

CAT 2019

Slot 2

Question paper & Solution



Slot-2 VARC

Direction (Q1-5): The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

Around the world, capital cities are disgorging bureaucrats. In the post-colonial fervour of the 20th century, coastal capitals picked by trade-focused empires were spurned for “regionally neutral” new ones But decamping wholesale is costly and unpopular; governments these days prefer piecemeal dispersal. The trend reflects how the world has changed. In past eras, when information travelled at a snail’s pace, civil servants had to cluster together. But now desk-workers can ping emails and video-chat around the world. Travel for face-to-face meetings may be unavoidable, but transport links, too, have improved....

Proponents of moving civil servants around promise countless benefits. It disperses the risk that a terrorist attack or natural disaster will cripple an entire government. Workers in the sticks will be inspired by new ideas that walled-off capitals cannot conjure up. Autonomous regulators perform best far from the pressure and lobbying of the big city. Some even hail a cure for ascendant cynicism and populism. The unloved bureaucrats of faraway capitals will become as popular as firefighters once they mix with regular folk.

Beyond these sunny visions, dispersing central-government functions usually has three specific aims: to improve the lives of both civil servants and those living in clogged capitals; to save money; and to redress regional imbalances. The trouble is that these goals are not always realised.

The first aim—improving living conditions—has a long pedigree. After the second world war Britain moved thousands of civil servants to “agreeable English country towns” as London was rebuilt. But swapping the capital for somewhere smaller is not always agreeable. Attrition rates can exceed 80%.... The second reason to pack bureaucrats off is to save money. Office space costs far more in capitals.... Agencies that are moved elsewhere can often recruit better workers on lower salaries than in capitals, where well-paying multinationals mop up talent.

The third reason to shift is to rebalance regional inequality.... Norway treats federal jobs as a resource every region deserves to enjoy, like profits from oil. Where government jobs go, private ones follow.... Sometimes the aim is to fulfil the potential of a country’s second-tier cities. Unlike poor, remote places, bigger cities can make the most of relocated government agencies, linking them to local universities and businesses and supplying a better-educated workforce. The decision in 1946 to set up America’s Centres for Disease Control in Atlanta rather than Washington, D.C., has transformed the city into a hub for health-sector research and business.

The dilemma is obvious. Pick small, poor towns, and areas of high unemployment get new jobs, but it is hard to attract the most qualified workers; opt for larger cities with infrastructure and better-qualified residents, and the country’s most deprived areas see little benefit....

Others contend that decentralisation begets corruption by making government agencies less accountable.... A study in America found that state-government corruption is worse when the state capital is isolated—journalists, who tend to live in the bigger cities, become less watchful of those in power.

1. According to the passage, colonial powers located their capitals:

- A. to showcase their power and prestige.
- B. where they had the densest populations.
- C. based on political expediency.
- D. to promote their trading interests.

Answer: D

Solution:

A careful reading of the first paragraph will give the answer. Refer to the lines - 'In the post-colonial fervour of the 20th century, coastal capitals picked by trade-focused empires were spurned for "regionally neutral" new ones ... '

From this, we can infer that the empires were focused on trade and their capitals were coastal to make trade easy.

Options A, B, C mention points not stated in the passage.

Option D is the right answer- to promote their trading interests.

2. The "dilemma" mentioned in the passage refers to:

- A. keeping government agencies in the largest city with good infrastructure or moving them to a remote area with few amenities.
- B. concentrating on decongesting large cities or focusing on boosting employment in relatively larger cities.
- C. encouraging private enterprises to relocate to smaller towns or not incentivising them in order to keep government costs in those towns low.
- D. relocating government agencies to boost growth in remote areas with poor amenities or to relatively larger cities with good amenities.

Answer: D

Solution:

The word dilemma is used in the first line of paragraph 6 and the author explains the dilemma in the following lines. Refer to the lines -The dilemma is obvious. Pick small, poor towns, and areas of high unemployment get new jobs, but it is hard to attract the most qualified workers; opt for larger cities with infrastructure and better-qualified residents, and the country's most deprived areas see little benefit.

So, the dilemma is between picking small or large towns as all have their own benefits and drawbacks. This point is clearly explained in option D.

Hence, option D is the correct answer.

3. People who support decentralising central government functions are LEAST likely to cite which of the following reasons for their view?

- A. More independence could be enjoyed by regulatory bodies located away from political centres.
- B. Policy makers may benefit from fresh thinking in a new environment.
- C. It reduces expenses as infrastructure costs and salaries are lower in smaller cities.
- D. It could weaken the nexus between bureaucrats and media in the capital.

Answer: D

Solution:

The question asks us to identify the option that is least likely to favour decentralising central government functions. So, three options are likely to state the benefits of decentralisation while the answer is the option that points to a drawback of decentralisation.

The benefits have been mentioned in paragraphs 2 and 3.

Read the lines of the concluding paragraph which states that 'decentralisation begets corruption by making government agencies less accountable A study in America found that state-government corruption is worse when the state capital is isolated—journalists, who tend to live in the bigger cities, become less watchful of those in power.'

If the connection between media and bureaucrats is weakened, then journalists become less watchful, and it would increase corruption.

Hence, D is the correct answer.

4.The "long pedigree" of the aim to shift civil servants to improve their living standards implies that this move:

A. is not a new idea and has been tried in the past.

B. has become common practice in several countries worldwide.

C. is supported by politicians and the ruling elites.

D. takes a long time to achieve its intended outcomes.

Answer: A

Solution:

The word 'Pedigree' means the record of one's ancestry.

The lines in paragraph 4 where the word has been used will help us determine the meaning- The first aim—improving living conditions—has a long pedigree- Meaning shifting civil servants to improve their standards of living has a long history.

This meaning is best expressed in option A- It's not a new idea and has been tried in the past.

Hence, option A is the correct answer.

5. According to the author, relocating government agencies has not always been a success for all of the following reasons EXCEPT:

A. a rise in pollution levels and congestion in the new locations.

B. the difficulty of attracting talented, well-skilled people in more remote areas.

C. increased avenues of corruption away from the capital city.

D. high staff losses, as people may not be prepared to move to smaller towns.

Answer: A

Solution:

We have to look for an option which has not been mentioned by the author as a problem faced in relocating government agencies.

The author has nowhere mentioned increasing pollution as a problem for relocation- Hence, A is the correct answer

Direction (Q6-10): The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

War, natural disasters and climate change are destroying some of the world's most precious cultural sites. Google is trying to help preserve these archaeological wonders by allowing users access to 3D images of these treasures through its site.

But the project is raising questions about Google's motivations and about who should own the digital copyrights. Some critics call it a form of "digital colonialism."

When it comes to archaeological treasures, the losses have been mounting. ISIS blew up parts of the ancient city of Palmyra in Syria and an earthquake hit Bagan, an ancient city in Myanmar, damaging dozens of temples, in 2016. In the past, all archaeologists and historians had for restoration and research were photos, drawings, remnants and intuition.

But that's changing. Before the earthquake at Bagan, many of the temples on the site were scanned [These] scans ... are on Google's Arts & Culture site. The digital renditions allow viewers to virtually wander the halls of the temple, look up-close at paintings and turn the building over, to look up at its chambers [Google Arts & Culture] works with museums and other nonprofits ... to put high-quality images online.

The images of the temples in Bagan are part of a collaboration with CyArk, a nonprofit that creates the 3D scanning of historic sites Google ... says [it] doesn't make money off this website, but it fits in with Google's mission to make the world's information available and useful.

Critics say the collaboration could be an attempt by a large corporation to wrap itself in the sheen of culture. Ethan Watrall, an archaeologist, professor at Michigan State University and a member of the Society for American Archaeology, says he's not comfortable with the arrangement between CyArk and Google Watrall says this project is just a way for Google to promote Google. "They want to make this material accessible so people will browse it and be filled with wonder by it," he says. "But at its core, it's all about advertisements and driving traffic." Watrall says these images belong on the site of a museum or educational institution, where there is serious scholarship and a very different mission

[There's] another issue for some archaeologists and art historians. CyArk owns the copyrights of the scans — not the countries where these sites are located. That means the countries need CyArk's permission to use these images for commercial purposes. Erin Thompson, a professor of art crime at John Jay College of Criminal Justice in New York City, says it's the latest example of a Western nation appropriating a foreign culture, a centuries-long battle CyArk says it copyrights the scans so no one can use them in an inappropriate way. The company says it works closely with authorities during the process, even training local people to help. But critics like Thompson are not persuaded She would prefer the scans to be owned by the countries and people where these sites are located.

6. Based on his views mentioned in the passage, one could best characterize Dr. Watrall as being:

- A. opposed to the use of digital technology in archaeological and cultural sites in developing countries.
- B. dismissive of laypeople's access to specialist images of archaeological and cultural sites.
- C. uneasy about the marketing of archaeological images for commercial use by firms such as Google and CyArk.
- D. critical about the links between a non-profit and a commercial tech platform for distributing archaeological images.

