way of life is civilised by its own determination of the word...*}

**Option D:** The author does not present Kurtz's view of the savages and thus, we can eliminate this choice.

Hence, Option C is the correct answer.

**4. All of the following would qualify as examples of Orientalism EXCEPT:**

- A. A French best-seller novel describing all of present-day Middle East as an underdeveloped society with strict, primitive rules curbing freedom.
- B. An acclaimed Hollywood movie painting India as a land of snake charmers rife with superstitions and exotic food.
- C. A popular British band’s music video depicting all Chinese people as individuals who eat nothing but raw meat and live animals.



D. An American short film portraying Sudan's political scene as being overrun with corruption scandals and administrative malpractices.

**Sol.** {...By painting one ethnic group with the stereotypical traits of another ethnic group located 10,000km (6,213 miles) away and more than 50 years earlier, Coppola serves up a classic example of Orientalism. This term was coined by Edward W Said in his book of the same name, published a year before the release of *Apocalypse Now*, which offers a critique of the West's commonly held view of Africa, Asia and the Middle East as 'the Orient', a negative portrayal that continues to be reinforced in the "electronic, post-modern world"...}

In options A, B and C, the cultural/social elements are distorted inappropriately [and perhaps without any basis]; these appear to reflect certain stereotypes furthered by the West. Contrarily, Option D might still turn out to be an accurate depiction of the political setup in Sudan and is not necessarily a stereotype.

Hence, Option D is the correct choice.

### Instructions

**The passage below is accompanied by a set of questions. Choose the best answer to each question.**

How do friendships facilitate the development of empathy? According to social learning theory, empathic friends serve as role models for adolescents. Repeated interactions with empathic friends provide opportunities for the modelling and observation of empathic concern, turn-taking, and taking others' perspectives. When one friend responds empathically to another, that response is felt as supportive, which can strengthen the friendship bond and increase the likelihood of future empathic responding among the friends. In addition, mutual disclosure among friends provides them with the opportunity to learn about others' thoughts, intentions and emotions, and maintaining friendships over time requires learning to negotiate the needs of all parties.

We recently conducted research that helps to further illuminate how friendship might affect empathy development during adolescence. We analysed questionnaire data from 318 adolescents in Sweden, collected by the researcher Erik Amnå and his team on two occasions, one year apart. Each adolescent reported the names of up to eight friends at school, and if a peer confirmed the friendship, we treated these students as friendship pairs. Members of the friendship pairs also each rated how well certain empathy-related statements described them personally. These prompts covered two forms of empathy: perspective-taking, the ability to adopt the viewpoints of other people (eg, 'Sometimes I try to understand my friends better by imagining how things would look from their perspective'); and empathic concern (eg, 'When I see someone being taken advantage of, it feels like I want to protect that person').

Our results indicate that, for optimal empathy development, it's not enough to simply have *any* friends. We found that adolescents who had a lot of friends weren't necessarily more empathic - that is, they were not more inclined to try to see other people's points of view, and weren't more concerned about others than were adolescents with fewer friends. What seems to



matter is having empathic friends. Adolescents whose friends rated relatively highly on measures of perspective-taking and empathic concern tended to increase more in their own self-rated empathy over the course of a year, compared with those who had less empathic friends.

Other research that we have conducted shows a similar pattern: having one friend with an immigrant background was associated with increases in adolescents' empathy and positive attitudes towards immigrants over time. Having a greater number of immigrant friends, however, did not seem to play a role. So, it may be the quality rather than the quantity of friendships that matters most to adolescent empathy development.

[...]Despite the apparent power that peers have to encourage empathy development, there are processes that might get in the way of such positive effects. We know that adolescents tend to select friends who are similar to them. That means that empathic youth are likely to select relatively empathic friends, while less empathic youth might select friends who are similarly lower in empathy. By befriending low-empathy peers, adolescents who are low in empathy themselves could miss out on the lessons that friendships with empathic peers offer. This may exacerbate the social difficulties of these youth.

### 5. The penultimate paragraph

- A. reaffirms the need to have friends from varied backgrounds to develop empathy in adolescents.
- B. emphasises how having empathic friends matters more than having a greater number of friends.
- C. suggests that adolescents should focus on quality and not quantity when it comes to their peer group.
- D. highlights the change in future attitudes as a result of interactions during adolescence.

**Sol.** {*...Other research that we have conducted shows a similar pattern: having one friend with an immigrant background was associated with increases in adolescents' empathy and positive attitudes towards immigrants over time. Having a greater number of immigrant friends, however, did not seem to play a role. So, it may be the quality rather than the quantity of friendships that matter most to adolescent empathy development...*}

The author emphasises that having empathic friends is more significant than having many friends. In this context, he claims that quality, and not quantity, is essential for developing empathy in adolescents. Option B correctly captures this.

Option A: This has not been implied in the passage. While the example revolving around friends with an immigrant background is cited, the intention is not to assert having friends with varied perspectives.

Option C: While the statement here might sound correct, it is vague and fails to capture the idea of empathic interactions. Quality over quantity is presented in the context of friendship and empathy; this is not highlighted in Option C (as opposed to Option B).

Option D: The idea mentioned here is tangential to the discussion and fails to capture the message conveyed by the penultimate paragraph.



**6. Friendships facilitate the development of empathy in all of the following ways EXCEPT:**

- A. Adolescents feel protected due to the supportive nature of empathic peer group interactions, thereby increasing the likelihood of future empathic responding.
- B. Recurrent correspondence with empathetic friends influences adolescents by providing them with options to observe and mould behaviour.
- C. Adolescents, when interacting with an empathic peer group, learn to respect varied perspectives and realise the importance of negotiating the needs of all group members.
- D. Empathic communication within peer groups strengthens friendships and paves the way for more empathic future interactions among group members.

**Sol. Option A:** The term “protected” distorts the statement; such an idea has not been mentioned in the passage.

**Option B:** This can be understood from the following - *“Repeated interactions with empathic friends provide opportunities for the modelling and observation of empathic concern, turn-taking, and taking others’ perspectives.”*

**Option C:** The statement here is drawn from - *“In addition, mutual disclosure among friends provides them with the opportunity to learn about others’ thoughts, intentions and emotions, and maintaining friendships over time requires learning to negotiate the needs of all parties.”*

**Option D:** This has been explicitly highlighted in the following excerpt - *“When one friend responds empathically to another, that response is felt as supportive, which can strengthen the friendship bond and increase the likelihood of future empathic responding among the friends.”*  
Hence, Option A is the correct choice.

**7. As per the passage, a potential issue associated with the process of using peer groups to foster empathy development is that**

- A. empathic youth are likely to select relatively empathic friends, while less empathic youth might end up being left out.
- B. adolescents might end up becoming less empathetic if they select low-empathy peers.
- C. association with low-empathy peers might aggravate existing social issues faced by adolescents exhibiting low empathy.
- D. low-empathy adolescents might miss out on the lessons that friendships with empathic peers offer.

**Sol.** The author clearly delineates the issue as follows: {*...By befriending low-empathy peers, adolescents who are low in empathy themselves could miss out on the lessons that friendships with empathic peers offer. This may exacerbate the social difficulties of these youth...*} The limitation presented is that association with low-empathy peers might aggravate existing social issues faced by adolescents exhibiting low empathy. **Option C** aptly captures this.



Option A: The phrasing here is incorrect; the author states - {...empathic youth are likely to select relatively empathic friends, while less empathic youth might select friends who are similarly lower in empathy...} There is no mention of the latter being 'left out.'

Option B: We cannot infer this from the passage.

Option D: The statement here is true but fails to highlight the issue. Low-empathy adolescents might miss out on the lessons that friendships with empathic peers offer is that they might; the outcome: this might aggravate existing social issues faced by these individuals. Since Option D fails to mention the consequences, we can eliminate it.

**8. Which of the following piece of information can be used to criticise the social learning theory?**

A. Studies have shown a significant correlation between family environment and empathetic behaviour and, as such, attributing such tendencies merely to the peer group fails to paint a holistic picture.

B. Behavioural scientists have identified that the future attitudes of adolescents towards social issues are influenced by a complex mixture of factors that involve, but are not limited to, financial, social, and religious elements.

C. Multiple reports indicate that the ability of some adolescents to discern and pick out peers possessing similar tendencies or those that serve as role models is grossly overrated.

D. Research has established that adolescents have a significant amount of control over their behaviour and, as such, they don't necessarily reproduce poor behaviour, like violence, or good behaviour, like kindness, merely because they experience it.

**Sol.** {...According to social learning theory, empathic friends serve as role models for adolescents. Repeated interactions with empathic friends provide opportunities for the modelling and observation of empathic concern, turn-taking, and taking others' perspectives...}

The underlying premise: adolescents are impressionable - they get affected by the behaviour of those around them. If any of the provided information allows us to undermine this premise, it can be used to criticise the social learning theory.

Option A: The author does not discount the role of the family in fostering empathetic behaviour; he simply focuses on how friendship "facilitates" the development of such tendencies. It is quite possible that both these elements contribute equally to the development of empathy. Therefore, this information does very little to undermine the social learning theory, as presented in the passage.

Option B: The information here is not relevant to the stated theory. The role of friendship in fostering empathy is the focus and not the future attitudes of adolescents towards social issues; while the impact of empathic interactions on the same is discussed, it is not attached to the theory.

Option C: Even if true, this information does not undermine the premise of the theory. While we can argue that the ability to pick role models might be overrated, what is valid for 'some adolescents' cannot be extended to all. Since the theory is presented as a generalized statement, Option C does very little to counter it.

Option D: If true, this would weaken the premise of the theory since it shows that adolescents do not reproduce the behaviour of those around them merely because they see it. Hence, seeing someone being empathetic is not sufficient to drive them to become empathetic. This would





greatly undermine the idea that peers exercise influence over adolescent behaviour. One could use the information to elicit the thought that perhaps, friendship as a standalone variable, does not explain empathic behaviour among adolescents.

Hence, Option D is the correct choice.

### Instructions

**The passage below is accompanied by a set of questions. Choose the best answer to each question.**

Simply looking at a cycad can take you back in time. The rough, stout trunk rising into a spray of stiff, palm-like leaves can feel better suited to the Late Cretaceous than our modern world, as if a horned dinosaur might amble up to shear off a mouthful of the tough vegetation. But while cycads have been around for a very long time, they are hardly living fossils. Cycads have undergone dramatic changes through their storied history—and it may be up to us to save them. Despite surviving multiple mass extinctions, many cycad species are in danger of disappearing because of humans. We're not only altering the habitats where these resilient plants grow, but a growing trade in rare and endangered cycads is threatening to erase plants that have flourished for millions of years.

Cycads predate even the earliest dinosaurs. Around 280 million years ago, in what's now Brazil's Paraná Basin, there grew a plant with a tough, scaly outer coating. Paleobotanists know this plant as *Iratinia australis*, the oldest-known cycad. "These fossils already have many of the characters seen in living cycad families," says Mario Coiro of the Ronin Institute, "though in unexpected combinations." This early flowering of cycads is part of a paleobotanical story that involves plants that are unfamiliar to our modern eyes. "We know they are related to other interesting lineages of plants, like seed ferns, that are all extinct now," says Universidad de Antiquia botanist Cristina Lopez-Gallego. Yet cycads didn't meet immediate success. The plants survived the worst mass extinction of all time at the end of the Permian Period, 252 million years ago, before proliferating alongside early dinosaurs and mammals in the Triassic.

At a glance, cycads might not seem all that different from a small palm tree or other familiar plants. But appearance can be deceiving. Cycads are technically gymnosperms, the broad family of plants that includes conifers. Somewhat like a pine, cycads bear cones that hold their seeds—structures technically known as strobili that grow in the center of the plant's crown. Some cycads are small, growing only a few inches off the ground, while others can tower over your head. Still, the pineapple-like shape, frond-like leaves and cones have been a mark of cycads for a very long time.

Between 200 and 66 million years ago, especially, cycads were seemingly everywhere and certainly were fodder for many a dinosaur. Paleontologists have even speculated that dinosaurs helped the spread of cycads by eating the fruits of these plants, including the seeds inside. The creatures might have dropped embryonic cycads in new places, complete with some fresh fertilizer to aid their growth. The plant's longstanding record and frequent use as window-dressing in paleoart leads to the impression that cycads have stodgily been in evolution's slow lane ever since, but botanists are finding that these plants have been much more responsive than anyone appreciated.



A 2011 study found that cycads have been responding to changes in Earth's climate and evolving rapidly to keep up with our changing planet. About 300 living species of cycad now exist, but most of them are not older than about twelve million years. What we are seeing is a diversification of cycads that happened much closer in time to us than the cycads that lived in forests stalked by Allosaurus back in the Jurassic.

**9. The author remarks that Cycads are better suited to the Cretaceous period because:**

- A. modern-day conditions are unfavourable to cycads, given how they are in danger of disappearing.
- B. their appearance is reminiscent of vegetation in the pre-historic period.
- C. they are as old as, if not older than, dinosaurs of the Cretaceous era.
- D. their traits have not evolved much after the Cretaceous era, giving them a prehistoric look.