Answer: D

Solution:

The question is asking for the option which best represents Dr. Watrall's views expressed in the passage.

The passage mentions Ethan Watrall and his reservations on the arrangement between CyArk and Google, which he feels would only serve to promote Google and increase traffic on Google.

His view is that ... 'these images belong on the site of a museum or educational institution, where there is serious scholarship and a very different mission.'

Option A is incorrect as the passage does not state that he is opposed to the use of digital technologies in archaeological and cultural sites in developing countries.

Option B is incorrect as Watrall is not dismissive of laypeople's access to specialist images. He says the images belong to a museum or an educational institution.

Option C is incorrect as it misrepresents the facts mentioned in the passage. There is no commercial use of the images.

Option D is the correct option. Watrall's objection is to the link between CyArk and Google and their arrangement on the distribution of images.

7. By "digital colonialism", critics of the CyArk–Google project are referring to the fact that:

A. CyArk and Google have been scanning images without copyright permission from host countries.

B. the scanning process can damage delicate frescos and statues at the sites.

C. countries where the scanned sites are located do not own the scan copyrights.

D. CyArk and Google have not shared the details of digitisation with the host countries.

Answer: C

Solution:

A reading of the first two paragraphs and paragraph 7 explains the meaning of the term digital colonisation used in the passage.

The passage states that 'Google is trying to help preserve ... archaeological wonders by allowing users access to 3D images of these treasures through its site. But the project is raising questions about Google's motivations and about who should own the digital copyrights. Some critics call it a form of "digital colonialism."

So, Google's project on preserving archeological wonders is being termed as digital colonisation. The main reason why it is being termed such is that CyArk (with whom Google is collaborating on this project) owns the copyrights of the scans — not the countries where these sites are located. That means the countries need CyArk's permission to use these images for commercial purposes.

This point is best expressed in option C.

8. Which of the following, if true, would most strongly invalidate Dr. Watrall's objections?

A. Google takes down advertisements on its website hosting CyArk's scanned images.

B. There is a ban on CyArk scanning archeological sites located in other countries.

C. CyArk does not own the copyright on scanned images of archaeological sites.

D. CyArk uploads its scanned images of archaeological sites onto museum websites only.

Answer: D

Solution:

Dr. Watrall's main objection is that Google's project in collaboration with CyArk promotes Google. The images on Google do not belong there but actually belong in a museum or educational institution where it could be of use to scholarly pursuits.

This point is weakened by option D which states that CyArk uploads its scanned images of archaeological sites onto museum websites only.

Hence, option D is the correct answer.

9. In Dr. Thompson's view, CyArk owning the copyright of its digital scans of archaeological sites is akin to:

- A. tourists uploading photos of monuments onto social media.
- B. the seizing of ancient Egyptian artefacts by a Western Museum.
- C. the illegal downloading of content from the internet.
- D. digital platforms capturing users' data for market research.

Answer: B

Solution:

The passage states Erin Thomson's views in the concluding paragraph. She says CyArk's ownership of the copyright of the images is the latest example of a Western nation appropriating a foreign culture, a centuries-long battle.

Among the options, it can be stated to be similar to option B.

10. Of the following arguments, which one is LEAST likely to be used by the companies that digitally scan cultural sites?

- A. It enables people who cannot physically visit these sites to experience them.
- B. It helps preserve precious images in case the sites are damaged or destroyed.
- C. It allows a large corporation to project itself as a protector of culture.
- D. It provides images free of cost to all users.

Answer: C

Solution:

It is an inference question but quite easy to solve. Companies that digitally scan cultural sites would obviously point out that it is in public interest and not for any private gain.

A, B, and D would show the companies in a good light as they all benefit the public. Option C is our answer as it shows that it will help project an image of the company - it will be like a promotion.

Therefore, C is the correct answer.

Direction (Q11-15): The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

The magic of squatter cities is that they are improved steadily and gradually by their residents. To a planner's eye, these cities look chaotic. I trained as a biologist and to my eye, they look organic. Squatter cities are also unexpectedly green. They have maximum density—1 million people per square mile in some areas of Mumbai—and have minimum energy and material use. People get around by foot, bicycle, rickshaw, or the universal shared taxi.

Not everything is efficient in the slums, though. In the Brazilian favelas where electricity is stolen and therefore free, people leave their lights on all day. But in most slums recycling is literally a way of life. The Dharavi slum in Mumbai has 400 recycling units and 30,000 ragpickers. Six thousand tons of rubbish are sorted every day. In 2007, the Economist reported that in Vietnam and Mozambique, "Waves of gleaners sift the sweepings of Hanoi's streets, just as Mozambiquan children pick over the rubbish of Maputo's main tip. Every city in Asia and Latin America has an industry based on gathering up old cardboard boxes." ...

In his 1985 article, Calthorpe made a statement that still jars with most people: "The city is the most environmentally benign form of human settlement. Each city dweller consumes less land, less energy, less water, and produces less pollution than his counterpart in settlements of lower densities." "Green Manhattan" was the inflammatory title of a 2004 New Yorker article by David Owen. "By the most

significant measures," he wrote, "New York is the greenest community in the United States, and one of the greenest cities in the world ... The key to New York's relative environmental benignity is its extreme compactness.... Placing one and a half million people on a twenty-three-square-mile island sharply reduces their opportunities to be wasteful." He went on to note that this very compactness forces people to live in the world's most energy-efficient apartment buildings....

Urban density allows half of humanity to live on 2.8 per cent of the land.... Consider just the infrastructure efficiencies. According to a 2004 UN report: "The concentration of population and enterprises in urban areas greatly reduces the unit cost of piped water, sewers, drains, roads, electricity, garbage collection, transport, health care, and schools." ...

[T]he nationally subsidised city of Manaus in northern Brazil "answers the question" of how to stop deforestation: give people decent jobs. Then they can afford houses, and gain security. One hundred thousand people who would otherwise be deforesting the jungle around Manaus are now prospering in town making such things as mobile phones and televisions....

Of course, fast-growing cities are far from an unmitigated good. They concentrate crime, pollution, disease and injustice as much as business, innovation, education and entertainment.... But if they are overall a net good for those who move there, it is because cities offer more than just jobs. They are transformative: in the slums, as well as the office towers and leafy suburbs, the progress is from hick to metropolitan to cosmopolitan ...

11. Which one of the following statements would undermine the author's stand regarding the greenness of cities?

- A. The compactness of big cities in the West increases the incidence of violent crime.
- B. Sorting through rubbish contributes to the rapid spread of diseases in the slums.
- C. The high density of cities leads to an increase in carbon dioxide and global warming.
- D. Over the last decade the cost of utilities has been increasing for city dwellers.

Answer: C

Solution:

The author's main point in the passage is to highlight that urban cities and squatter cities are green. He substantiates his point with examples of Brazilian Favelas, Dharavi, and Mozambique and quotes Calthorpe and David Owen on environmentally friendly cities.

The option that would undermine or weaken his statement would counter this point and draw attention to the environmental damage caused by cities.

Option A mentions increasing crime in cities which does not weaken the author's claim of green cities.

Option B mentions the spread of diseases which again does not counter the green nature of cities.

Option D mentions high cost of living which again does not weaken the green claim.

Option C mentions two factors which counter the author's claim. If cities cause an increase in the levels of carbon dioxide and global warming, it goes against the author's claim that they are environment friendly.

Hence, option C is the answer.

12. According to the passage, squatter cities are environment-friendly for all of the following reasons EXCEPT:

- A. their transportation is energy efficient.
- B. they recycle material.
- C. they sort out garbage.
- D. their streets are kept clean.

Answer: D

Solution:

Paragraphs 1 and 2 mention the various ways in which squatter cities are environment friendly. We have to look for an option that has not been mentioned as a reason to show that squatter cities are environment friendly

The author mentions energy-efficient transport - 'People get around by foot, bicycle, rickshaw, or the universal shared taxi.'- so A has been mentioned.

Option B has been mentioned with examples of Dharavi, Vietnam, and Mozambique- 'But in most slums recycling is literally a way of life.'

Option C has been mentioned - "Waves of gleaners sift the sweepings of Hanoi's streets, just as Mozambiquan children pick over the rubbish of Maputo's main tip. Every city in Asia and Latin America has an industry based on gathering up old cardboard boxes."

Option D - the streets are kept clean - is not a reason why it is environment friendly. Hence option D is the answer.

13. We can infer that Calthorpe's statement "still jars" with most people because most people:

- A. regard cities as places of disease and crime.
- B. do not consider cities to be eco-friendly places.
- C. do not regard cities as good places to live in.
- D. consider cities to be very crowded and polluted.

Answer: B

Solution:

When we say something 'jars people', we mean it upsets them or unsettles them. Calthorpe's statement was that "The city is the most environmentally benign form of human settlement." The author says it still jars with most people meaning it upsets them or makes them feel perturbed. This would happen if they disagreed with it - That they do not think cities are the most environmentally friendly form of human settlement.

This is best expressed in option B.

14. In the context of the passage, the author refers to Manaus in order to:

- A. explain how urban areas help the environment.
- B. describe the infrastructure efficiencies of living in a city.
- C. explain where cities source their labour for factories.
- D. promote cities as employment hubs for people.

Answer: A

Solution:

Refer to the lines in Paragraph 5 where the author mentions Manau - 'The nationally subsidised city of Manaus in northern Brazil "answers the question" of how to stop deforestation: give people decent jobs. Then they can afford houses and gain security. One hundred thousand people who would otherwise be deforesting the

jungle around Manaus are now prospering in town making such things as mobile phones and televisions.

So according to the author, Manaus is the answer to the question how to stop deforestation - by giving them jobs.

So, the correct answer is A -to explain how urban areas help the environment.

15. From the passage it can be inferred that cities are good places to live in for all of the following reasons EXCEPT that they:

- A. offer employment opportunities.
- B. help prevent destruction of the environment.
- C. contribute to the cultural transformation of residents.
- D. have suburban areas as well as office areas.

Answer: D

Solution:

The author mentions the benefits and drawbacks of cities in the concluding paragraph.

The author states that cities are good for 'business, innovation, education and entertainment But if they are overall a net good for those who move there, it is because cities offer more than just jobs. They are transformative: in the slums, as well as the office towers and leafy suburbs, the progress is from hick to metropolitan to cosmopolitan ...'

Option A has been mentioned more than once.

Option B can be inferred from the example of Manaus and the author's overall argument that cities are environment friendly.

C has been mentioned in the last few lines of the passage - 'they are transformative ...'

D is the answer - the fact that a city has suburban and office areas is not related to it being a good place to live in.

Direction (Q16-19): The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

For two years, I tracked down dozens of ... Chinese in Upper Egypt [who were] selling lingerie. In a deeply conservative region, where Egyptian families rarely allow women to work or own businesses, the Chinese flourished because of their status as outsiders. They didn't gossip, and they kept their opinions to themselves. In a New Yorker article entitled "Learning to Speak Lingerie," I described the Chinese use of Arabic as another non-threatening characteristic. I wrote, "Unlike Mandarin, Arabic is inflected for gender, and Chinese dealers, who learn the language strictly by ear, often pick up speech patterns from female customers. I've come to think of it as the lingerie dialect, and there's something disarming about these Chinese men speaking in the feminine voice." ...

When I wrote about the Chinese in the New Yorker, most readers seemed to appreciate the unusual perspective. But as I often find with topics that involve the Middle East, some people had trouble getting past the black-and-white quality of a byline. "This piece is so orientalist I don't know what to do," Aisha Gani, a reporter who worked at The Guardian, tweeted. Another colleague at the British paper, Iman Amrani, agreed: "I wouldn't have minded an article on the subject written by an Egyptian woman—probably would have had better insight." ...

As an MOL (man of language), I also take issue with this kind of essentialism. Empathy and understanding are not inherited traits, and they are not strictly tied to

gender and race. An individual who wrestles with a difficult language can learn to be more sympathetic to outsiders and open to different experiences of the world. This learning process—the embarrassments, the frustrations, the gradual sense of understanding and connection—is invariably transformative. In Upper Egypt, the Chinese experience of struggling to learn Arabic and local culture had made them much more thoughtful. In the same way, I was interested in their lives not because of some kind of voyeurism, but because I had also experienced Egypt and Arabic as an outsider. And both the Chinese and the Egyptians welcomed me because I spoke their languages. My identity as a white male was far less important than my ability to communicate.

And that easily lobbed word—“Orientalist”—hardly captures the complexity of our interactions. What exactly is the dynamic when a man from Missouri observes a Zhejiang native selling lingerie to an Upper Egyptian woman? ... If all of us now stand beside the same river, speaking in ways we all understand, who’s looking east and who’s looking west? Which way is Oriental?

For all of our current interest in identity politics, there’s no corresponding sense of identity linguistics. You are what you speak—the words that run throughout your mind are at least as fundamental to your selfhood as is your ethnicity or your gender. And sometimes it’s healthy to consider human characteristics that are not inborn, rigid, and outwardly defined. After all, you can always learn another language and change who you are.

16. Which of the following can be inferred from the author’s claim, “Which way is Oriental?”

- A. Learning another language can mitigate cultural hierarchies and barriers.
- B. Globalisation has mitigated cultural hierarchies and barriers.
- C. Goodwill alone mitigates cultural hierarchies and barriers.
- D. Orientalism is a discourse of the past, from colonial times, rarely visible today.

Answer: A

Solution:

The main purpose of the author is to speak out against essentialism and type casting people on the basis of gender, race, and language. He says we cannot have identity linguistics. He sums up his arguments in the concluding paragraph that a person is defined by what he speaks and ‘the words that run throughout your mind are at least as fundamental to your selfhood as is your ethnicity or your gender. And sometimes it’s healthy to consider human characteristics that are not inborn, rigid, and outwardly defined. After all, you can always learn another language and change who you are.’ Oriental stands for ‘of or related to the East, especially East Asia. Generally, China is considered Orient for the Western countries. According to the author, when we speak the same language and communicate, the word Oriental or East Asian becomes meaningless. Hence, he asks ‘Which way is Orient?’

This is best expressed in option A.

17. A French ethnographer decides to study the culture of a Nigerian tribe. Which of the following is most likely to be the view of the author of the passage?

- A. The author would encourage the ethnographer but ask him/her to first learn the language of the Nigerian tribe s/he wishes to study.
- B. The author would encourage the ethnographer but ask him/her to be mindful of his/her racial and gender identity in the process.

C. The author would discourage the ethnographer from conducting the study as Nigerian ethnographers can better understand the tribe.

D. The author would encourage the ethnographer and recommend him/her to hire a good translator for the purpose of holding interviews.

Answer: A

Solution:

The author's main point is that language can help overcome cultural barriers. Therefore, he would ask the ethnographer to learn the language first to understand the culture.

Hence option A.

18. The author's critics would argue that:

A. Empathy can overcome identity politics.

B. Language is insufficient to bridge cultural barriers.

C. Linguistic politics can be erased.

D. Orientalism cannot be practiced by Egyptians.

Answer: B

Solution:

The author's main point is that language can help overcome cultural barriers. He gives a lot of importance to language. His critics would undermine the importance of language in understanding and overcoming cultural barriers. Hence option B would be the argument of his critics.

19. According to the passage, which of the following is not responsible for language's ability to change us?

A. The ups and downs involved in the course of learning a language.

B. Language's intrinsic connection to our notions of self and identity.

C. Language's ability to mediate the impact of identity markers one is born with.

D. The twists and turns in the evolution of language over time.

Answer: D

Solution:

The author mentions how language can be transformative. Refer to the following lines-

'This learning process—the embarrassments, the frustrations, the gradual sense of understanding and connection—is invariably transformative.'

Option A can be inferred from the embarrassments and frustrations of the language learning process.

Options B and C can be inferred from the fact that according to the author language itself is an identity marker and gives one a sense of self - the words that run throughout your mind are at least as fundamental to your selfhood as is your ethnicity or your gender.

Option D is out of scope of the passage as nowhere in the passage is evolution of language mentioned.

Hence, option D is the correct answer.

Direction (Q20-24): The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

British colonial policy ... went through two policy phases, or at least there were two strategies between which its policies actually oscillated, sometimes to its great advantage. At first, the new colonial apparatus exercised caution, and occupied India

by a mix of military power and subtle diplomacy, the high ground in the middle of the circle of circles. This, however, pushed them into contradictions. For, whatever their sense of the strangeness of the country and the thinness of colonial presence, the British colonial state represented the great conquering discourse of Enlightenment rationalism, entering India precisely at the moment of its greatest unchecked arrogance. As inheritors and representatives of this discourse, which carried everything before it, this colonial state could hardly adopt for long such a self-denying attitude. It had restructured everything in Europe—the productive system, the political regimes, the moral and cognitive orders—and would do the same in India, particularly as some empirically inclined theorists of that generation considered the colonies a massive laboratory of utilitarian or other theoretical experiments. Consequently, the colonial state could not settle simply for eminence at the cost of its marginality; it began to take initiatives to introduce the logic of modernity into Indian society. But this modernity did not enter a passive society. Sometimes, its initiatives were resisted by pre-existing structural forms. At times, there was a more direct form of collective resistance. Therefore, the map of continuity and discontinuity that this state left behind at the time of independence was rather complex and has to be traced with care.