**Sol.** "...Simply *looking* at a cycad can take you back in time. The rough, stout trunk rising into a spray of stiff, palm-like leaves can feel better suited to the Late Cretaceous than our modern world, as if a horned dinosaur might amble up to shear off a mouthful of the tough vegetation..." In the above excerpt, the author remarks on the appearance of cycads; he states that cycads are reminiscent of the prehistoric era in terms of how its traits resemble vegetation during this period. We are subsequently informed that cycads actually originated 280 million years ago and have undergone a long process of evolution. Thus, given its appearance, the author feels that cycads might be better suited to the Cretaceous period. Option B correctly focuses on this idea and is the correct answer.

Although Options A and C are true, these are not the reasons behind the author's comment. Option D contradicts what has been mentioned in the passage; we have been told that cycads have shown great responsiveness to changes and have adapted accordingly.

**10. The last paragraph serves to**

- A. quash the misconception that cycads have been evolving slowly by presenting evidence of how they have been responsive and constantly adapting over time.
- B. compare and cite how cycads evolved more rapidly in the presence of humans as opposed to the slow rate of evolution observed during the prehistoric age of dinosaurs.
- C. emphasise the fact that human activity has accelerated the evolutionary process of cycads, causing them to undergo dramatic changes in the recent past.
- D. inform readers that though the origin of cycads can be traced to a period as far back as 280 million years ago, the existing specimens are not older than about 12 million years.

**Sol.** "...The plant's longstanding record and frequent use as window-dressing in paleoart *leads to the impression that cycads have stoddily been in evolution's slow lane ever since, but botanists are finding that these plants have been much more responsive than anyone*



*appreciated...A 2011 study found that cycads have been responding to changes in Earth's climate and evolving rapidly to keep up with our changing planet..."*

Based on the highlighted part, we understand that the common perception about the slow evolution of cycads is untrue, given that recent studies have shown the constant responsiveness and adaptability of these plants. Therefore, the study highlighted in the last para quashes the misconception that cycads have been evolving slowly by presenting evidence of how they have been responsive and constantly adapting over time. Option A is the correct choice.

While Options B and C are touched upon in the final paragraph, the author does not intend to emphasise the comparison. Nor is the focus solely on the changes that these plants have undergone. Instead, the focus is on the facets highlighted by these changes [i.e. the responsiveness and adaptability of cycads]. Option D is not implied from the final paragraph and, thus, can be eliminated.

Hence, Option A is the correct choice.

**11. None of the following statements is false EXCEPT:**

A. Despite belonging to different families of plants, cycads are deceptively similar in appearance to palm trees.

B. The oldest known cycad fossil is marked by traces of certain traits found in living cycad families.

C. Unlike the modern day, cycads thrived in the period between 200 and 66 million years ago, with dinosaurs aiding their proliferation.

D. Cycads were the only plants that survived the worst mass extinction of all time at the end of the Permian Period, 252 million years ago.

**Sol. Option A:** The statement here is true based on the following excerpt - *{...At a glance, cycads might not seem all that different from a small palm tree or other familiar plants. But appearance can be deceiving. Cycads are technically gymnosperms, the broad family of plants that includes conifers...}*

**Option B:** We can infer this from the following excerpt - *{...Cycads predate even the earliest dinosaurs. Around 280 million years ago, in what's now Brazil's Paraná Basin, there grew a plant with a tough, scaly outer coating. Paleobotanists know this plant as *Iratinia australis*, the oldest-known cycad. "These fossils already have many of the characters seen in living cycad families," says Mario Coiro of the Ronin Institute, "though in unexpected combinations"..."}*

**Option C:** This statement is correct - *{...Between 200 and 66 million years ago, especially, cycads were seemingly everywhere and certainly were fodder for many a dinosaur. Paleontologists have even speculated that dinosaurs helped the spread of cycads by eating the fruits of these plants, including the seeds inside...}*

**Option D:** We know that cycads survived the worst extinction; however, claiming that they were the **sole** plants that survived this event would be incorrect. *{...The plants survived the worst mass extinction of all time at the end of the Permian Period, 252 million years ago, before proliferating alongside early dinosaurs and mammals in the Triassic...}*

Hence, Option D is the correct choice.



12. Based on the passage, the difficulty that cycads faced in meeting immediate success can be best attributed to:

- A. the absence of dinosaurs to aid the spread of these plants when they first originated 280 million years ago.
- B. the growing trade in rare and endangered cycads that rendered these plants vulnerable to extinction.
- C. the multiple catastrophic events that resulted in unfavourable conditions for the proliferation of these plants.
- D. change in the habitats where these resilient plants grow as a result of continued human activity.

**Sol.** "...Yet cycads didn't meet **immediate success**. The plants survived the **worst mass extinction** of all time at the end of the Permian Period, 252 million years ago, **before proliferating alongside** early dinosaurs and mammals in the Triassic..."

The author explicitly mentions that extinction level events were why cycads could not meet 'immediate success.' Option C correctly captures this. While the remaining options are presented as challenges, they are not relevant to the given question. Hence, Option C is the correct choice.

### Instructions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

Consider the recent drama in Florida. The evident retaliation by Gov. Ron DeSantis and his Republican allies against Disney, a major corporate player in their state, is part of a larger trend: What critics once called the party of big business is now eager to lash out at large companies and even nonprofits it deems inappropriately political — which in practice means anti-Republican.

Conservatives angry at technology platforms over what they see as unfair treatment of right-of-centre viewpoints have found a champion in a Republican senator, Josh Hawley of Missouri, who has introduced bills to reform legal protection for certain social media platforms and offered the Bust Up Big Tech Act. J.D. Vance, running in the Ohio Republican Senate primary, has suggested that we “seize the assets” of the Ford Foundation and other progressive NGOs; he also called for raising the taxes of companies that showed concerns about state-level voting legislation favoured by Republicans last year. Leading right-wing commentators, from Tucker Carlson of Fox News to Ben Shapiro of The Daily Wire, cheer the efforts on.

Too many conservatives seem to have no qualms today in wielding state power to punish their political opponents and shape the economy to their whims. This is not just a departure from the Republican consensus of the last half-century. It is a wholesale rejection of free markets and



the very idea of limited government. It will make America poorer and the American people more vulnerable to tyranny.

Republicans' reversal is easy enough to explain: As companies increasingly accede to activist demands to make themselves combatants in a culture war, they have alienated broad swaths of the population. Twenty years ago, according to Gallup, fewer than half of Americans said they were somewhat or very dissatisfied with "the size and influence of major corporations." Today, that number is 74 per cent. Defending economic liberty is now passé. Taking on "big business" has become an effective way to score political points on the right, at least when the businesses are also seen as "woke."

The change may be politically expedient, but it will have grave costs. Conservatives once understood that free markets are an engine that produces widespread prosperity — and that government meddling is too often a wrench in the works. Choosing winners and losers, and otherwise substituting the preferences of lawmakers and bureaucrats for the logic of supply and demand, interferes with the economy's ability to meet people's material needs. If Republicans continue down this path, the result will be fewer jobs, higher prices, less consumer choice and a hampering of the unforeseen innovations that make our lives better all the time.

But conservatives are turning on more than markets; they may be turning on the rule of law itself. The First Amendment prohibits the government from abridging people's ability to speak, publish, broadcast and petition for a redress of grievances, precisely because the American founders saw criticizing one's rulers as a God-given right. Drawing attention to errors and advocating a better path forward are some of the core mechanisms by which "we, the people" hold our government to account. The use of state power to punish someone for disfavored political speech is a gross violation of that ideal.

### **13. The example of Disney has been cited to highlight which of the following?**

- A. The recent trend in American politics where the opinions from the other end of the political spectrum are highly criticized.
- B. The evolution of Republicans from the party of the 'big businesses' to being the party of small businesses and non-profits.
- C. The recent trend among Republicans to attack the big businesses that are not in line with their ideologies and policies.
- D. The trend among 'big businesses' to take political stances that antagonize conservative American politicians.

**Sol.** Consider the recent drama in Florida. The evident retaliation by Gov. Ron DeSantis and his Republican allies against Disney, a major corporate player in their state, is part of a larger trend: What critics once called the party of big business is now eager to lash out at large companies and even nonprofits it deems inappropriately political — which in practice means anti-Republican.

In the first paragraph, the author highlights that the attack on Disney is a part of a major trend: Republicans become antipathic towards the big businesses they were known to support just because they find the businesses political, which is a euphemism for dissenting views. Thus,



the example highlights the trend that the big businesses that are not in line with Republican ideologies will face their wrath. Option C comes the closest to capturing this, and hence, is the correct answer.

A: Option A is too broad. The example has been mentioned to highlight the intolerance of the Republicans in particular.

B: Option B is distorted. It implies that the Republicans have become the voices of the small businesses, which has not been mentioned.

D: Option D is not the correct answer, as the focus is on Republicans only and their attacks on certain big businesses.

**14. Which of the following, if true, undermines the author's argument in the penultimate paragraph?**

A. A recent survey indicated that most Conservatives support free market trade but under the condition that government legislators are able to periodically regulate certain undesirable elements.

B. Many groups and political representatives with left-of-centre viewpoints oppose free markets, given the higher level of unemployment and inequality that stems from it.

C. The criticism towards the Republican stance on administrative interference in free markets is more prominent in states governed by its political opponents than in states with more Conservatives.

D. Government intervention prevents monopoly in free markets and stops large firms from charging high prices to consumers and thwarting innovation by suppressing competitors.

**Sol.** The author asserts that government interference in a free market economy is undesirable. He lists down the repercussions of meddling with the free market - "*fewer jobs, higher prices, less consumer choice and a hampering of the unforeseen innovations.*" The option that presents a stance contrary to the aforementioned claim will significantly undermine the author's argument. Option D emphasises the need for government intervention in free markets to curb the power exercised by large firms. The idea here is that free markets might allow large firms to monopolise trade, which might be detrimental to the facets listed by the author, such as prices and innovation. The author assumes that free market trade will help lower prices and also foster innovation. However, the point in D indicates otherwise and weakens the author's claim.

Option A: If valid, the information here does not affect the author's assertion. Republicans are already interfering with free markets, and placing the interference on a condition does very little to weaken the argument.

Option B: The statement here goes on a tangent. Rather than focusing on how two sides of the political spectrum support the topic of free markets, the argument is concerning how government intervention in the same leads to undesirable outcomes. Hence, Option B does not undermine the author's claim.

Option C: The information here does not refute the claims presented in the penultimate paragraph; the source or degree of criticism is inconsequential.

Hence, Option D is the correct choice.



**15. Which of the following has been mentioned as a reason behind the change in the way Republicans handle big businesses?**

- A. The estrangement caused by the policies of the businesses themselves.
- B. A large number of businesses having 'woke' ideologies and work cultures.
- C. An increase in the level of intolerance among the masses against business people.
- D. A decrease in the number of supporters of economic liberty in the market.

**Sol.** *Republicans' reversal is easy enough to explain: As companies increasingly accede to activist demands to make themselves combatants in a culture war, they have alienated broad swaths of the population. Twenty years ago, according to Gallup, fewer than half of Americans said they were somewhat or very dissatisfied with "the size and influence of major corporations." Today, that number is 74 per cent. Defending economic liberty is now passé. Taking on "big business" has become an effective way to score political points on the right, at least when the businesses are also seen as "woke."*

A: It has been mentioned that the companies have made themselves combatants in a culture war. This policy led to estrangement of many, and hence the reprisal against the business by the government. Option A is the correct answer.

B: There is no indication about the number of businesses that are 'woke'. Option B is outside the scope.

C: An intolerance against general business people has not been mentioned anywhere.

D: It has not been mentioned that the number of supporters of economic liberty have decreased, only the political incentive for the preservation of the same has decreased.

**16. All of the following are examples of possible retaliatory measures by Republicans EXCEPT:**

A. Sanctioning a full-blown investigation into Google's operations based on the contention that they are using algorithms to manipulate Americans against conservatives.

B. Tweaking legal compliance standards so that large tech firms like Amazon can't buy other companies without proving that doing so will enhance competition and help consumers.

C. Passing an anti-trust bill against Meta by accusing it of infecting the media ecosystem with corporate liberalism and propagating censorship of political opinions.

D. Developing a robust legal strategy against Twitter's action of pulling down posts by conservative activists and think tankers, which conservatives view as a deliberate interference in political discourse.

**Sol.** *"What critics once called the party of big business is now eager to lash out at large companies and even nonprofits it deems inappropriately political — which in practice means anti-Republican."*

We understand that Republicans are using their power to retaliate against large companies; this retaliation is based on the premise that these firms are indulging in "anti-Republican" activities, which basically implies an ideologically antagonistic/opposing view or action. Thus, the



crackdown is largely a result of not supporting the Republican ideology, and the given options can be assessed using this criterion.

The investigation mentioned in Option A is an aggressive response to the belief that Google is manipulating Americans against conservatives. Similarly, in Option C, Republicans believe that Meta is fostering an environment of corporate liberalism and propagating censorship of political opinions. The anti-trust bill is a retaliatory measure. In Option D, conservatives viewed Twitter's actions as a deliberate interference in political discourse and consequently reacted with legal measures.

Unlike the other choices, the changes in compliance standards mentioned in Option B are not politically motivated (at least not evident enough). Hence, Option B is the correct choice.