Most significantly, of course, initiatives for ... modernity came to assume an external character. The acceptance of modernity came to be connected, ineradicably, with subjection. This again points to two different problems, one theoretical, the other political. Theoretically, because modernity was externally introduced, it is explanatorily unhelpful to apply the logical format of the 'transition process' to this pattern of change. Such a logical format would be wrong on two counts. First, however subtly, it would imply that what was proposed to be built was something like European capitalism. (And, in any case, historians have forcefully argued that what it was to replace was not like feudalism, with or without modificatory adjectives.) But, more fundamentally, the logical structure of endogenous change does not apply here. Here transformation agendas attack as an external force. This externality is not something that can be casually mentioned and forgotten. It is inscribed on every move, every object, every proposal, every legislative act, each line of causality. It comes to be marked on the epoch itself. This repetitive emphasis on externality should not be seen as a nationalist initiative that is so well rehearsed in Indian social science....

Quite apart from the externality of the entire historical proposal of modernity, some of its contents were remarkable.... Economic reforms, or rather alterations ... did not foreshadow the construction of a classical capitalist economy, with its necessary emphasis on extractive and transport sectors. What happened was the creation of a degenerate version of capitalism—what early dependency theorists called the 'development of underdevelopment'.

20. All of the following statements about British colonialism can be inferred from the first paragraph, EXCEPT that it:

- A. was at least partly an outcome of Enlightenment rationalism.
- B. faced resistance from existing structural forms of Indian modernity.
- C. was at least partly shaped by the project of European modernity.
- D. allowed the treatment of colonies as experimental sites.

Answer: B

Solution:

We have to identify the option that cannot be inferred.

Option A can be inferred from these lines of para 1 - 'the British colonial state represented the great conquering discourse of Enlightenment rationalism... As inheritors and representatives of this discourse, which carried everything before it, this colonial state could hardly adopt for long such a self-denying attitude... "

Option B cannot be inferred from the passage.

The passage states that initiatives to introduce its logic of modernity on Indian society by the British 'were resisted by pre-existing structural forms'. From that we cannot infer that they were existing structural forms of Indian modernity. The passage mentions structural forms in general.

Hence option B is the answer.

21. All of the following statements, if true, could be seen as supporting the arguments in the passage, EXCEPT:

A. the introduction of capitalism in India was not through the transformation of feudalism, as happened in Europe.

B. modernity was imposed upon India by the British and, therefore, led to underdevelopment.

C. throughout the history of colonial conquest, natives have often been experimented on by the colonisers.

D. the change in British colonial policy was induced by resistance to modernity in Indian society.

Answer: D

Solution:

We have to look for an option which does not support the arguments in the passage. Option A can be said to support the argument of the author mentioned in the following lines

'First, however subtly, it would imply that what was proposed to be built was something like European capitalism. (And, in any case, historians have forcefully argued that what it was to replace was not like feudalism....)'

The author argues that what European modernity tried to build was not like European capitalism and historians claim that what it tried to replace was not like feudalism in Europe.

Option B states that "modernity was imposed upon India by the British and, therefore, led to underdevelopment". It supports the arguments in the following lines , '... 'Economic reforms, or rather alterations did not foreshadow the construction of a classical capitalist economy, with its necessary emphasis on extractive and transport sectors. What happened was the creation of a degenerate version of capitalism—what early dependency theorists called the 'development of underdevelopment'.

Option C supports the author's claim in the first para '...empirically inclined theorists of that generation considered the colonies a massive laboratory of utilitarian or other theoretical experiments.'

Option D is the answer as it has not been mentioned in the passage.

Hence option D is the correct answer.

22. "Consequently, the colonial state could not settle simply for eminence at the cost of its marginality; it began to take initiatives to introduce the logic of modernity into Indian society." Which of the following best captures the sense of this statement?

- A. The colonial state's eminence was unsettled by its marginal position; therefore, it developed Indian society by modernising it.
- B. The colonial enterprise was a costly one; so, to justify the cost it began to take initiatives to introduce the logic of modernity into Indian society.
- C. The colonial state felt marginalised from Indian society because of its own modernity; therefore, it sought to address that marginalisation by bringing its modernity to change Indian society.
- D. The cost of the colonial state's eminence was not settled; therefore, it took the initiative of introducing modernity into Indian society.

Answer: C

Solution:

One has to understand the meaning of the statement.

Eminence means superiority or distinction. So, the sentence implies that the British believed they were different and superior to the Indian because of their modernity. But they realised that they did not want that modernity to be the cause of their marginalisation or insignificance. So, they decided that they would modernise Indian society.

This is best explained in option C.

Hence option C is the correct answer.

23. Which one of the following 5-word sequences best captures the flow of the arguments in the passage?

- A. Military power—arrogance—laboratory—modernity—capitalism.
- B. Colonial policy—Enlightenment—external modernity—subjection—underdevelopment.
- C. Colonial policy—arrogant rationality—resistance—independence—development.
- D. Military power—colonialism—restructuring—feudalism—capitalism.

Answer: B

Solution:

The key arguments in the passage can be identified by looking at the structure of the passage-

British colonial policy and its phases- role of enlightened rationalism - initiatives to introduce the logic of modernity into Indian society- modernity came to assume an external character and came to be associated with subjection- led to the creation of a degenerate version of capitalism or 'development of underdevelopment'.

This flow is captured exactly by option B.

Hence option B is the correct answer.

24. Which of the following observations is a valid conclusion to draw from the author's statement that "the logical structure of endogenous change does not apply here. Here transformation agendas attack as an external force"?

- A. The endogenous logic of colonialism can only bring change if it attacks and transforms external forces.
- B. Indian society is not endogamous; it is more accurately characterised as aggressively exogamous.
- C. Colonised societies cannot be changed through logic; they need to be transformed with external force.

D. The transformation of Indian society did not happen organically but was forced by colonial agendas.

Answer: D

Solution:

"The logical structure of endogenous change does not apply here. Here transformation agendas attack as an external force"?

The author says change does not happen endogenously or from within. Transformation happens with external colonial agendas.

This meaning is best expressed by option D.

25. Direction: The passages given below are followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Language is an autapomorphy found only in our lineage, and not shared with other branches of our group such as primates. We also have no definitive evidence that any species other than *Homo sapiens* ever had language. However, it must be noted straightaway that 'language' is not a monolithic entity, but rather a complex bundle of traits that must have evolved over a significant time frame.... Moreover, language crucially draws on aspects of cognition that are long established in the primate lineage, such as memory: the language faculty as a whole comprises more than just the uniquely linguistic features.

A. Language, a derived trait found only in humans, has evolved over time and involves memory.

B. Language is a distinctively human feature as there is no evidence of the existence of language in any other species.

C. Language evolved with linguistic features building on features of cognition such as memory.

D. Language is not a single, uniform entity but the end result of a long and complex process of linguistic evolution.

Answer: C

Solution:

The passage is about language. The author states that language is unique to humans. It is a complex bundle of traits that evolved over a long timeframe. Language draws on aspects of cognition that are long established in the primate lineage, such as memory.

All these features are mentioned in option C.

Other options misrepresent the facts mentioned in the passage.

26. Direction: The passages given below are followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Social movement organizations often struggle to mobilize supporters from allied movements in their efforts to achieve critical mass. Organizations with hybrid identities—those whose organizational identities span the boundaries of two or more social movements, issues, or identities—are vital to mobilizing these constituencies. Studies of the post-9/11 U.S. antiwar movement show that individuals with past involvement in non-anti-war movements are more likely to join hybrid organizations than are individuals without involvement in non-anti-war movements. In addition, they show that organizations with hybrid identities occupy relatively more central positions in inter-organizational contact networks within the antiwar movement and thus recruit significantly more participants in demonstrations than do nonhybrid organizations.

- A. Post 9/11 studies show that people who are involved in non anti-war movements are likely to join hybrid organizations.
- B. Hybrid organizations attract individuals that are deeply involved in anti-war movements.
- C. Movements that work towards social change often find it difficult to mobilize a critical mass of supporters.
- D. Organizations with hybrid identities are able to mobilize individuals with different points of view.

Answer: D

Solution:

The passage is about social movement organisations and how they mobilise support. The author states that social movement organisations struggle to mobilise supporters from allied movements. Organisations with hybrid identities are vital to mobilising support and recruit more participants than do nonhybrid organisations.

These key points are best expressed in option D.

27. Direction: The four sentences (labelled 1, 2, 3, 4) given below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequence of the order of the sentences and key in the sequence of the four numbers as your answer.

1) Conceptualisations of 'women's time' as contrary to clock-time and clock-time as synonymous with economic rationalism are two of the deleterious results of this representation.

2) While dichotomies of 'men's time', 'women's time', clock-time, and caring time can be analytically useful, this article argues that everyday caring practices incorporate a multiplicity of times; and both men and women can engage in these multiple-times

3) When the everyday practices of working sole fathers and working sole mothers are carefully examined to explore conceptualisations of gendered time, it is found that caring time is often more focused on the clock than generally theorised.

4) Clock-time has been consistently represented in feminist literature as a masculine artefact representative of a 'time is money' perspective.

Answer: 4132

Solution:

A reading of all the sentences in the jumble shows that 4 is a good starting sentence as it introduces the subject Clock time.

4-1 is a pair as 1 refers to the presentation mentioned in 4- 'this representation'

3 follows 4 as it mentions 'caring time which is more focused on the clock than people realized.