**17. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.**

1. Women of colour who feel the same way are under attack from the left for supposedly playing along with the creepy racist and eugenicist tradition that wants to see the African-American population kept in check.
2. Then, of course, there is the question of what we think about men who never want children.
3. This film engages with those women who want to live their lives outside the tradition of partnership, homeownership and parenthood.
4. Women who do not want children are under attack from the right for being selfish and woke.
5. Therese Shechter's film is about the difficult and still taboo subject of women who don't want children (not now, not ever) and those who regret having had them, and must now persuade others and themselves that they are not therefore evil.

**Sol.** A brief reading of the sentences suggests that the paragraph is about a film about the taboo of women who do not have children.

53 is a mandatory pair that talks about the movie. Similarly, 41 is a mandatory pair that mentions the consequences of the taboo.

All the sentences given above deal with the taboo or highlight an aspect of the film, except 2. 2 runs tangent to the discussion by introducing the concept of men who do not want children. Hence, 2 is out of context here.

**18. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.**

1. If there were any doubts remaining about O'Sullivan's status as the greatest of all-time, they may now finally have been removed.
2. At times O'Sullivan is so laid back about the magnitude of his achievements in the game that he is practically horizontal.
3. It is the one thing which will mean so much since he first lifted the trophy aloft inside the Crucible 21 years ago.
4. But anyone who understands snooker can appreciate that this moment, a seventh world title to draw level with Stephen Hendry and tie the modern-era record.
5. Arguably O'Sullivan is playing in a field much tougher than Hendry ever did but, irrespective of that, the fact that he has now won world titles in three different decades is a staggering testimony to his longevity as a player.





**Sol.** A brief reading of the sentences suggests that the paragraph is about a recent achievement of Ronnie O’Sullivan, who equalled Hendry in the number of world titles in snooker. 243 is a mandatory pair of sentences. 2 introduces the laid back nature of O’Sullivan, and 4 then contrasts it by highlighting how big of an achievement the feat is. 3 then buttresses the point introduced in sentence 4.

Out of 1 and 5, 1 seems a better fit in the paragraph. 1 has a reverential tone as adopted in the other three sentences. 5 has a more critical tone, that tries to bring the achievements of the two in contrast. Hence, 5 is out of the context here.

**19. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.**

While not perfect, Europe’s landmark new deals on tech regulation could be a big step forward in curbing the harassment and abuse of journalists online, too, by forcing big tech companies to clean up the disinformation and hate speech that pollute our news environment. We may also see meaningful action on spyware used to target and surveil journalists, after the Pegasus scandal earlier this year. Critically, big tech firms such as Apple have committed action and money to the cause, as have governments on both sides of the Atlantic. The devil will be in the detail, but it is at least movement in the right direction

- A. New privacy laws, being passed globally, have their own share of limitations but could be a boon to journalists across the world.
- B. Safeguarding the journalists has become an important objective of organizations globally, with considerable investment done for the cause.
- C. Actions taken to regulate tech are likely to be advantageous to journalists since they will help curb disinformation and hate speech as well as provide protection against spyware.
- D. Though the new data surveillance and misinformation rules do not hold much water, they seem to be steps in the right direction.

**Sol.** The main point of the paragraph is: actions on data regulation and privacy protection can safeguard journalists by curbing misinformation and preventing their nefarious tracking.

Option C comes the closest to capturing the above point. Hence, Option C is the correct answer. It has not been implied that the new laws do not hold much water or will be disadvantageous. Options A and D can be eliminated.

Option B misses out on the key point and talks about organizations becoming cognizant of the safety of journalists. Hence, it can be eliminated too.

**20. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.**

1. In his hypothesis, the heart occupied - physically and figuratively - a central place in the body, controlling other organs.
2. Here, the brain and lungs played supporting roles, merely cooling and cushioning the heart. The heart was, for Aristotle, where reason flowed.
3. Early medical science in the west borrowed heavily from Plato, beginning with Aristotle, who practised and taught medicine throughout his life.



4. Aristotle agreed that eudaimonia could be realised by moderating the visceral and sensual appetites. He saw the heart as the vessel of intelligence, and arguably the most virtuous of organs.

**Sol.** A brief reading of the sentences suggests that the paragraph is about the opinion of Aristotle on the heart's function in the body. 3 sets the context of the paragraph by introducing how medicine derived from the teachings of Aristotle. 4 then turns the flow of thought towards heart by introducing his opinion on the same. 1 then further adds to Aristotle's opinion, and 2 then buttresses it by highlighting how he believed that the other organs played sideroles in the functioning of the body. Hence, the correct sequence is 3412.

21. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Habits are not simply stupefied and rigid reactions to environmental triggers, or 'single-track dispositions' to respond to the world with highly stereotyped reflexes. To see this, we need only note that forging any clear-cut distinction between habit and skill is not even remotely intuitive or feasible. On one hand, many of our skills consist of habits. Skill acquisition in sports, for example, is often nothing but the process of cultivating a new motor habit through repetitive practice. On the other hand, habits often comprise skills. Consider the habit of whistling when you are bored. This is a considerably skilful act, which can in some cases constitute genuine musical expertise. For just these reasons, introducing a clear-cut distinction between skill and habit, such that habitual doings cannot, by definition, be skilled or intelligent, is wrongheaded.

- A. Habits are the natural reaction of humans to their surroundings, and scientists are trying to differentiate between habits and skills.
- B. A difficulty in completely separating skills from habits or vice-versa shows that the latter should not be viewed with disdain as something unintelligent.
- C. The fact that habits can comprise skills and vice versa highlights how important habit formation is for skill acquisition.
- D. The only point of differentiation between skills and habits is that skills are intelligent while habits are considered unintelligent.

**Sol.** The main points of the paragraph are:

- 1. Habits should not be viewed with disdain and as something unskillful or unintelligent.
- 2. There is no clear demarcation between skills and habits, and are subparts of each other in different cases.

Option B comes the closest to capturing the above two points and hence, is the correct answer.

A: Option A fails to cover both the main points.

C: Option C is distorted. The author is not trying to highlight the importance of habit in skill formation.

D: Option D runs contrary to what the author is trying to highlight through the paragraph.



22. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

“Save Roe” has been the rallying cry of abortion-rights groups for nearly 50 years. But we need to stop banging our heads against the Supreme Court’s marble walls. While the situation is dire, we do have the potential today to realign American politics and develop a new strategy that not only preserves but expands reproductive freedoms. Here, we must think and talk about this issue differently. While our opponents talk about protecting religious beliefs or the “pre-born,” we must highlight the rights of women themselves, and point out that enabling them to choose whether, when and with whom they have children is central to gender equality and essential to the ability to control one’s own life.

A. The way forward to improve reproductive rights is to alter the political scenario itself, countering the argument of protection of beliefs with the argument for the preservation of women's rights.

B. The rallying cries of the abortion supporters have become outdated and must be replaced by an appropriate emphasis on the preservation of women's rights.

C. "Save Roe" has been seriously limiting the conservation of abortion rights by overemphasizing the role of judiciary and obscuring the role of politicians and the bureaucracy.

D. The only way to counter dogmatic beliefs about abortion is to introduce modern concepts like women's rights into the minds of the masses and alter the political scenario.

**Sol.** The main points of the paragraph are:

1. Instead of focusing only on the judicial system, a revolution in reproductive rights can be brought upon by proactively improving the political scenario.

2. The way forward is to counter the preservation of beliefs by espousing women's rights.

Option A comes the closest in capturing the two points and hence is the correct answer.

B: Misses out on point 1. Also, the paragraph does not mention that the rallying cries have become outdated, just that an addition is needed to them.

C: Option C is a distortion. It has not been mentioned that the rallying cry has been to the disadvantage of the groups.

D: Misses out on point 1.

23. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

1. All elections emit a different kind of noise, equally audible, even less likely to be put into words.

2. When people talk about dog whistles in politics, they mean ugly messages - usually racist - that only some voters can hear.

3. It’s metaphorically inexact: we can all *hear* them, but only some of us come when we’re called.

4. A “what’s this really all about?” noise.

**Sol.** A brief reading of the sentences suggests that the paragraph must be about certain political noises heard in elections. Here, we can make two mandatory pairs:

**23: Here, 2 talks about the term dog-whistles and what it signifies. 3 then talks about how the metaphor is not correct.**

14: Here, 4 refers to the noise mentioned in sentence 1.

23 should precede 14. Here 23 talks about the racist messages that are encoded for other racists to perceive, and 14 then talks about another noise - of confusion - that is also heard during elections. Hence, the correct sequence is 2314.

**24. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.**

1. There’s an existential thread, too, and album-closer High Note sees Sigrid pondering her own mortality as she sings.
2. Morbid thoughts aside, Sigrid has moved on from the identity crisis she suffered at the beginning of the pandemic.
3. These worries are why she also leaned into disco on How to Let Go, most notably on the self-love anthem Mirror and glitterball oddity A Driver Saved My Life, an ode to blasting tunes in the back of an Uber.
4. Like any young person who has lived through political and economic upheaval, a global pandemic, and is witnessing the climate crisis play out in real time, thinking about death is understandable.

**Sol.** A brief reading of the sentences shows that the paragraph is about a particular singer named Sigrid, and how her singing is influenced by the things she feels.

1 sets the context for the rest of the paragraph by introducing the existential aspect of her singing.

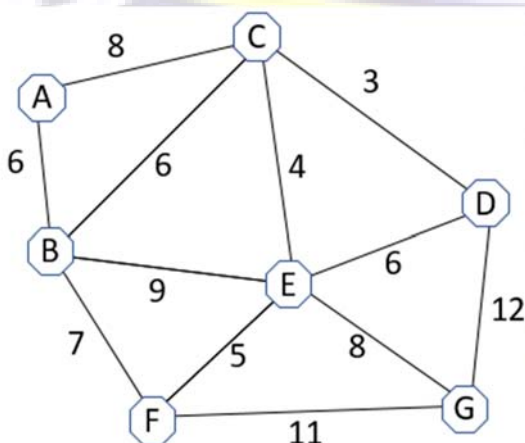
43 is a mandatory pair, where 4 lists the things that could have been worrying the singer, and 3 has a reference to these worries.

2 then ends a paragraph by mentioning that other than the existential thoughts, Sigrid has had other accomplishments.

Hence, the correct order of the sentences is 1432.

**Instructions**

As shown in the figure below, A, B, C, D, E, F and G are different cities connected by roads. The numbers written on each path represent the total length of that route (in km). Ramlal is a delivery person for “Z-Cart” and handles all the deliveries for the above mentioned seven cities.





Based on the information given, answer the questions that follow.

**25. On a particular day, Ramlal starts his deliveries from city A and has to make deliveries to each city. What is the minimum distance he must travel to visit each city exactly once and return to city A without using the same road twice?**

- A. 44
- B. 54
- C. 49
- D. 47

**Sol.** Starting from city A, eight routes can be taken to visit each city exactly once and return to city A.

If the first city visited after A is B, then the following four routes are possible:

- 1. A-B-F-G-D-E-C-A --> total distance =  $6 + 7 + 11 + 12 + 6 + 4 + 8 = 54\text{km}$
- 2. A-B-F-G-E-D-C-A --> total distance =  $6 + 7 + 11 + 8 + 6 + 3 + 8 = 49\text{km}$
- 3. A-B-F-E-G-D-C-A --> total distance =  $6 + 7 + 5 + 8 + 12 + 3 + 8 = 49\text{km}$
- 4. A-B-E-F-G-D-C-A --> total distance =  $6 + 9 + 5 + 11 + 12 + 3 + 8 = 54\text{km}$

If the first city visited after A is C, then all the above routes in the reverse order are possible:

- 1. A-C-D-G-F-E-B-A --> total distance = 54km
- 2. A-C-D-G-E-F-B-A --> total distance = 49km
- 3. A-C-D-E-G-F-B-A --> total distance = 49km
- 4. A-C-E-D-G-F-B-A --> total distance = 54km

Thus, we can observe that the minimum distance that must be travelled to visit each city once is 49km.

Hence, option C is the correct answer.

**26. How many routes are possible for travelling from city A to city G such that no city is visited twice?**

- A. 28
- B. 18
- C. 21
- D. 26

**Sol.** While travelling from A to G, there are two possible ways that the journey can start:

Case 1: The first city after A is C

From C, he can travel to either D, E or B.

D: ACDG, ACDEG, ACDEFG, ACDEBFG

E: ACEG, ACEFG, ACEBFG, ACEDG

B: ACBFG, ACBFEG, ACBFEDG, ACBEG, ACBEFG, ACBEDG



Thus, a total of  $4 + 4 + 6 = 14$  routes

Case 2: The first city after A is B

From B, he can travel to either C, E or F.

C: ABCDG, ABCEG, ABCEDG, ABCEFG, ABCDEG, ABCDEFG

E: ABEG, ABEFG, ABEDG, ABECDG

F: ABFG, ABFEG, ABFEDG, ABFECDG

Thus, a total of  $6 + 4 + 4 = 14$  routes

Thus, the required total number of routes =  $14 + 14 = 28$  routes.

Therefore, option A is the correct answer.

**27. What is the ratio of the minimum distance to the maximum distance that must be travelled to reach city A from city F?**

All the cities can be visited a maximum of once in the process.