2 sums up all the different 'times' mentioned in the 3 sentences preceding it.

Hence the order is 4132.

28. Direction: The four sentences (labelled 1, 2, 3, 4) given below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequence of the order of the sentences and key in the sequence of the four numbers as your answer.

1) Living things—animals and plants—typically exhibit correlational structure.

2) Adaptive behaviour depends on cognitive economy, treating objects as equivalent.

3) The information we receive from our senses, from the world, typically has structure and order, and is not arbitrary.

4) To categorize an object means to consider it equivalent to other things in that category, and different—along some salient dimension—from things that are not.

Answer: 2431

Solution:

2 is the only standalone sentence in the sequence and can be considered as the starting sentence- it talks of adaptive behaviour and how it depends on cognitive economy by treating objects as equivalent.

4 expands on this idea of equivalence, so 2-4 is a pair.

3 -1 is a pair as 3 talks of structure and 1 gives examples of how living things exhibit correlational structure.

Hence 2431 is the correct order.

29. Direction: The four sentences (labelled 1, 2, 3, 4) given below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequence of the order of the sentences and key in the sequence of the four numbers as your answer.

1) To the uninitiated listener, atonal music can sound like chaotic, random noise.

2) Atonality is a condition of music in which the constructs of the music do not 'live' within the confines of a particular key signature, scale, or mode.

3) After you realize the amount of knowledge, skill, and technical expertise required to compose or perform it, your tune may change, so to speak.

4) However, atonality is one of the most important movements in 20th century music.

Answer: 2143

Solution:

2 is a good starting sentence for the sequence as it is a general statement on atonality in music.

1 expands on 2 stating what atonal music is like.

4 follows this by talking of another aspect of atonality using 'however' and 3 follows 4 by using the pronoun 'it' to refer to atonality and summing up the concept of atonality.

Hence 2143 is the correct order.

30. Direction: The four sentences (labelled 1, 2, 3, 4) given below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequence of the order of the sentences and key in the sequence of the four numbers as your answer.

1) Such a belief in the harmony of nature requires a purpose presumably imposed by the goodness and wisdom of a deity.

2) These parts all fit together into an integrated, well-ordered system that was created by design.

3) Historically, the notion of a balance of nature is part observational, part metaphysical, and not scientific in any way.

4) It is an example of an ancient belief system called teleology, the notion that what we call nature has a predetermined destiny associated with its component parts.

Answer: 3421

Solution:

3 can be considered as the starting sentence as it is a general statement on the notion of balance of nature.

4 follows 3 by expanding on the 'notion that we call nature'

We can clearly identify that 4-2 is a pair - 4 mentions component parts and 2 talks about 'these parts'

1 can follow these sentences summing up the paragraph.

Hence, 3421 is the right order.

31. **Direction:** The passages given below are followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Privacy-challenged office workers may find it hard to believe, but open-plan offices and cubicles were invented by architects and designers who thought that to break down the social walls that divide people, you had to break down the real walls, too. Modernist architects saw walls and rooms as downright fascist. The spaciousness and flexibility of an open plan would liberate homeowners and office dwellers from the confines of boxes. But companies took up their idea less out of a democratic ideology than a desire to pack in as many workers as they could. The typical open-plan office of the first half of the 20th century was a white-collar assembly line. Cubicles were interior designers' attempt to put some soul back in.

A. Wall-free office spaces did not quite work out as desired and therefore cubicles came into being.

B. Wall-free office spaces did not quite work out the way their utopian inventors intended, as they became tools for exploitation of labor.

C. Wall-free office spaces could have worked out the way their utopian inventors intended had companies cared for workers' satisfaction.

D. Wall-free office spaces did not quite work out as companies don't believe in democratic ideology.

Answer: B

Solution:

The main points made in the passage are as follows:

Open-plan offices and cubicles were invented by architects and designers to break down the social walls that divide people.

But companies took up their idea to pack in as many workers as they could.

The open-plan office of the first half of the 20th century was a white-collar assembly line.

These points are best expressed in option B.

Hence, option B is the correct answer.

32. **Direction:** 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. Choose its number as your answer and key it in:

1) A particularly interesting example of inference occurs in many single panel comics.

2) It's the creator's participation and imagination that makes the single-panel comic so engaging and so rewarding.

3) Often, the humor requires you to imagine what happened in the instant immediately before or immediately after the panel you're being shown.

4) To get the joke, you actually have to figure out what some of these missing panels must be.

5) It is as though the cartoonist devised a series of panels to tell the story and has chosen to show you only one – and typically not even the funniest.

Answer: 2

Solution:

A quick reading of all the sentences reveals that the theme of most sentences in the paragraph is about humour present in single panel comics. This theme is present in sentences 1,3,4, and 5.

2 is also talking about single panel comics but it mentions another aspect - what makes single point comics so engaging and rewarding.

Hence, 2 is the odd one out.

33. **Direction:** 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. Choose its number as your answer and key it in:

1) Socrates told us that 'the unexamined life is not worth living' and that to 'know thyself' is the path to true wisdom.

2) It suggests that you should adopt an ancient rhetorical method favored by the likes of Julius Caesar and known as 'illeism' – or speaking about yourself in the third person.

3) Research has shown that people who are prone to rumination also often suffer from impaired decision making under pressure and are at a substantially increased risk of depression.

4) Simple rumination – the process of churning your concerns around in your head – is not the way to achieve self-realization.

5) The idea is that this small change in perspective can clear your emotional fog, allowing you to see past your biases.

Answer: 1

Solution:

A reading of all the sentences in the paragraph reveal that all the sentences seem to be on the same theme. To identify the odd one out, we need to try to arrange the sentences in a coherent order.

4325 seems to be a good sequence- 4 introduces what is the topic- rumination and self realisation- it says simple rumination is not the way.

3 expand on that and shows why- 2 will follow 3 - the 'it' in 2 refers to research in 3 5 sums up the 'idea' behind 2.

Hence 1 is the odd one out as it is a general statement on knowing yourself- not part of this sequence.

34. **Direction:** 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. Choose its number as your answer and key it in:

1) Pro-life !! point to the rise in legalized abortion figures and see this as morally intolerable.

2) On one side of the controversy are those who call themselves "pro-life". They view the foetus as a human life rather than as an unformed complex of cells.

3) Pro-choicers are of the opinion that law will not prevent women from having unwanted children.

4) These groups cite both legal and religious reasons for their opposition to abortion.

5) While Pro-choicers believe that women, not legislators or judges, should have the right to decide whether and under what circumstances they will bear children.

Answer: 3

Solution:

1,2,4,5 are part of the same sequence which is about the two sides of the controversial topic of abortion - the pro-life and the pro-choice groups.

3 misrepresents the point of the pro-choice argument. Hence it is the odd one out.

Slot-2 DILR

Direction: Ten players, as listed in the table below, participated in a rifle shooting competition comprising of 10 rounds. Each round had 6 participants. Players numbered 1 through 6 participated in Round 1, players 2 through 7 in Round 2,..., players 5 through 10 in Round 5, players 6 through 10 and 1 in Round 6, players 7 through 10, 1 and 2 in Round 7 and so on. The top three performances in each round were awarded 7, 3 and 1 points respectively. There were no ties in any of the 10 rounds. The table below gives the total number of points obtained by the 10 players after Round 6 and Round 10 .

Player Number	Player Name	Points after round 6	Points after round 10
1	Amita	8	18
2	Bala	2	5
3	Chen	3	6
4	David	6	6
5	Eric	3	10
6	Fatima	10	10
7	Gordon	17	17
8	Hansa	1	4
9	Ikea	2	17
10	Joshin	14	17

The following information is known about Rounds 1 through 6:

- 1) Gordon did not score consecutively in any two rounds.
- 2) Eric and Fatima both scored in a round.

The following information is known about Rounds 7 through 10:

- 1) Only two players scored in three consecutive rounds. One of them was Chen. No other player scored in any two consecutive rounds.
- 2) Joshin scored in Round 7, while Amita scored in Round 10.
- 3) No player scored in all the four rounds.

|||End|||

What were the scores of Chen, David, and Eric respectively after Round 3?

- A. 3, 3, 3
- B. 3, 3, 0
- C. 3, 6, 3
- D. 3, 0, 3

Answer ||| A

Solution |||

The total of Joshin after six rounds is 14. Hence, Joshin scored 7 each in round 5 and 6.

Total of Amita after six rounds is 8 and she cannot score 7 in round six as it is already scored by Joshin in that round. Hence, the only possibility is that she scored 7 in round one and 1 in round six.

Total of Bala after six rounds is 8. Hence, he should have scored 1 in both rounds one and two. Similarly, Ikea's total after six rounds is 2 and she cannot score 1 in round six as it is already scored by Amita. Hence, she must have scored 1 in both rounds four and five.

The total of Hansa is 1 after six rounds. She must have scored that in round three as she cannot score 1 in other rounds.