A. 13:48

B. 1:4

C. 13:49

D. 1:3

**Sol.** The minimum distance between A and F is through route F-B-A =  $7 + 6 = 13$ km

The maximum distance between A and F is through route F-G-D-E-B-C-A =  $11 + 12 + 6 + 9 + 6 + 8 = 52$

Thus, the required ratio is =  $13:52 = 1:4$ .

Hence, option B is the correct answer.

**28. If Ramlal's delivery truck burns 2litres of fuel per hour. What is the minimum total fuel cost from city A to city G at a speed of 10km/hr if the fuel rate is Rs 100/litre?**

**Sol.** The minimum cost will be accrued while travelling the shortest distance between A and G.

The shortest distance between A and G is through route A-C-E-G and is =  $8 + 4 + 8 = 20$ km.

The time required to cover this distance =  $20/10 = 2$ hours

The fuel consumed in travelling =  $2 \times 2 = 4$ litres

The cost of fuel =  $4 \times 100 = \text{Rs } 400$

Thus, 400 is the required answer.



Instructions

In an attempt to solve different murder mysteries, six detectives have arrived at different conclusions as shown in the given tables.

- 1. Each detective is correct in the same number of particulars as any other detective.
- 2. One of the given details is correct for each particular. For example, six detectives guessed four different ranges(15-24, 25-34, 35-44, 45-54) for age, and exactly one of the four ranges is correct. The same rule applies to the remaining particulars as well.

29. What is the occupation of the murderer?

Gender	Age	Height(cm)	Weight(kg)	Occupation	Smoker
Male	35-44	150-169	60-62	driver	weed
Female	15-24	170-189	60-62	actor	cigarette
Male	15-24	130-149	66-68	barber	pipe
Female	45-54	110-129	69-71	farmer	non-smoker
Male	15-24	110-129	60-62	tailor	cigarette
Female	25-34	130-149	63-65	author	weed

- A. driver
- B. actor
- C. barber
- D. tailor

**Sol.** In statement 2, it is given exactly one of each particular is correct.  
Maximum possible correct choices = 3 for gender + 3 for age + 2 for height + 3 for weight + 1 for occupation + 2 for smoker = 14  
Minimum possible correct choices = 3 for gender + 1 each for all other particulars = 3 + 5 = 8  
In statement 1, it is given that each detective is correct in the same number of particulars as any other detective. Therefore, correct choices should be multiple of 6. The only possible value in the given range is 12. This implies each detective guessed two particulars correctly. The murderer could not be 60-62 kg and 15-24 years old. If this is true, one detective will be correct for three particulars, including gender. The murderer cannot be neither 60-62 kg nor 15-24 years. If so, the maximum number of correct choices will be 10, which should not be the case. Therefore, it should be one of 60-62 kg or 15-24 yrs, and the total number of correct choices is 12. Gender - 3 correct choices, occupation - 1 correct choice, weight/age - 3 correct choices.  
 $3 + 3 + 1 + x + y + z = 12$   
 $x + y + z = 5$   
possible values for x,y,z - (3,1,1) and (2,2,1)  
(3,1,1) is not possible. The only possible values of x, y, and z are 2, 2, 1



Therefore, two detectives are correct about the height of 110-129 cm or 130-149 cm, and two are correct about the smoking, i.e. weed or cigarette.

If the murderer is 60-62 kg, he cannot be male. If the murderer is 60-62 kg and male, one detective will be correct for three particulars, including smoking. Therefore, if the murderer is 60-62 kgs, the gender should be female.

F - (60-62kgs)

Exactly two particulars for each detective should be correct.

For the second detective, both gender and weight are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (60-62kg) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-150cm. This implies height is 110-129cm.

Therefore, F - (60-62kg) - weed - (110-129cm)

Considering the above information, the third detective can't have two correct particulars.

Therefore, a weight is 60-62 kg is incorrect. This implies murderer should be 15-24 years.

The murderer should be 15-24 years but not male. If the murderer is male, one detective would have three correct particulars, including height. Therefore, murderer is female.

F - (15-24)

For the second detective, both gender and age are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (15-24) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-149cm. This implies height is 110-129cm.

Therefore, F - (15-24) - weed - (110-129cm)

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F			T	2
2	T	T	F			F	2
3	F	T	F			F	2
4	T	F	T			F	2
5	F	T	T			F	2
6	T	F	F			T	2
Total	3	3	2	1	1	2	12

This will be the final table according to the data given and the information depicted.

Second, fourth, fifth, and sixth detectives already have two correct particulars; the remaining should be incorrect, i.e. False(F).

Weight cannot be 60-62 kg.





## SIVA SIVANI INSTITUTE OF MANAGEMENT

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F	F	T	T	2
2	T	T	F	F	F	F	2
3	F	T	F	T	F	F	2
4	T	F	T	F	F	F	2
5	F	T	T	F	F	F	2
6	T	F	F	F	F	T	2
Total	3	3	2	1	1	2	12

Therefore, murderer is Female - (15-24yrs) - (110-129cm) - (66-68kg) - driver - weed smoker.

The occupation of murderer is driver. The answer is option A.

### 30. Which of the following can be the age of murderer?

Gender	Age	Height(cm)	Weight(kg)	Occupation	Smoker
Male	35-44	150-169	60-62	driver	weed
Female	15-24	170-189	60-62	actor	cigarette
Male	15-24	130-149	66-68	barber	pipe
Female	45-54	110-129	69-71	farmer	non-smoker
Male	15-24	110-129	60-62	tailor	cigarette
Female	25-34	130-149	63-65	author	weed

- A. 20 years
- B. 30 years
- C. 40 years
- D. 50 years

**Sol.** In statement 2, it is given exactly one of each particular is correct.

Maximum possible correct choices = 3 for gender + 3 for age + 2 for height + 3 for weight + 1 for occupation + 2 for smoker = 14

Minimum possible correct choices = 3 for gender + 1 each for all other particulars = 3 + 5 = 8

In statement 1, it is given that each detective is correct in the same number of particulars as any other detective. Therefore, correct choices should be multiple of 6. The only possible value in the given range is 12. This implies each detective guessed two particulars correctly. The murderer could not be 60-62 kg and 15-24 years old. If this is true, one detective will be correct for three particulars, including gender. The murderer cannot be neither 60-62 kg nor 15-24 years. If so, the maximum number of correct choices will be 10, which should not be the case. Therefore, it should be one of 60-62 kg or 15-24 years but not both.



## SIVA SIVANI INSTITUTE OF MANAGEMENT

The murderer is either 60-62 kg or 15-24 yrs, and the total number of correct choices is 12.  
Gender - 3 correct choices, occupation - 1 correct choice, weight/age - 3 correct choices.

$$3 + 3 + 1 + x + y + z = 12$$

$$x + y + z = 5$$

possible values for x,y,z - (3,1,1) and (2,2,1)

(3,1,1) is not possible. The only possible values of x, y, and z are 2, 2, 1

Therefore, two detectives are correct about the height of 110-129 cm or 130-149 cm, and two are correct about the smoking, i.e. weed or cigarette.

If the murderer is 60-62 kg, he cannot be male. If the murderer is 60-62 kg and male, one detective will be correct for three particulars, including smoking. Therefore, if the murderer is 60-62 kgs, the gender should be female.

F - (60-62kgs)

Exactly two particulars for each detective should be correct.

For the second detective, both gender and weight are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (60-62kg) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-150cm. This implies height is 110-129cm.

Therefore, F - (60-62kg) - weed - (110-129cm)

Considering the above information, the third detective can't have two correct particulars.

Therefore, a weight is 60-62 kg is incorrect. This implies murderer should be 15-24 years.

The murderer should be 15-24 years but not male. If the murderer is male, one detective would have three correct particulars, including height. Therefore, murderer is female.

F - (15-24)

For the second detective, both gender and age are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (15-24) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-149cm. This implies height is 110-129cm.

Therefore, F - (15-24) - weed - (110-129cm)

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F			T	2
2	T	T	F			F	2
3	F	T	F			F	2
4	T	F	T			F	2
5	F	T	T			F	2
6	T	F	F			T	2
Total	3	3	2	1	1	2	12

This will be the final table according to the data given and the information depicted.

Second, fourth, fifth, and sixth detectives already have two correct particulars; the remaining should be incorrect, i.e. False(F).

Weight cannot be 60-62 kg.



Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F	F	T	T	2
2	T	T	F	F	F	F	2
3	F	T	F	T	F	F	2
4	T	F	T	F	F	F	2
5	F	T	T	F	F	F	2
6	T	F	F	F	F	T	2
Total	3	3	2	1	1	2	12

Therefore, murderer is F - (15-24yrs) - (110-129cm) - (66-68kg) - driver - weed smoker. The possible age is 20 years. The answer is option A.

31. Which of the following can be the height of murderer?

Gender	Age	Height(cm)	Weight(kg)	Occupation	Smoker
Male	35-44	150-169	60-62	driver	weed
Female	15-24	170-189	60-62	actor	cigarette
Male	15-24	130-149	66-68	barber	pipe
Female	45-54	110-129	69-71	farmer	non-smoker
Male	15-24	110-129	60-62	tailor	cigarette
Female	25-34	130-149	63-65	author	weed

- A. 120 cm
- B. 140 cm
- C. 160 cm
- D. 180 cm

**Sol.** In statement 2, it is given exactly one of each particular is correct.  
Maximum possible correct choices = 3 for gender + 3 for age + 2 for height + 3 for weight + 1 for occupation + 2 for smoker = 14  
Minimum possible correct choices = 3 for gender + 1 each for all other particulars = 3 + 5 = 8  
In statement 1, it is given that each detective is correct in the same number of particulars as



any other detective. Therefore, correct choices should be multiple of 6. The only possible value in the given range is 12. This implies each detective guessed two particulars correctly. The murderer could not be 60-62 kg and 15-24 years old. If this is true, one detective will be correct for three particulars, including gender. The murderer cannot be neither 60-62 kg nor 15-24 years. If so, the maximum number of correct choices will be 10, which should not be the case. Therefore, it should be one of 60-62 kg or 15-24 years but not both.

The murderer is either 60-62 kg or 15-24 yrs, and the total number of correct choices is 12. Gender - 3 correct choices, occupation - 1 correct choice, weight/age - 3 correct choices.

$$3 + 3 + 1 + x + y + z = 12$$

$$x + y + z = 5$$

possible values for x,y,z - (3,1,1) and (2,2,1)

(3,1,1) is not possible. The only possible values of x, y, and z are 2, 2, 1

Therefore, two detectives are correct about the height of 110-129 cm or 130-149 cm, and two are correct about the smoking, i.e. weed or cigarette.

If the murderer is 60-62 kg, he cannot be male. If the murderer is 60-62 kg and male, one detective will be correct for three particulars, including smoking. Therefore, if the murderer is 60-62 kgs, the gender should be female.

F - (60-62kgs)

Exactly two particulars for each detective should be correct.

For the second detective, both gender and weight are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (60-62kg) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-150cm. This implies height is 110-129cm.

Therefore, F - (60-62kg) - weed - (110-129cm)

Considering the above information, the third detective can't have two correct particulars.

Therefore, a weight is 60-62 kg is incorrect. This implies murderer should be 15-24 years.

The murderer should be 15-24 years but not male. If the murderer is male, one detective would have three correct particulars, including height. Therefore, murderer is female.

F - (15-24)

For the second detective, both gender and age are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (15-24) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-149cm. This implies height is 110-129cm.

Therefore, F - (15-24) - weed - (110-129cm)

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F			T	2
2	T	T	F			F	2
3	F	T	F			F	2
4	T	F	T			F	2
5	F	T	T			F	2
6	T	F	F			T	2
Total	3	3	2	1	1	2	12



## SIVA SIVANI INSTITUTE OF MANAGEMENT

This will be the final table according to the data given and the information depicted. Second, fourth, fifth, and sixth detectives already have two correct particulars; the remaining should be incorrect, i.e. False(F).

Weight cannot be 60-62 kg.

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F	F	T	T	2
2	T	T	F	F	F	F	2
3	F	T	F	T	F	F	2
4	T	F	T	F	F	F	2
5	F	T	T	F	F	F	2
6	T	F	F	F	F	T	2
Total	3	3	2	1	1	2	12

Therefore, murderer is F - (15-24yrs) - (110-129cm) - (66-68kg) - driver - weed smoker.

The possible height is 120 cm. The answer is option A.

### 32. Which of the following can be the possible weight of the murderer?

Gender	Age	Height(cm)	Weight(kg)	Occupation	Smoker
Male	35-44	150-169	60-62	driver	weed
Female	15-24	170-189	60-62	actor	cigarette
Male	15-24	130-149	66-68	barber	pipe
Female	45-54	110-129	69-71	farmer	non-smoker
Male	15-24	110-129	60-62	tailor	cigarette
Female	25-34	130-149	63-65	author	weed

- A. 62 kg
- B. 65 kg
- C. 67 kg
- D. 71 kg

**Sol.** In statement 2, it is given exactly one of each particular is correct.

Maximum possible correct choices = 3 for gender + 3 for age + 2 for height + 3 for weight + 1 for occupation + 2 for smoker = 14

Minimum possible correct choices = 3 for gender + 1 each for all other particulars = 3 + 5 = 8

In statement 1, it is given that each detective is correct in the same number of particulars as any other detective. Therefore, correct choices should be multiple of 6. The only possible value in the given range is 12. This implies each detective guessed two particulars correctly.

The murderer could not be 60-62 kg and 15-24 years old. If this is true, one detective will be



## SIVA SIVANI INSTITUTE OF MANAGEMENT

correct for three particulars, including gender. The murderer cannot be neither 60-62 kg nor 15-24 years. If so, the maximum number of correct choices will be 10, which should not be the case. Therefore, it should be one of 60-62 kg or 15-24 years but not both.

The murderer is either 60-62 kg or 15-24 yrs, and the total number of correct choices is 12.

Gender - 3 correct choices, occupation - 1 correct choice, weight/age - 3 correct choices.

$$3 + 3 + 1 + x + y + z = 12$$

$$x + y + z = 5$$

possible values for x,y,z - (3,1,1) and (2,2,1)

(3,1,1) is not possible. The only possible values of x, y, and z are 2, 2, 1

Therefore, two detectives are correct about the height of 110-129 cm or 130-149 cm, and two are correct about the smoking, i.e. weed or cigarette.

If the murderer is 60-62 kg, he cannot be male. If the murderer is 60-62 kg and male, one detective will be correct for three particulars, including smoking. Therefore, if the murderer is 60-62 kgs, the gender should be female.

F - (60-62kgs)

Exactly two particulars for each detective should be correct.

For the second detective, both gender and weight are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (60-62kg) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-150cm. This implies height is 110-129cm.

Therefore, F - (60-62kg) - weed - (110-129cm)

Considering the above information, the third detective can't have two correct particulars.

Therefore, a weight is 60-62 kg is incorrect. This implies murderer should be 15-24 years.

The murderer should be 15-24 years but not male. If the murderer is male, one detective would have three correct particulars, including height. Therefore, murderer is female.

F - (15-24)

For the second detective, both gender and age are correct. The remaining should be incorrect, which means the murderer doesn't smoke a cigarette. This implies he should smoke weed.

Therefore, F - (15-24) - weed

For the sixth detective, both gender and smoking habits are correct. The remaining should be incorrect, so the height shouldn't be 130-149cm. This implies height is 110-129cm.

Therefore, F - (15-24) - weed - (110-129cm)

Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F			T	2
2	T	T	F			F	2
3	F	T	F			F	2
4	T	F	T			F	2
5	F	T	T			F	2
6	T	F	F			T	2
Total	3	3	2	1	1	2	12

This will be the final table according to the data given and the information depicted.

Second, fourth, fifth, and sixth detectives already have two correct particulars; the remaining should be incorrect, i.e. False(F).

Weight cannot be 60-62 kg.



Detective	Gender	Age	Height	Weight	Job	Smoker	Total
1	F	F	F	F	T	T	2
2	T	T	F	F	F	F	2
3	F	T	F	T	F	F	2
4	T	F	T	F	F	F	2
5	F	T	T	F	F	F	2
6	T	F	F	F	F	T	2
Total	3	3	2	1	1	2	12

Therefore, murderer is F - (15-24yrs) - (110-129cm) - (66-68kg) - driver - weed smoker.

The possible weight is 67 kg. The answer is option C.

**Instructions**

Each of the three rivers - Nile, Congo and Niger - flows through three cities - Nairobi, Harare and Lagos. These rivers are flowing above danger mark in these cities. It is known that if all the three rivers, in a city, flow at more than 5 cm above danger mark, then the city becomes flooded and if any two rivers in a city flow at more than 5 cm above danger mark, then the city becomes semi-flooded. It is also known that one of these three cities is flooded and another one is semi-flooded. Total 200 cusecs (cubic feet per second) of water was released from a dam into the three rivers in three cities combined. Before that release of water each river was exactly at the danger mark.

The table given below shows the increase in water level (in cm) above the danger mark in a river on releasing 1 cusec of water from the dam in that river.

River	Increase in water level
Nile	0.2 cm
Congo	0.3 cm
Niger	0.4 cm

For example, if a total of 60 cusecs of water was released in the Nile out of which 10 cusecs were released in Nairobi, 20 cusecs were released in Harare and 30 cusecs were released in Lagos, then by using the above table we can conclude that the Nile flows 2 cm above the danger mark in Nairobi, 4 cm above the danger mark in Harare and 6 cm above the danger mark in Lagos.

It is also known that :-

- (i) The sum of the level of the river increased above the danger mark in all the three cities taken together is equal for two rivers out of the three. One river flows 11 cm above danger mark in a city.



- (ii) Nile flows at a level above danger mark in cities Harare, Nairobi and Lagos in the ratio of 3 : 9 : 7.
- (iii) Amount of water released in Congo in Nairobi and that in Niger in Harare is in the ratio of 2 : 3.
- (iv) All the three rivers flow at more than 1 cm above its danger mark in each city.

All rivers must flow at a level above danger mark in each city in integer value of cm only.

**33. The maximum level (in cm) above danger mark at which Niger can flow in any city is**

**Sol.** From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

**Case 1:**

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.

**Case 2:**

Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be =  $\frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95 + 47.5) = 57.5$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.





Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$

$$\text{or, } \frac{(40x+30x)}{12} = 105$$

or, x= 18 cm

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3		4
<b>Nairobi</b>	9	2	
<b>Lagos</b>	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
<b>Harare</b>	3	5	4
<b>Nairobi</b>	9	2	6/7/8
<b>Lagos</b>	7	11	8/7/6



Case 2:

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
Harare	3		6
Nairobi	9	3	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
Harare	3	4	6
Nairobi	9	3	6
Lagos	7	11	6

Niger can flow at maximum of 8 cm above the danger mark in a city.

34. The minimum water in cusecs that can be released in the city of 'Harare' is

- A. 40 cusecs
- B.  $\frac{125}{3}$  cusecs
- C.  $\frac{130}{3}$  cusecs
- D. 50 cusecs

Sol. From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

Case 1:

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs



This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.

**Case 2:**

Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be =  $\frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95 + 47.5) = 57.5$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.

Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$

$$\text{or, } \frac{(40x + 30x)}{12} = 105$$

$$\text{or, } x = 18 \text{ cm}$$

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
Harare	3		4
Nairobi	9	2	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
Harare	3	5	4
Nairobi	9	2	6/7/8
Lagos	7	11	8/7/6



Case 2:

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
Harare	3		6
Nairobi	9	3	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
Harare	3	4	6
Nairobi	9	3	6
Lagos	7	11	6

When Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark, water released in Harare =  $\frac{3}{0.2} + \frac{5}{0.3} + \frac{4}{0.4} = 15 + \frac{50}{3} + 10 = \frac{125}{3}$  cusecs

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark, water released in Harare =  $\frac{3}{0.2} + \frac{4}{0.3} + \frac{6}{0.4} = 15 + \frac{40}{3} + 15 = \frac{130}{3}$  cusecs

35. All of the following statements are false **except**

- A. Nairobi is flooded and Harare is semi-flooded.
- B. Nairobi is flooded and Lagos is semi-flooded.
- C. Lagos is flooded and Harare is semi-flooded.
- D. Lagos is flooded and Nairobi is semi-flooded.

**Sol.** From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

**Case 1:**

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.



**Case 2:**

Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be  $= \frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95 + 47.5) = 57.5$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.

Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$

$$\text{or, } \frac{(40x+30x)}{12} = 105$$

$$\text{or, } x = 18 \text{ cm}$$

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3		4
<b>Nairobi</b>	9	2	
<b>Lagos</b>	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
<b>Harare</b>	3	5	4
<b>Nairobi</b>	9	2	6/7/8
<b>Lagos</b>	7	11	8/7/6



Case 2:

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
Harare	3		6
Nairobi	9	3	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
Harare	3	4	6
Nairobi	9	3	6
Lagos	7	11	6

Lagos is flooded and Nairobi is semi-flooded.

36. What percentage of total water was released in Congo?

- A. 47.5
- B. 30
- C. 57.5
- D. 60

Sol. From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

Case 1:

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.



**Case 2:**

Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be  $= \frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95 + 47.5) = 57.5$

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.

Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$

$$\text{or, } \frac{(40x + 30x)}{12} = 105$$

$$\text{or, } x = 18 \text{ cm}$$

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3		4
<b>Nairobi</b>	9	2	
<b>Lagos</b>	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
<b>Harare</b>	3	5	4
<b>Nairobi</b>	9	2	6/7/8
<b>Lagos</b>	7	11	8/7/6



Case 2:

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
Harare	3		6
Nairobi	9	3	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
Harare	3	4	6
Nairobi	9	3	6
Lagos	7	11	6

Water released in Congo =  $\frac{18}{0.3} = 60$  cusecs

Percentage =  $\frac{60}{200} \times 100 = 30\%$

37. River X flows at 11 cm above danger mark in city Y, then X and Y are

- A. Congo and Harare respectively
- B. Congo and Lagos repectively
- C. Niger and Nairobi respectively
- D. Niger and Lagos respectively

Sol. From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

Case 1:

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.

Case 2:





Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be  $= \frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95 + 47.5) = 57.5$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.

Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$

$$\text{or, } \frac{(40x + 30x)}{12} = 105$$

$$\text{or, } x = 18 \text{ cm}$$

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
Harare	3		4
Nairobi	9	2	
Lagos	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
Harare	3	5	4
Nairobi	9	2	6/7/8
Lagos	7	11	8/7/6

**Case 2:**

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
Harare	3		6
Nairobi	9	3	
Lagos	7		



In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
Harare	3	4	6
Nairobi	9	3	6
Lagos	7	11	6

**38. Niger flows at x cm above danger mark in the city of Nairobi. How many possible values of x exists?**

- A. 4
- B. 3
- C. 2
- D. 1

**Sol.** From statement (ii); let Nile flow at 3 cm, 9 cm and 7 cm above danger mark in Harare, Nairobi and Lagos respectively.

Therefore, Water released in Nile =  $\frac{(3+9+7)}{0.2} = \frac{19}{0.2} = 95$  cusecs

Nile cannot flow (6, 8 and 14) cm above danger mark because in this case water released in Nile will be 190 cusecs and only 10 cusecs water will be released in Congo and Niger together, which is not possible.

From statement (i), two rivers flow at same level above danger mark in three cities together.

**Case 1:**

Suppose both Nile and Congo flow 19 cm above danger mark. Then water released in Congo will be =  $\frac{19}{0.3} = \frac{190}{3}$  cusecs

Therefore, water released in Niger =  $200 - \left(95 + \frac{190}{3}\right) = \frac{125}{3}$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Niger is not an integer.

**Case 2:**

Suppose both Nile and Niger flow 19 cm above danger mark. Then water released in Niger will be =  $\frac{19}{0.4} = 47.5$  cusecs

Therefore, water released in Congo =  $200 - (95+47.5) = 57.5$  cusecs

This is not possible because in this case the sum of water levels above danger mark in Congo is not an integer.

So it can be concluded that Congo and Niger flow at same level above danger mark in three cities together.

**Case 3:**

Congo and Niger flow at same level above danger mark in three cities together.

Let Congo and Niger flow at x cm above danger mark in three cities together.

Therefore, water released in Congo =  $\frac{x}{0.3}$  cusecs

Water released in Niger =  $\frac{x}{0.4}$  cusecs

$$\frac{x}{0.3} + \frac{x}{0.4} = 200 - 95$$



or,  $\frac{(40x + 30x)}{12} = 105$

or,  $x = 18$  cm

From statement (iii), we can conclude that Congo in Nairobi and Niger in Harare must flow above danger mark in the ratio  $(2 \times 0.3) : (3 \times 0.4) = 1 : 2$

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

**Case 1:**

Congo in Nairobi and Niger in Harare flows 2 cm and 4 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3		4
<b>Nairobi</b>	9	2	
<b>Lagos</b>	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

Now, we have the following table

	Nile	Congo	Niger
<b>Harare</b>	3	5	4
<b>Nairobi</b>	9	2	6/7/8
<b>Lagos</b>	7	11	8/7/6

**Case 2:**

Congo in Nairobi and Niger in Harare flows 3 cm and 6 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3		6
<b>Nairobi</b>	9	3	
<b>Lagos</b>	7		

In the above table there is only one possibility that Nairobi is semi-flooded and Lagos is flooded which is only possible when Congo in Lagos 11 cm above danger mark because it is given that one river flows 11 cm above danger mark.

	Nile	Congo	Niger
<b>Harare</b>	3	4	6
<b>Nairobi</b>	9	3	6
<b>Lagos</b>	7	11	6

The possible values of x can be 6, 7 and 8, so there are three possible values of x.



**Instructions**

Amit came across a unique puzzle called “Number path”. In this puzzle, an  $m \times n$  matrix is given in which some cells are empty while others contain some numbers. The objective is to fill the entire matrix using the given rules of the puzzle.

1. Every number, except 1, is part of a pair and needs to be connected to another cell containing the same number through a path of empty cells between them, such that the total number of cells connecting them (including the two) equals the number written in the cell. Once the path is secured, all the empty cells in the path are filled with the same number as the cells that are being connected.
2. Each number in a path can be part of only one unique path.
3. Paths should be drawn in a way so that all empty cells are covered in the final matrix.

For example, consider the following matrix.