Gordon did not score in any consecutive rounds and his total after six rounds is 17. Hence, he must have scored in rounds 2, 4, and 6.

As he cannot score 7 in round six, he must have scored 3 in that round and 7 in rounds two and four.

Eric must have scored 3 in only one round as he cannot score 1 in three rounds because from rounds one to four score 1 has already been taken.

Similarly, Fatima also must have scored 7 and 3 taking her score to 10 after six rounds.

We are given that Eric and Fatima both scored in a round and that is only possible when both have scored in round three. In round five someone must have scored 3. It cannot be Eric, hence, Fatima must have scored 3 in round five.

David must have scored 3 in round four. Scores of Chen and David for rounds one and two cannot be determined.

The following table can be derived

	1	2	3	4	5	6	Total	7	8	9	10	Total
Amita	7	-	-	-	-	1	8					18
Bala	1	1	-	-	-	-	2					5
Chen			0	-	-	-	3	-				6
David			0	3	-	-	6	-	-			6
Eric	0	0	3	0	0	-	3	-	-	-		10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17		-	-	-	17
Hansa	-	-	1	0	0	0	1			-	-	4
Ikea	-	-	-	1	1	0	2				-	17
Joshin	-	-	-	-	7	7	14					17

Chen must have scored 1 in each round 7, 8, and 9 so that the total can reach up to 6.

Ikea must have scored 15 in rounds seven to nine to reach the score of 17.

He can score 15 in three rounds only by scoring 7 in two rounds and 1 in one round. Since he cannot score 1 in rounds eight and nine, he must have scored that in round seven.

He must have scored 7 each in round eight and nine to take up the total to 17.

Amita should score a total of 10 in rounds seven to ten. Since she cannot score 1 in any of those rounds and she has scored in round 10, she must have scored 7 in round seven and 3 in round ten.

Joshin scored in round seven and we know that she needs 3 total to take her total to 17.

Since she cannot score 1 in any of the rounds, we can say that she must have scored 3 in round seven.

Hansa must have scored 3 in round eight as she cannot score that in round seven which was already scored by Joshin and Bala must have scored 3 in round nine as he cannot score that in any other round.

The following table can be derived:

	1	2	3	4	5	6	Total	7	8	9	10	Total
Amita	7	-	-	-	-	1	8	7	0	0	3	18
Bala	1	1	-	-	-	-	2	0	0	3	0	5
Chen			0	-	-	-	3	-	1	1	1	6
David			0	3	-	-	6	-	-	0	0	6
Eric	0	0	3	0	0	-	3	-	-	-	7	10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17	0	-	-	-	17
Hansa	-	-	1	0	0	0	1	0	3	-	-	4
Ikea	-	-	-	1	1	0	2	1	7	7	-	17
Joshin	-	-	-	-	7	7	14	3	0	0	0	17

Chen and David scored 3 in either round one or two.

The scores of Chen, David, and Eric were 3, 3, and 3 respectively in round 3.

The correct option is A.

2. Which three players were in the last three positions after Round 4?

- A. Bala, Ikea, Joshin
- B. Bala, Hansa, Ikea
- C. Bala, Chen, Gordon
- D. Hansa, Ikea, Joshin

Answer ||| D

Solution |||

The total of Joshin after six rounds is 14. Hence, Joshin scored 7 each in round 5 and 6.

Total of Amita after six rounds is 8 and she cannot score 7 in round six it is already scored by Joshin in that round. Hence, the only possibility is that she scored 7 in round one and 1 in round six.

Total of Bala after six rounds is 8. Hence, he should have scored 1 in both rounds one and two. Similarly, total of Ikea after six rounds is 2 and she cannot score 1 in round six as it is already scored by Amita. Hence, she must have scored 1 in both rounds four and five.

The total of Hansa is 1 after six rounds. She must have scored that in round three as she cannot score 1 in other rounds.

Gordon did not score in any consecutive rounds and his total after six rounds is 17. Hence, he must have scored in rounds 2, 4 and 6.

As he cannot score 7 in round six, he must have scored 3 in that round and 7 in rounds two and four.

Eric must have scored 3 in only one round as he cannot score 1 in three rounds because from rounds one to four score 1 has already been taken.

Similarly, Fatima also must have scored 7 and 3 for taking his score to 10 after six rounds.

We are given that Eric and Fatima both scored in a round and that is only possible when both have scored in round three. In round five someone must have scored 3. It cannot be Eric, hence, Fatima must have scored 3 in round five.

David must have scored 3 in round four. Scores of Chen and David for rounds one and two cannot be determined.

The following table can be derived

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Chen			0	-	-	-	3	-				6
David			0	3	-	-	6	-	-			6
Eric	0	0	3	0	0	-	3	-	-	-		10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17		-	-	-	17
Hansa	-	-	1	0	0	0	1			-	-	4
Ikea	-	-	-	1	1	0	2				-	17
Joshin	-	-	-	-	7	7	14					17

Chen must have scored 1 in each round 7, 8 and 9 so that the total can reach up to 6.

Ikea must have scored 15 in rounds seven to nine for reaching the score of 17.

He can score 15 in three rounds only by scoring 7 in two rounds and 1 in one round. Since he cannot score 1 in rounds eight and nine, he must have scored that in round seven.

He must have scored 7 each in round eight and nine to take up the total to 17.

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David			0	3	-	-	6	-	-	0	0	6
Eric	0	0	3	0	0	-	3	-	-	-	7	10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17	0	-	-	-	17
Hansa	-	-	1	0	0	0	1	0	3	-	-	4
Ikea	-	-	-	1	1	0	2	1	7	7	-	17
Joshin	-	-	-	-	7	7	14	3	0	0	0	17

Chen and David scored 3 in either round one or two.

The scores of Chen, David and Eric were 3, 3, 3 respectively in round 3.

From the table, we can say that Hansa, Ikea, and Joshin were in the last three positions after round 4.

The correct option is D.

3. Which player scored points in the maximum number of rounds?

- A. Ikea
- B. Chen
- C. Amita
- D. Joshin

Answer ||| A

Solution |||

The total of Joshin after six rounds is 14. Hence, Joshin scored 7 each in round 5 and 6.

Total of Amita after six rounds is 8 and she cannot score 7 in round six it is already scored by Joshin in that round. Hence, the only possibility is that she scored 7 in round one and 1 in round six.

Total of Bala after six rounds is 8. Hence, he should have scored 1 in both rounds one and two. Similarly, total of Ikea after six rounds is 2 and she cannot score 1 in round six as it is already scored by Amita. Hence, she must have scored 1 in both rounds four and five.

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Chen			0	-	-	-	3	-				6
David			0	3	-	-	6	-	-			6
Eric	0	0	3	0	0	-	3	-	-	-		10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17		-	-	-	17
Hansa	-	-	1	0	0	0	1			-	-	4
Ikea	-	-	-	1	1	0	2				-	17
Joshin	-	-	-	-	7	7	14					17

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He can score 15 in three rounds only by scoring 7 in two rounds and 1 in one round. Since he cannot score 1 in rounds eight and nine, he must have scored that in round seven.

He must have scored 7 each in round eight and nine to take up the total to 17.

Amita should score a total of 10 in rounds seven to ten. Since she cannot score 1 in any of those rounds and she has scored in round 10, she must have scored 7 in round seven and 3 in round ten.

Joshin scored in round seven and we know that she needs 3 total take her total to 17.

Since she cannot score 1 in any of the rounds, we can say that she must have scored 3 in round seven.

Hansa must have scored 3 in round eight as she cannot score that in round seven which was already scored by Joshin and Bala must have scored 3 in round nine as he cannot score that in any other round.

The following table can be derived:

	1	2	3	4	5	6	Total	7	8	9	10	Total
Amita	7	-	-	-	-	1	8	7	0	0	3	18
Bala	1	1	-	-	-	-	2	0	0	3	0	5
Chen			0	-	-	-	3	-	1	1	1	6
David			0	3	-	-	6	-	-	0	0	6
Eric	0	0	3	0	0	-	3	-	-	-	7	10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17	0	-	-	-	17
Hansa	-	-	1	0	0	0	1	0	3	-	-	4
Ikea	-	-	-	1	1	0	2	1	7	7	-	17
Joshin	-	-	-	-	7	7	14	3	0	0	0	17

Chen and David scored 3 in either round one or two.

The scores of Chen, David and Eric were 3, 3, 3 respectively in round 3.

Ikea scored in six rounds which was the maximum.

The correct option is A.

4. Which players scored points in the last round?

- A. Amita, Chen, David
- B. Amita, Chen, Eric
- C. Amita, Eric, Joshin
- D. Amita, Bala, Chen

Answer ||| B

Solution |||

Amita, Chen, and Eric scored points in the last round.

The total of Joshin after six rounds is 14. Hence, Joshin scored 7 each in round 5 and 6.

Total of Amita after six rounds is 8 and she cannot score 7 in round six it is already scored by Joshin in that round. Hence, the only possibility is that she scored 7 in round one and 1 in round six.

Total of Bala after six rounds is 8. Hence, he should have scored 1 in both rounds one and two. Similarly, total of Ikea after six rounds is 2 and she cannot score 1 in round six as it is already scored by Amita. Hence, she must have scored 1 in both rounds four and five.

The total of Hansa is 1 after six rounds. She must have scored that in round three as she cannot score 1 in other rounds.

Gordon did not score in any consecutive rounds and his total after six rounds is 17. Hence, he must have scored in rounds 2, 4 and 6.

As he cannot score 7 in round six, he must have scored 3 in that round and 7 in rounds two and four.

Eric must have scored 3 in only one round as he cannot score 1 in three rounds because from rounds one to four score 1 has already been taken.

Similarly, Fatima also must have scored 7 and 3 for taking his score to 10 after six rounds.

We are given that Eric and Fatima both scored in a round and that is only possible when both have scored in round three. In round five someone must have scored 3. It cannot be Eric, hence, Fatima must have scored 3 in round five.

David must have scored 3 in round four. Scores of Chen and David for rounds one and two cannot be determined.

The following table can be derived

	1	2	3	4	5	6	Total	7	8	9	10	Total
Amita	7	-	-	-	-	1	8					18
Bala	1	1	-	-	-	-	2					5
Chen			0	-	-	-	3	-				6
David			0	3	-	-	6	-	-			6
Eric	0	0	3	0	0	-	3	-	-	-		10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17		-	-	-	17
Hansa	-	-	1	0	0	0	1			-	-	4
Ikea	-	-	-	1	1	0	2				-	17
Joshin	-	-	-	-	7	7	14					17

Chen must have scored 1 in each round 7, 8 and 9 so that the total can reach up to 6.

Ikea must have scored 15 in rounds seven to nine for reaching the score of 17.

He can score 15 in three rounds only by scoring 7 in two rounds and 1 in one round. Since he cannot score 1 in rounds eight and nine, he must have scored that in round seven.

He must have scored 7 each in round eight and nine to take up the total to 17.

Amita should score a total of 10 in rounds seven to ten. Since she cannot score 1 in any of those rounds and she has scored in round 10, she must have scored 7 in round seven and 3 in round ten.

Joshin scored in round seven and we know that she needs 3 total take her total to 17.

Since she cannot score 1 in any of the rounds, we can say that she must have scored 3 in round seven.

Hansa must have scored 3 in round eight as she cannot score that in round seven which was already scored by Joshin and Bala must have scored 3 in round nine as he cannot score that in any other round.

The following table can be derived:

	1	2	3	4	5	6	Total	7	8	9	10	Total
Amita	7	-	-	-	-	1	8	7	0	0	3	18
Bala	1	1	-	-	-	-	2	0	0	3	0	5
Chen			0	-	-	-	3	-	1	1	1	6
David			0	3	-	-	6	-	-	0	0	6
Eric	0	0	3	0	0	-	3	-	-	-	7	10
Fatima	0	0	7	0	3	0	10	-	-	-	-	10
Gordon	-	7	0	7	0	3	17	0	-	-	-	17
Hansa	-	-	1	0	0	0	1	0	3	-	-	4
Ikea	-	-	-	1	1	0	2	1	7	7	-	17
Joshin	-	-	-	-	7	7	14	3	0	0	0	17

Chen and David scored 3 in either round one or two.

The scores of Chen, David and Eric were 3, 3, 3 respectively in round 3.

The correct option is B

5. Direction: Three doctors, Dr. Ben, Dr. Kane and Dr. Wayne visit a particular clinic Monday to Saturday to see patients. Dr. Ben sees each patient for 10 minutes and charges Rs. 100/-. Dr. Kane sees each patient for 15 minutes and charges Rs. 200/-, while Dr. Wayne sees each patient for 25 minutes and charges Rs. 300/-.

The clinic has three rooms numbered 1, 2 and 3 which are assigned to the three doctors as per the following table.

Room number	Monday and Tuesday	Wednesday and Thursday	Friday and Saturday
1	Ben	Wayne	Kane
2	Kane	Ben	Wayne
3	Wayne	Kane	Ben

The clinic is open from 9 a.m. to 11.30 a.m. every Monday to Saturday.

On arrival each patient is handed a numbered token indicating their position in the queue, starting with token number 1 every day. As soon as any doctor becomes free, the next patient in the queue enters that emptied room for consultation. If at any time, more than one room is free then the waiting patient enters the room with the smallest number. For example, if the next two patients in the queue have token numbers 7 and 8 and if rooms numbered 1 and 3 are free, then patient with token number 7 enters room number 1 and patient with token number 8 enters room number 3.

|||End|||

What is the maximum number of patients that the clinic can cater to on any single day?

- A. 15
- B. 12
- C. 31
- D. 30

Answer ||| C

Solution |||

The total duration is 2.5 hrs, i.e., 150 mins.

The following table can be derived from the given information:

Doctor	Time taken for one patient	Maximum patients per day
Ben	10	15 (150/10)
Kane	15	10 (150/15)
Wayne	25	6 (150/25)
	Total	31

Therefore, the clinic can cater a maximum of 31 patients on any single day.

The correct option is C.

6. The queue is never empty on one particular Saturday. Which of the three doctors would earn the maximum amount in consultation charges on that day?

- A. Both Dr. Wayne and Dr. Kane
- B. Dr. Ben
- C. Dr. Wayne
- D. Dr. Kane

Answer ||| D

Solution |||

Since the queue is never empty, we can say that the doctors are handling maximum patients.

Doctor	Time taken for one patient	Maximum patients per day	Charge per patient	Maximum earnings
Ben	10	15 (150/10)	100	1500
Kane	15	10 (150/15)	200	2000
Wayne	25	6 (150/25)	300	1800
	Total	31		

Doctor Kane would earn the maximum amount in consultation charges on that Saturday.

The correct option is D

7. Mr. Singh visited the clinic on Monday, Wednesday, and Friday of a particular week, arriving at 8:50 a.m. on each of the three days. His token number was 13 on all three days. On which day was he at the clinic for the maximum duration?

- A. Same duration on all three days
- B. Wednesday
- C. Friday
- D. Monday

Answer ||| D

Solution |||

Patient Number	Entry time
1	9:00 am
2	9:00 am
3	9:00 am
4	9:10 am
5	9:15 am
6	9:20 am
7	9:25 am
8	9:30 am
9	9:30 am
10	9:40 am
11	9:45 am
12	9:50 am
13	9:50 am

50 is a multiple of both 10 and 25. Hence, two patients simultaneously entered the rooms and Mr. Singh visited either Ben or Wayne.

Mr. Singh's token was 13. He visited Doctor Wayne on Monday.

On Wednesday and Friday, he visited Doctor Ben.

Doctor Wayne takes more time than Doctor Ben. Therefore, on Monday he was in the clinic for maximum duration.

The correct option is D.

8. On a slow Thursday, only two patients are waiting at 9 a.m. After that, two patients keep arriving at exact 15 minute intervals starting at 9:15 a.m. -- i.e. at 9:15 a.m., 9:30 a.m., 9:45 a.m. etc. Then the total duration in minutes when all three doctors are simultaneously free is

- A. 30
- B. 10
- C. 15
- D. 0

Answer ||| D

Solution |||

From the following table we get the order of patients with different token numbers entering the doctor's room.

	Time taken for one patient	9:10	9:15	9:20	9:25	9:30	9:45	10:00
Wayne	25				4			9
Ben	10	1		3		5	7	10
Kane	15		2			6	8	

For further clearance we can understand from the timeline:

At 9:00 am – 2 patients were waiting

At 9:10 am – waiting number 1 - Doctor Ben

At 9:15 am – waiting number 2 - Doctor Kane and 2 new patients came to the clinic.

At 9:20 am - waiting number 3 - Doctor Ben

At 9:25 am - waiting number 4 - Doctor Wayne

At 9:30 am – two new patients came to clinic - Doctor Ben and Kane

9:40 – 9:45 – Only Doctor Ben is free.