1	4	2
2		2
2		4

Here, there’s only one way to connect the cells with 4 in them, i.e., through the empty cells in the middle column. The cells with 2 are already connected to their pairs.

1	4	2
2		2
2		4

Since the cells are connected, the empty cells in the path connecting the two 4’s will be filled with 4 to get the final solution as given below.

1	4	2
2	4	2
2	4	4

Based on this information, help Amit solve the following questions.

**39. Consider the below-given  $4 \times 4$  matrix.**

6			
4	3		
		3	6
1	4	2	2



What is the total sum of all the numbers in the matrix?

- A. 48
- B. 91
- C. 66
- D. 36

Sol.

6			
4	3		
		3	6
1	4	2	2

1 does not have a pair, and 2 is already connected to its pair. The cells with 4 in them can only be connected through the path in row 3, while the cells with 3 in them can only be connected via the cell in row 2 - column 3. Finally, the cells with 6 in them will be connected through the cells in row 1 and column 4, as shown in the below figure.

6			
4	3		
		3	6
1	4	2	2

Since all the connecting paths are determined, we can fill all the cells as given below.

6	6	6	6
4	3	3	6
4	4	3	6
1	4	2	2

On counting, we get the total sum of all the cells to be 66.

Alternate Solution:

Since each pair of numbers has the same number written in the cells connecting them, the total for each pair of numbers is equal to the square of the number.

Thus, total sum =  $1 + 2^2 + 3^2 + 4^2 + 6^2 = 1 + 4 + 9 + 16 + 36 = 66$

40. Consider the following  $7 \times 5$  matrix.

1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8

In how many columns does any number appear more than twice?

- A. 2
- B. 5
- C. 3
- D. 4

Sol.

1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8

The cells with the number 1 do not have a pair, and the cells with the number 2 are already connected to their pairs.

The cells with the number 3 can only be connected through the cell (2,2), row 2 - column 2.

The cells with the number 8 can only be connected along the cells through row 2 and then along column 5.

Then, the remaining cells can be connected as shown below.

1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8



Since all the pairs are connected, the blank cells can be filled in to get the final matrix as given below.

1	3	2	2	1
3	3	8	8	8
4	4	4	4	8
2	4	4	4	8
2	4	5	5	8
5	5	5	5	8
5	5	5	5	8

In column two, the number 4 appears thrice, in columns three and four, 5 appears thrice; and in column five, the number 8 appears six times.

Hence, the required number of columns is 4, and option D is the answer.

41. Consider the following  $7 \times 5$  matrix.

1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8

Find the difference between the sum of the first three columns and the sum of last three rows.

Sol.

1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8

The cells with the number 1 do not have a pair, and the cells with the number 2 are already connected to their pairs.

The cells with the number 33 can only be connected through the cell (2,2), row 2 - column 2.

The cells with the number 8 can only be connected along the cells through row 2 and then along column 5.

Then, the remaining cells can be connected, as shown below.



1	3	2	2	1
3		8		
4				
2		4	4	
2	4	5		
5	5			
			5	8

Since all the pairs are connected, the blank cells can be filled in to get the final matrix as given below.

1	3	2	2	1
3	3	8	8	8
4	4	4	4	8
2	4	4	4	8
2	4	5	5	8
5	5	5	5	8
5	5	5	5	8

The sum of cells in the first three columns = 83

The sum of cells in the last three rows = 80

Thus, the required difference =  $83 - 80 = 3$

42. Consider the following  $8 \times 8$  matrix.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

What is the difference between the highest sum of any row and the lowest sum of any column?

- A. 8
- B. 48
- C. 22
- D. 33





Sol.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

First connect all the obvious pairs of cells. The cells with the numbers 3, 4, 5, and 6 in them. Once this is done, it can be seen that the cell (1,1) can only be paired with the cell (6,4), and the cell (1,2) with the cell (3, 8). Once done, the rest of the cells can be connected to their pairs as follows.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

Since all the cells are paired, the empty cells can be filled with appropriate numbers as follows.

9	9	9	9	9	9	9	9
9	9	1	6	6	2	2	9
5	9	9	3	6	6	1	9
5	5	9	3	3	6	6	3
5	5	9	3	3	3	3	3
9	9	9	9	8	8	8	8
9	9	9	9	4	4	8	8
9	9	9	4	4	1	8	8

From the above matrix, we can see that the row 1 will have the highest sum =  $9 \times 8 = 72$   
 The lowest sum of any column is for column 6, and it is = 39  
 Thus, the required difference is  $72 - 39 = 33$   
 Hence, the answer is option D.



43. Consider the following  $8 \times 8$  matrix.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

If from the final matrix, the first and last rows, as well as the first and last columns are removed, what will be the average of all the numbers in the resultant matrix?

- A. 5.9
- B. 6.3
- C. 7.8
- D. 4.4

Sol.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

First connect all the obvious pairs of cells. The cells with the numbers 3,4,5, and 6 in them. Once this is done, it can be seen that the cell (1,1) can only be paired with the cell (6,4), and the cell (1,2) with the cell (3,8). Once done, the rest of the cells can be connected to their pairs as follows.



9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

Since all the cells are paired, the empty cells can be filled with appropriate numbers as follows.

9	9	9	9	9	9	9	9
9	9	1	6	6	2	2	9
5	9	9	3	6	6	1	9
5	5	9	3	3	6	6	3
5	5	9	3	3	3	3	3
9	9	9	9	8	8	8	8
9	9	9	9	4	4	8	8
9	9	9	4	4	1	8	8

Now, the first and last rows as well as columns are removed from the above matrix.

9	1	6	6	2	2
9	9	3	6	6	1
5	9	3	3	6	6
5	9	3	3	3	3
9	9	9	8	8	8
9	9	9	4	4	8

The total sum of all the cells = 212 and the total number of cells = 36.

Thus, the required average =  $\frac{212}{36} = 5.9$

Hence, the answer is option A.

44. Consider the following  $8 \times 8$  matrix.



9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

From the final matrix, how many  $2 \times 2$  matrices can be obtained with all four digits similar?

Sol.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		

First connect all the obvious pairs of cells. The cells with the numbers 3,4,5, and 6 in them. Once this is done, it can be seen that the cell (1,1) can only be paired with the cell (6,4), and the cell (1,2) with the cell (3,8). Once done, the rest of the cells can be connected to their pairs as follows.

9	9						
		1	6		2	2	
5			3			1	9
				3		6	3
5			3		3	3	
9			9	8			
			9		4	8	
			4		1		



Since all the cells are paired, the empty cells can be filled with appropriate numbers as follows.

9	9	9	9	9	9	9	9
9	9	1	6	6	2	2	9
5	9	9	3	6	6	1	9
5	5	9	3	3	6	6	3
5	5	9	3	3	3	3	3
9	9	9	9	8	8	8	8
9	9	9	9	4	4	8	8
9	9	9	4	4	1	8	8

By observing the figure, we can get six  $2 \times 2$  matrices with all the numbers 9, two with all the numbers 8, one with all numbers 3, and one with all numbers 5.

Hence, the total number of matrices with all similar digits =  $6 + 2 + 1 + 1 = 10$

**45. Three horses, A, B and C, ran in a 1000 m race. A beats B by 250 m, and B beats C by 200 m. If A and C were running towards each other from two points, P and Q, respectively, 1600 m apart and meet at a point R. How far is point R from Q (in metres)?**

**Sol.** If the time is constant, speed is directly proportional to the distance travelled.

A beats B by 250 m. Thus, the ratio of speeds of A and B =  $1000 : 750 = 100 : 75$

B beats C by 200m. Thus, the ratio of speeds of B and C =  $1000 : 800 = 100 : 80$

Thus, the ratio of speeds of A, B and C =  $100 : 75 : 60$

When A and C are running towards each other from points 1600 m apart, A will cover 1000 m in the same time that C covers 600 m, as their speeds are in a ratio of  $100 : 60$ .

Thus, point R is 1000 m from point P and 600 m from point Q.

Hence, 600 is the answer.

**46. Some desktops and laptops are to be purchased. Each desktop costs Rs. 15000 while each laptop costs Rs. 10000. Both the laptops and desktops have the same selling price of Rs. 20000. If the total profit earned is equal to the total cost price of desktops, what is the ratio of numbers of laptops and desktops?**

- A. 3:5
- B. 1:2
- C. 2:1
- D. 1:1

**Sol.** Lets say  $x$  desktops and  $y$  laptops are sold.

$$20000(x + y) - 15000x - 10000y = 15000x$$

Solving, we get

$$10000y = 10000x$$

$$\therefore x : y = 1 : 1$$

47. A construction worker takes 3 minutes to lay a brick. The worker starts building a wall which will contain 1035 bricks. Every 3 minutes, another worker with the same efficiency is added to the workforce, continuing until the wall is finished. How much time does it take for the wall to be completed (in minutes)?

**Sol.** Every 3 minutes, one worker is added to the workforce. Let the wall be finished in  $3n$  minutes.

After the first three minutes, one brick is added; two bricks are added after the next three minutes. Thus, in  $3n$  minutes,  $n(n+1)/2$  bricks will have been added.

Thus,  $n(n+1)/2 = 1035 \rightarrow n = 45$

Thus, the total time required to finish the wall =  $3n = 45 * 3 = 135$  minutes.

Hence, 135 is the correct answer.

48. A wedding cake had cylindrically shaped three layers, kept one over the other in decreasing order of their diameters. The diameters of each layer were 40 cm, 30 cm and 20 cm, from the bottom layer to the top layer, and the height of each layer was 6 cm. If the specific volume [volume occupied by one kg of a substance] of the cake is  $29\pi$  cu.cm/kg, what is the weight of the whole cake?

- A. 300 kg
- B. 150 kg
- C. 600 kg
- D. 15 kg

**Sol.** To find the weight of the whole cake, we will first have to find its volume.

The radii of each layer are 20 cm, 15 cm and 10 cm, and the height of each layer is 6 cm.

Volume of cake (V) = Volume of Bottom layer + Volume of Middle layer + Volume of Top layer

$$V = \pi \times (20)^2 \times 6 + \pi \times (15)^2 \times 6 + \pi \times (10)^2 \times 6$$

$$V = 2400\pi + 1350\pi + 600\pi$$

$$V = 4350\pi \text{ cu.cm}$$

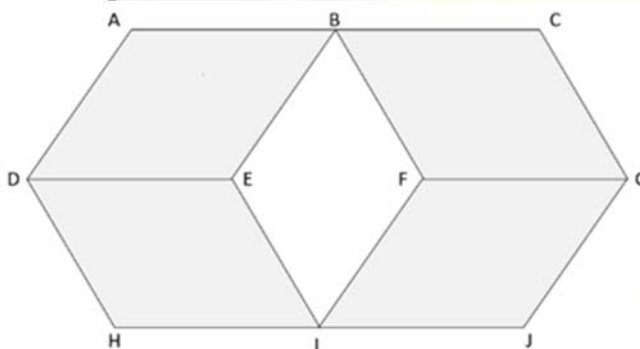
Weight = Volume/specific volume

$$\text{Weight} = \frac{4350\pi}{29\pi}$$

$$\text{Weight} = 150 \text{ kg}$$

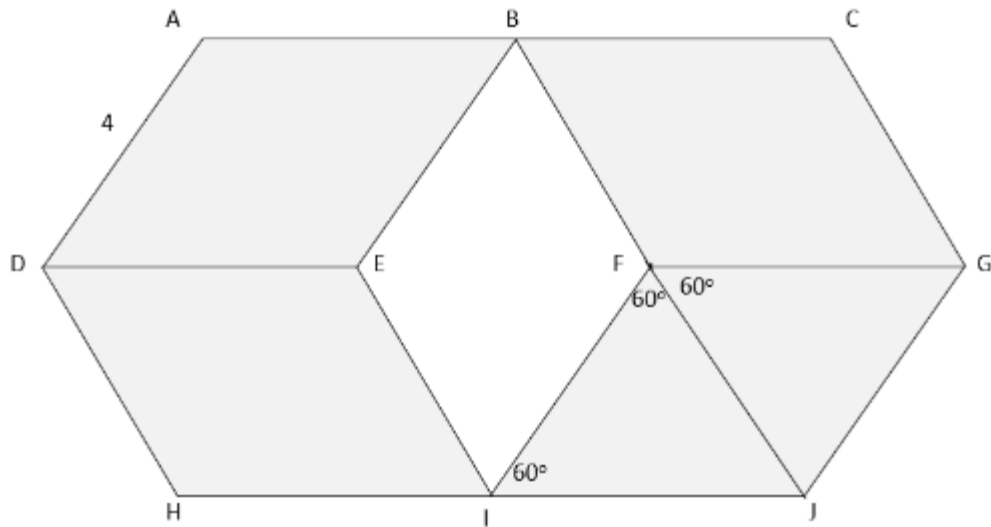
Hence, the correct answer is option B

49. Dash Ketchup won a “Pokomen” cards tournament, for which he was awarded a badge in shape, as shown below. It consists of four equal parallelograms arranged in a form as shown, with side AD = 4 cm and FJ bisects angle GFI. What is the ratio of the area of quadrilateral BEIF to the area of the shaded region if the angle ADE =  $60^\circ$ ?



- A. 2:3
- B. 1:5
- C. 1:4
- D. 1:2

Sol.



We are given that FJ bisects the angle GFI.

A parallelogram in which the diagonals are also angle bisectors is a rhombus. Thus, all four parallelograms are rhombus, with side length = 4 cm.

Thus, in ABED,  $\angle ADE = \angle ABE = 60^\circ$  and  $\angle DAB = \angle BED = 120^\circ$

Similarly, all the other rhombi will also have internal angles as  $60^\circ$  and  $120^\circ$ .

In Quadrilateral BEIF,  $BE = EI = IF = BF$ , and  $\angle EBF = 180 - \angle ABE - \angle FBC = 180 - 60 - 60 = 60^\circ = \angle EFI$

Similarly,  $\angle BEI = \angle BFI = 120^\circ$

Hence, Quadrilateral BEFI will also be a rhombus of side 4 cm and will be equal to the other four rhombi.

Thus, the ratio of areas of BEFI to the shaded region = 1 : 4.

The answer is option C.

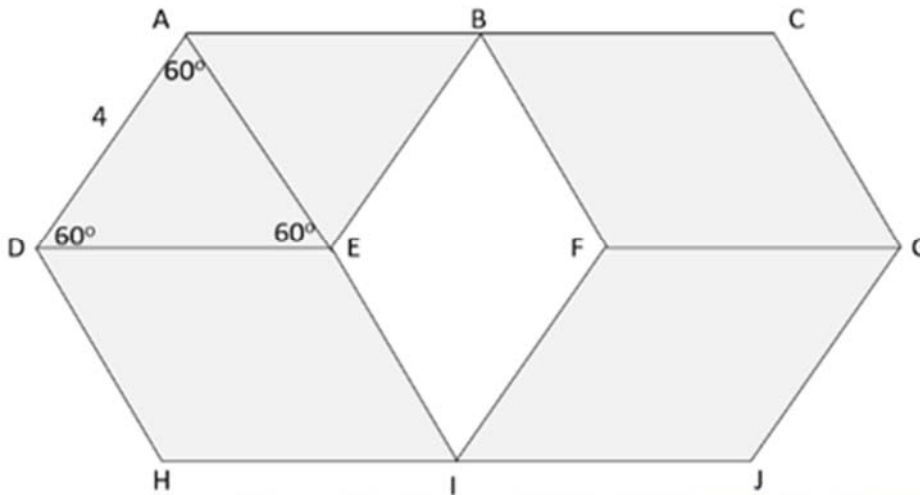
Alternate Solution:

In parallelogram ABED, angle ADE =  $60^\circ$ .

Thus, angle DAB =  $180 - 60 = 120^\circ$  (supplementary angles)

Diagonal FJ bisects angle GFI. Since all the parallelograms are equal, AE will bisect angle DAB.

Thus, angle DAE = angle DEA =  $60^\circ$ . Hence, Triangle ADE is an equilateral triangle.



Thus, Area of ABED =  $2 \times \frac{\sqrt{3}}{4} \times 4^2 = 8\sqrt{3}$

Thus, area of shaded region =  $4 \times A(\text{ABED}) = 4 \times 8\sqrt{3} = 32\sqrt{3}$

$\angle ABE + \angle EBF + \angle FBC = 180^\circ$  (linear angles)

$60 + \angle EBF + 60 = 180$

$\angle EBF = 60^\circ$

Similarly, we can find that angle BFE = angle BEF =  $60^\circ$

Thus, triangle BEF is an equilateral triangle.

Similarly, we can get that triangle IEF is an equilateral triangle.

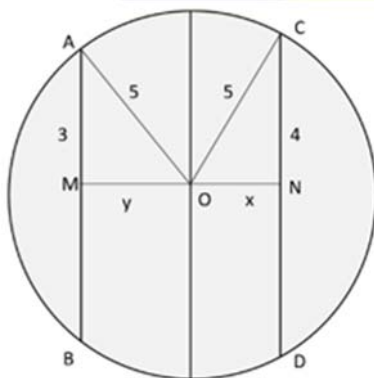
Thus,  $A(\text{EBFI}) = 2 \times A(\text{EBF}) = 2 \times \frac{\sqrt{3}}{4} \times 4^2 = 8\sqrt{3}$

Thus,  $A(\text{EBFI}) : A(\text{shaded region}) = \frac{8\sqrt{3}}{32\sqrt{3}} = \frac{1}{4} = 1 : 4$

**50. A circle with a diameter of 10 units has two chords of lengths 6 units and 8 units. If the chords are at the maximum possible distance from each other, what is the difference between the areas of triangles with bases equal to the chords and the height equal to the distance between the chords?**

- A. 7 sq.units
- B. 28 sq.units
- C. 21 sq.units
- D. 1 sq.unit

**Sol.**







Let AB and CD be the chords with lengths 6 units and 8 units, respectively. Let O be the centre of the circle and MN be the distance between the two chords.

Since we are given that the chords are at a maximum possible distance, they will be on the opposite sides of the centre.

In Triangle AMO, angle AMO = 90°

$$AO^2 = AM^2 + MO^2$$

$$5^2 = 3^2 + y^2$$

$$y^2 = 25 - 9 = 16$$

$$y = 4 \text{ units.}$$

Similarly, in Triangle CNO, angle CNO = 90°

$$CO^2 = CN^2 + NO^2$$

$$5^2 = 4^2 + x^2$$

$$x^2 = 25 - 16 = 9$$

$$x = 3 \text{ units}$$

Thus, the distance between the two chords = MN = x + y = 3 + 4 = 7 units.

The difference between the areas of triangles where the bases are equal to the chords and the height is equal to the distance between the chords =  $\left(\frac{1}{2} \times 8 \times 7\right) - \left(\frac{1}{2} \times 6 \times 7\right) = 28 - 21 = 7 \text{ sq.units.}$

Hence, option A is the answer.

**51. Let 'a' and 'b' be the roots of a quadratic equation, such that 'a' is 25% more than 'b'. If the ratio of the sum of the roots to the product of the roots is  $\frac{9}{10}$ , what is the value**

**of  $\frac{a+b^2}{a^{2b}}$  ?**

- A.  $\frac{13}{25}$
- B.  $\frac{33}{40}$
- C.  $\frac{41}{50}$
- D.  $\frac{25}{13}$

**Sol.** We are given that 'a' is 25% more than 'b'.

$$a = 1.25b = \frac{5b}{4}$$

The ratio of the sum of roots to the product of roots is  $\frac{9}{10}$

$$a + \frac{b}{ab} = \frac{9}{10}$$

$$\frac{\frac{5}{4}b + b}{\frac{5}{4}b \times b} = \frac{9}{10}$$

$$\frac{9b}{5b^2} = \frac{9}{10}$$

$$\frac{1}{5b} = \frac{1}{10}$$

$$b = 2$$

$$\text{Thus, } a = \frac{5}{4} \times 2 = \frac{5}{2}$$

$$\text{Thus, } \frac{a+b^2}{a^{2b}} = \frac{\frac{5}{2} + 2^2}{\left(\frac{5}{2}\right)^2 \times 2} = \frac{5+8}{25} = \frac{13}{25}$$

Hence, option A is the answer.

52. If one of the vertices of a square lies on  $(0, 0)$  and its diagonals intersect at  $(2, 2)$ , what is the area of the circle with a radius equal to the side of the square?

- A.  $8\pi$
- B.  $32\pi$
- C.  $8\sqrt{2}\pi$
- D.  $16\pi$

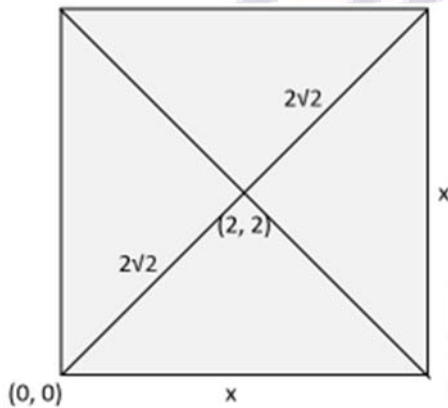
**Sol.** Let the length of each side of the square be  $x$ .  
Diagonals of a square bisect each other.

Thus, length of a diagonal =  $2 \times$  distance between  $(0, 0)$  and  $(2, 2)$

$$= 2 \times \sqrt{(2 - 0)^2 + (2 - 0)^2}$$

$$= 2 \times \sqrt{8}$$

$$= 4\sqrt{2}$$



Using the Pythagoras theorem,

$$x^2 + x^2 = (4\sqrt{2})^2$$

$$2x^2 = 32$$

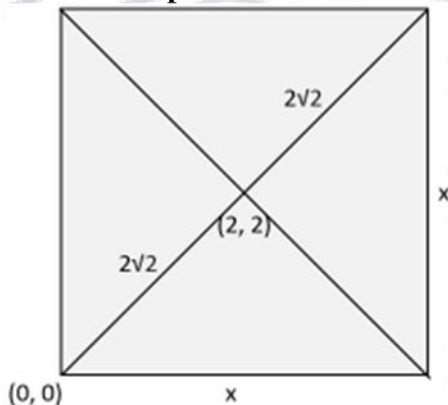
$$x^2 = 16$$

$$x = 4$$

Thus, area of the circle with radius equal to 4units =  $\pi (4)^2 = 16\pi$

Hence, option D is the answer.

**Alternate explanation:**



Let the vertex opposite to  $(0,0)$  be  $(x,y)$ .

Since  $(2,2)$  is the midpoint between them,

$$x + 0 = 2 \times 2 = 4$$

$y$  similarly is 4.



So we know that the opposite vertex is (4,4).  
Hence the other two vertices are (0,4) and (4,0).  
Each side is 4 units.  
We can calculate the radius accordingly.

**53. Inlet pipes A and C can fill a tank in 6 hours and 3 hours, respectively, whereas outlet pipes B and D can empty the tank in 4 hours and 2 hours, respectively. If A and C are started when the tank is empty, and D & B are opened after 1 hour and 2 hours, respectively, how long did it take for the tank to be empty again, from the moment A and C were opened?**

- A. 2 hours 45 minutes
- B. 2 hours
- C. 3 hours
- D. 4 hours

**Sol.** A, C take 6 hours and 3 hours to fill the tank. Thus, A and C fill  $\frac{1}{6}$  and  $\frac{1}{3}$  of the tank in an hour.

Similarly, B and D empty  $\frac{1}{4}$  and  $\frac{1}{2}$  of the tank in an hour.

Let the capacity of the tank be 12 units.

Thus, A and C fill 2 units and 4 units in an hour while B and D empty 3 units and 6 units in an hour.

For the first hour, only A and C are opened. Thus, units filled in the first hour = 2 + 4 = 6 units

For the second hour, A, C and D are open. Thus, units filled in second hour = 2 + 4 - 6 = 0 units

From the third hour onwards, all the pipes are open.

Thus, units filled/emptied after the third hour = 2 + 4 - 6 - 3 = -3 units

Let the time required for the tank to be empty, from the third hour onwards, be x.

Thus, 6 + 0 - 3x = 0                      --> x = 2

Thus, the total time required for the tank to be empty again = 1 + 1 + 2 = 4 hours.

Hence, option D is the answer.

**54. What are the last two digits of  $2387^{64} \times 238764$ ?**

- A. 61
- B. 41
- C. 21
- D. 01

**Sol.**  $2387^{64} = (7 \times 341)^{64} = 7^{64} \times 341^{64}$

The last two digits of  $2387^{64}$  will be the last two digits of the product of the last two digits of  $7^{64}$  and  $341^{64}$ .

For the first term,  $7^{64} = 7^{4n}$ . The last two digits of 7 repeat their cycle after every fourth power.

For  $7^{4n+1} = 07$ ,  $7^{4n+2} = 49$ ,  $7^{4n+3} = 43$  and  $7^{4n} = 01$

Thus, the last two digits of  $7^{64} = 01$

For the second term, we know that if any term ends in 1,

Last two digits of  $(abc...xyz1)^n = 10$  (last digit of  $z \times n$ ) + 1

Thus, for  $341^{64}$ , last two digits = 10 (last digit of  $4 \times 64$ ) + 1 = 61

Thus, the last two digits of  $2387^{64} = 01 \times 61 = 61$

Hence, option A is the correct answer.



Alternate Solution:

The last two digits of  $2387^{64}$  will be equal to the last two digits of  $87^{64}$

$$87^{64} = 3^{64} \times 29^{64}$$

The last two digits of the above number will be equal to the last two digits of the product of the last two digits of  $3^{64}$  and  $29^{64}$

Using binomial expansion to expand the above terms, we get.

$$29^{64} = (30-1)^{64} = {}^{64}C_0 (30)^0 (-1)^{64} + {}^{64}C_1 (30)^1 (-1)^{63} + \dots + {}^{64}C_{64} (30)^{64} (-1)^0$$

In the above expansion, all terms but the first two will be a multiple of 100100.

$$= 1 - 64 \times 30 + \text{Higher power of } 100$$

$$= -1919 + \text{Higher power of } 100$$

We get the last two digits as = 81

$$3^{64} = (10-7)^{64}$$

Using the similar binomial expansion, we get the last two digits of the above expansion as 81

Thus, the last two digits of  $2387^{64}$  = Last two digits of =  $81 \times 81 = 61$

**55.  $(\log_2 x)^3 - 4(\log_2 x)^2 - 5(\log_2 x) = 0$ . If  $S$  is the sum of all possible values of  $x$ , find the value of  $24S$ ?**

**Sol.** Let  $\log_2 x = y$

Thus, the equation becomes

$$y^3 - 4y^2 - 5y = 0$$

$$y(y^2 - 4y - 5) = 0$$

$$y(y^2 - 5y + y - 5) = 0$$

$$y(y - 5)(y + 1) = 0$$

$$y = 0 \text{ or } 5 \text{ or } -1$$

Thus,  $\log_2 x = 0$  or  $5$  or  $-1$

$$x = 2^0 \text{ or } 2^5 \text{ or } 2^{-1}$$

$$x = 1 \text{ or } 32 \text{ or } \frac{1}{2}$$

Thus, the sum of all possible values of  $x = S = 1 + 32 + \frac{1}{2} = \frac{67}{2}$ .

$$\text{Thus, } 24S = 24 \times \frac{67}{2} = 804$$

**56. A shopkeeper buys 15 kgs of rice at Rs. 23/kg and lost  $p$  kgs of rice owing to some transportation problems. What should be the value of  $p$  for which, if the shopkeeper marks up the price by 20 per cent (on cost price) he will realise a profit of 10 per cent on the overall transaction?**

A. 1.75

B. 1.25

C. 2.25

D. 3

**Sol.** Total cost price of the rice is Rs.  $15 \times 23$

Now, according to the question

selling price of the rice left is

$$(15 - p) \times 23 \times \frac{6}{5} = 15 \times 23 \times 1.1 \text{ (S.P. of Rice left must be equal to 1.1 times the overall cost)}$$

On solving, we get  $p$  as 1.25



57. A shoe store sells shoes of three brands brand X, brand Y and brand Z. Sales of the present month for brands X and Y are 3:5 whereas for brands Y and Z are 8:3. The sales of X and Y in total is approximately what per cent greater than that of Z?

- A. 372%
- B. 237%
- C. 327%
- D. 427%

Sol.  $\frac{X}{Y} = \frac{3}{5}; \frac{Y}{Z} = \frac{8}{3}$

$\therefore X : Y : Z = 24 : 40 : 15$

$\frac{(X+Y-Z)}{Z} = \frac{49}{15} = 327\%$

58. A boat can travel 32 km upstream in 2 hours. It covers the same distance in still water by taking 16 minutes more than it takes while going downstream. What can be the boat's speed in still water if it is known to be less than 30 km/hr?

- A. 18 km/hr
- B. 26 km/hr
- C. 20 km/hr
- D. 24 km/hr

Sol. Let the speed of the boat in still water be  $B$  km/hr and the speed of the stream be  $R$  km/hr. Thus, the boat's speed upstream and downstream is  $(B - R)$  km/hr and  $(B + R)$  km/hr, respectively.

The boat travels 32 km upstream in 2 hours. Thus,  $B - R = \frac{32}{2} = 16$  km/hr

The boat takes 16mins more to travel the same distance in still water than downstream. Thus,

$\frac{32}{(B+R)} + \frac{16}{60} = \frac{32}{B}$

$\frac{32}{(2B-16)} + \frac{16}{60} = \frac{32}{B}$

Solving this, we get a quadratic equation as,

$B^2 - 68B + 960 = 0$

$B^2 - 48B - 20B + 960 = 0$

Thus,  $B = 48, 20$  and  $R = B - 16 = 32, 4$ .

The boat's speed is less than 30 km/hr, and thus the required speed is 20 km/hr.

Hence, option C is the answer.

59. At present, the sum of ages of mother and father is ten times their son's age. Six years later, the sum of their ages will be six times their son's age. If the difference between the ages of the mother and father is four years, with the father being the elder one, what is the ratio of the current age of the father to the current age of the mother?

- A. 10 : 9
- B. 8 : 7
- C. 16 : 13
- D. 14 : 13



**Sol.** Let M, F and S denote the ages of the mother, father and son, respectively.  
At present, the sum of M and F is ten times S.

$$M + F = 10S \quad \dots(1)$$

After six years, sum of M and F becomes six times of S

$$M + 6 + F + 6 = 6(S + 6)$$

$$M + F + 12 = 6S + 36$$

$$10S + 12 = 6S + 36$$

$$10S - 6S = 36 - 12$$

$$4S = 24$$

$$S = 6$$

Thus, (1) becomes,  $M + F = 10 \times 6 = 60$

We are given that the father is four years older than the mother.

$$F - M = 4 \quad \dots(2)$$

Adding (1) and (2)

$$2F = 64$$

$$F = 32$$

$$M = 32 - 4 = 28$$

Thus, the required ration =  $F : M = 32 : 28 = 8 : 7$

Hence, option B is the correct answer.

**60. If A is a set of integer multiples of 13 that leave the remainder 2 when divided by 7, arranged in increasing order, what is the sum of the first five terms of set A?**

**Sol.** The required numbers are of form  $13k$  and  $7n+2$ .

Going through the multiples of 13 and checking for the remainder, the first term that satisfies the condition is 65.

The subsequent terms can be obtained by adding the  $LCM(13, 7) = 91$  to the previous numbers.

Thus,  $A = 65, 156, 247, 338, 429, \dots$

The sum of first five terms of set A =  $65 + 156 + 247 + 338 + 429 = 1235$

**61.  $S = \frac{7}{6 \times 4} + \frac{7}{8 \times 6} + \frac{7}{10 \times 8} + \dots + \frac{7}{100 \times 98}$ . If S is equal to the ratio of the fourth term to the fifth term of an arithmetic progression with the common difference 4, what is the first term of the AP?**

$$\text{Sol. } S = \frac{7}{6 \times 4} + \frac{7}{8 \times 6} + \frac{7}{10 \times 8} + \dots + \frac{7}{100 \times 98}$$

$$S = 7 \left( \frac{1}{6 \times 4} + \frac{1}{8 \times 6} + \frac{1}{10 \times 8} + \dots + \frac{1}{100 \times 98} \right)$$

$$S = \frac{7}{2} \left( \left( \frac{1}{4} - \frac{1}{6} \right) + \left( \frac{1}{6} - \frac{1}{8} \right) + \left( \frac{1}{8} - \frac{1}{10} \right) + \dots + \left( \frac{1}{98} - \frac{1}{100} \right) \right)$$

$$S = \frac{7}{2} \left( \frac{1}{4} - \frac{1}{100} \right)$$

$$S = \frac{7}{2} \left( \frac{96}{400} \right)$$

$$S = \frac{21}{25}$$

Let  $a$  and  $d$  be the first term and the common difference of the AP. Thus,  $d = 4$ .

$$\text{Thus, } S = \frac{a+3d}{a+4d} = \frac{21}{25}$$

$$25(a + 3d) = 21(a + 4d)$$

$$25a + 75d = 21a + 84d$$

$$4a = 9d$$



$$4a = 9 \times 4$$

$$a = 9.$$

Thus, the required answer is 9.

**62. In a class test, A scored twice as much as B, B scored 50% more than C, C scored half of E, and the ratio of E's score to D's score was 8:7. If C scored 28 marks and the passing score was 45, what percentage of students passed among the five?**

- A. 40%
- B. 80%
- C. 60%
- D. 20%

**Sol.**  $A : B = 2 : 1$

$$B : C = 3 : 2$$

$$C : E = 1 : 2$$

$$E : D = 8 : 7$$

Thus,  $A : B : C : D : E = 12 : 6 : 4 : 7 : 8$

Let the scores of A, B, C, D and E be  $12x, 6x, 4x, 7x$  and  $8x$ , respectively.

We are given,  $C = 28 = 4x$

$$x = 7$$

Thus,

$$A = 84$$

$$B = 42$$

$$D = 49$$

$$E = 56$$

Since the passing marks are 45, A, D and E passed the test, and the rest failed.

Thus, percentage of passed students  $= 3 \times \frac{100}{5} = 60\%$

Hence, option C is the answer.

**63. A lent Rs.10000 to B at 6%pa. B lent a part of the Rs.10000 to C at a rate of 8%pa. If the difference between the interest received by A and B at the end of the year is Rs. 400, what is the ratio between the money lent by B to C to the money lent by A to B?**

- A. 1:3
- B. 3:1
- C. 4:1
- D. 1:4



**Sol.** Let B lend Rs. X to C. Thus, the interest received by B at the end of the year =  $0.08X$ .

The interest received by A at the end of the year =  $0.06 \times 10000 = 600$ .

The difference between the interest received by A and B = 400

$$600 - 0.08X = 400$$

$$X = \frac{200}{0.08}$$

$$X = 2500$$

Thus, B lent Rs.2500 to C.

The ratio of money lent by B to C to the money lent by A to B =  $2500:10000 = 1:4$

Hence, option D is the answer.

**64. Three solutions, P, Q and R, are composed of two ingredients, A and B. The ratios of A to B in the three solutions are 1:2, 3:1 and 1:1. 100 ml of P is mixed with 100 ml of Q to form a solution M; then, 100 ml of M is mixed with 100 ml of R to create a solution N, and finally, 100 ml of N is combined with a 100 ml of P to form a solution O. What is the proportion of A in the solution O?**

A.  $\frac{41}{96}$

B.  $\frac{13}{36}$

C.  $\frac{41}{55}$

D.  $\frac{55}{96}$

**Sol.** The ratios of A to B for the solutions P, Q and R are 1:2, 3:1 and 1:1, respectively. Thus, A's proportion in each solution is  $\frac{1}{3}$ ,  $\frac{3}{4}$  and  $\frac{1}{2}$ , respectively.

A. 100 mls of P and Q are mixed together to form M. The proportion of A in M is  $= \frac{100 \times \frac{1}{3} + 100 \times \frac{3}{4}}{200} = \frac{13}{24}$

B. 100 mls of M is mixed with 100 mls of R to form N. The proportion of A in N is  $= \frac{100 \times \frac{13}{24} + 100 \times \frac{1}{2}}{200} = \frac{25}{48}$

C. 100 mls of N is mixed with 100 mls of P to create O. The proportion of A in O is  $= \frac{100 \times \frac{25}{48} + 100 \times \frac{1}{3}}{200} = \frac{41}{96}$ .

Hence, option A is the answer.





65. Three unbiased dice are rolled simultaneously, and the numbers on their faces are added. If the sum equals 11, what is the probability that all the three numbers shown on the faces are odd?

- A.  $\frac{1}{9}$
- B.  $\frac{2}{9}$
- C. 1
- D.  $\frac{4}{9}$

**Sol.** When three unbiased dice are rolled together, then all the possible outcomes belong to the set  $(1,1,1), (1,1,2), \dots, (6,6,6)$ .

We need the cases where the sum of the numbers equals 11.

- 1.  $(6,4,1)$ : Total possible ways =  $3! = 6$
- 2.  $(5,5,1)$ : Total possible ways =  ${}^3C_2 = 3$
- 3.  $(6,3,2)$ : Total possible ways =  $3! = 6$
- 4.  $(5,4,2)$ : Total possible ways =  $3! = 6$
- 5.  $(5,3,3)$ : Total possible ways =  ${}^3C_2 = 3$
- 6.  $(4,4,3)$ : Total possible ways =  ${}^3C_2 = 3$

Thus, total number of ways of getting a sum of 11 =  $6 + 3 + 6 + 6 + 3 + 3 = 27$

There are only two cases where all the numbers are odd,  $(5,5,1)$  and  $(5,3,3)$ .

Thus, the total number of ways of getting the sum 11 with odd numbers =  $3 + 3 = 6$

Thus, the required probability =  $\frac{6}{27} = \frac{2}{9}$

Hence, option B is the correct answer.



66. If  $\frac{x+8}{x^2-|x|-12} < 0$ , what is the value of  $|S|$ , where  $S$  is the sum of all the possible integer values of  $x$  satisfying the given inequality and  $|x| \leq 10$ ?

Sol.  $|x| \leq 10$

Thus,  $-10 \leq x \leq 10$

$$\frac{x+8}{x^2-|x|-12} < 0$$

$$\frac{x+8}{|x|^2-4|x|+3|x|-12} < 0$$

$$\frac{x+8}{(|x|-4)(|x|+3)} < 0$$

Thus, the boundary points for this inequality are  $-8, 4$  and  $-4$ .

' $-3$ ' won't be a boundary point because  $|x|$  cannot have a negative value.

We will have to check the sign of the expression in the regions around these boundary points.

Case 1:  $x < -8$

Let's take  $x = -9$ . The expression becomes  $\frac{-9+8}{(|-9|-4)(|-9|+3)} = -\frac{1}{60}$

Thus, the value of the expression is negative in this region.

Similarly, checking for the other regions, we get

$-8 < x < -4$ : The expression is positive

$-4 < x < 4$ : The expression is negative

$x > 4$ : The expression is positive

Thus, the values of  $x$  satisfying the given inequality are  $-10, -9, -3, -2, -1, 0, 1, 2$  and  $3$ .

Thus,  $S = -10 - 9 - 3 - 2 - 1 + 0 + 1 + 2 + 3 = -19$

Therefore,  $|S| = |-19| = 19$