At 9:45 am - two new patients came to clinic - Doctor Ben and Kane

9:50 – 9:55 – Only Wayne is free

9:55 – 10:00 – Only Wayne and Ben are free

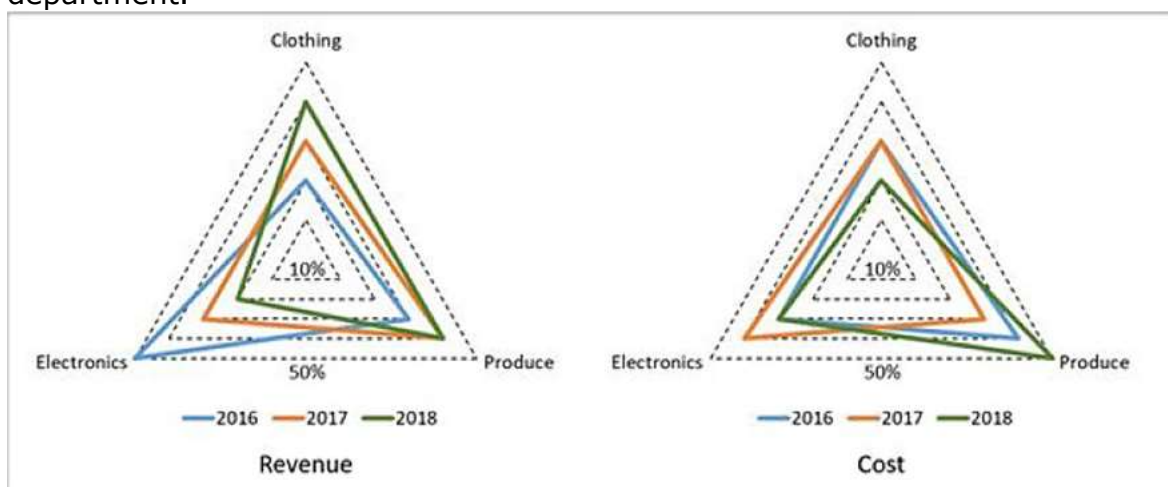
At 10:00 - two new patients came to clinic - Doctor Wayne and Ben

And the cycle continues like this.

Hence, the duration where all the doctors are free together is 0.

The correct option is D.

9. **Direction:** A large store has only three departments, Clothing, Produce, and Electronics. The following figure shows the percentages of revenue and cost from the three departments for the years 2016, 2017 and 2018. The dotted lines depict percentage levels. So for example, in 2016, 50% of store's revenue came from its Electronics department while 40% of its costs were incurred in the Produce department.



In this setup, Profit is computed as (Revenue – Cost) and Percentage Profit as $\text{Profit/Cost} \times 100\%$.

It is known that

- 1) The percentage profit for the store in 2016 was 100%.
- 2) The store's revenue doubled from 2016 to 2017, and its cost doubled from 2016 to 2018
- 3) There was no profit from the Electronics department in 2017
- 4) In 2018, the revenue from the Clothing department was the same as the cost incurred in the Produce department.

|||End|||

What was the percentage profit of the store in 2018?

Answer |||

Solution |||

From the given information we can derive the following tables:

Revenue table (in Percentage)

	Produce	Electronics	Clothing
2016	30	50	20
2017	40	30	30
2018	40	20	40

Cost table (in percentage)

	Produce	Electronics	Clothing
2016	40	30	30
2017	30	40	30
2018	50	30	20

Let's assume the cost as Rs.100 for 2016. Hence, the revenue would be 200.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40

Since the store's revenue doubled from 2016 to 2017, the total revenue for 2017 was 400.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2017	160	120	120

From 2, the store's cost doubled from 100 to 200 from 2016 to 2018.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2018	100	60	40

From 3, the cost of the electronics department in 2017 was the same as revenue, i.e., 120.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2017	90	120	90

From 4, the revenue of the clothing department and the revenue of the other two departments can be determined.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2018	100	50	100

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40
2017	160	120	120
2018	100	50	100

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30
2017	90	120	90
2018	100	60	40

From the above derived final table we can get the percentage profit of the store in

$$2018 = \frac{250-200}{200} (100\%) = 25\%.$$

The correct answer is 25%.

10. What was the ratio of revenue generated from the Produce department in 2017 to that in 2018?

- A. 8 : 5
- B. 16 : 9
- C. 4 : 3
- D. 9 : 16

Answer ||| A

Solution |||

From the given information we can derive the following tables:

Revenue table (in Percentage)

	Produce	Electronics	Clothing
2016	30	50	20
2017	40	30	30
2018	40	20	40

Cost table (in percentage)

	Produce	Electronics	Clothing
2016	40	30	30
2017	30	40	30
2018	50	30	20

Let's assume the cost as Rs.100 for 2016. Hence, the revenue would be 200

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40

Since the store's revenue doubled from 2016 to 2017, the total revenue for 2017 as 400.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2017	160	120	120

From 2, the store's cost doubled from 100 to 200 from 2016 to 2018.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2018	100	60	40

From 3, the cost of the electronics department in 2017 was the same as revenue i.e., 120.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2017	90	120	90

From 4, the revenue of the clothing department and the revenue of other two departments can be determined.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2018	100	50	100

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40
2017	160	120	120
2018	100	50	100

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30
2017	90	120	90
2018	100	60	40

The ratio of revenue generated from the Produce department in 2017 to that in 2018 = 160:100 i.e., 8 : 5.

The correct option is A.

11. What percentage of the total profits for the store in 2016 was from the Electronics department?

Answer ||| 70

Solution |||

From the given information we can derive the following tables:

Revenue table (in Percentage)

	Produce	Electronics	Clothing
2016	30	50	20
2017	40	30	30
2018	40	20	40

Cost table (in percentage)

	Produce	Electronics	Clothing
2016	40	30	30
2017	30	40	30
2018	50	30	20

Let's assume the cost as Rs.100 for 2016. Hence, the revenue would be 200

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40

Since the store's revenue doubled from 2016 to 2017, the total revenue for 2017 as 400.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2017	160	120	120

From 2, the store's cost doubled from 100 to 200 from 2016 to 2018.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2018	100	60	40

From 3, the cost of electronics department in 2017 was same as revenue i.e., 120.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2017	90	120	90

From 4, the revenue of clothing department and the revenue of other two departments can be determined.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2018	100	50	100

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40
2017	160	120	120
2018	100	50	100

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30
2017	90	120	90
2018	100	60	40

Profit of store from Electronics department in 2016 = $100 - 30 = 70$

Total profit for the store = 100.

Required percentage = 70%

12. What was the approximate difference in profit percentages of the store in 2017 and 2018?

- A. 33.3
- B. 15.5
- C. 8.3
- D. 25.0

Answer ||| C

Solution |||

From the given information we can derive the following tables:

Revenue table (in Percentage)

	Produce	Electronics	Clothing
2016	30	50	20
2017	40	30	30
2018	40	20	40

Cost table (in percentage)

	Produce	Electronics	Clothing
2016	40	30	30
2017	30	40	30
2018	50	30	20

Let's assume the cost as Rs.100 for 2016. Hence, the revenue would be 200

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40

Since the store's revenue doubled from 2016 to 2017, the total revenue for 2017 as 400.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2017	160	120	120

From 2, the store's cost doubled from 100 to 200 from 2016 to 2018.

Cost table (in Rs.)

	Produce	Electronics	Clothing
2018	100	60	40

From 3, the cost of electronics department in 2017 was same as revenue i.e., 120.
Cost table (in Rs.)

	Produce	Electronics	Clothing
2017	90	120	90

From 4, the revenue of clothing department and the revenue of other two departments can be determined.

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2018	100	50	100

Revenue table (in Rs.)

	Produce	Electronics	Clothing
2016	60	100	40
2017	160	120	120
2018	100	50	100

Cost table (in Rs.)

	Produce	Electronics	Clothing
2016	40	30	30
2017	90	120	90
2018	100	60	40

In 2017, the profit percentage was $\frac{100}{300}(100\%) = 33.33\%$ and in 2018 it was 25%.

Difference = $33.33 - 25 = 8.33\%$.

The correct option is C.

13. **Direction:** In the table below the check marks indicate all languages spoken by five people: Paula, Quentin, Robert, Sally and Terence. For example, Paula speaks only Chinese and English.

	Arabic	Basque	Chinese	Dutch	English	French
Paula			✓		✓	
Quentin				✓	✓	
Robert	✓					✓
Sally		✓			✓	
Terence			✓			✓

These five people form three teams, Team 1, Team 2 and Team 3. Each team has either 2 or 3 members. A team is said to speak a particular language if at least one of its members speak that language.

The following facts are known:

- (1) Each team speaks exactly four languages and has the same number of members.
- (2) English and Chinese are spoken by all three teams, Basque and French by exactly two teams and the other languages by exactly one team.
- (3) None of the teams include both Quentin and Robert.
- (4) Paula and Sally are together in exactly two teams.
- (5) Robert is in Team 1 and Quentin is in Team 3.

Who among the following four is not a member of Team 2?

- A. Terence
- B. Sally
- C. Paula
- D. Quentin

Answer ||| D

Solution |||

From the data given, we get the languages of Paula and Sally and combining that to points 4 and 2 we get the following table.

Team Members	Languages
Paula, Sally	English, Chinese, Basque
Paula, Sally	English, Chinese, Basque
	English, Chinese

Robert cannot be in the teams of Paula and Sally as he can speak 2 different languages that would violate the condition that each team can speak 4 languages. Robert is in team 1 and Quentin is in team 3.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally	English, Chinese, Basque
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Form 2, Basque and French are spoken by two teams. Hence, team 2 should consist of a person who could speak French. Since only Robert and Terrance speak French but team 2 does not contain Arabic language so Terrance would be in team 2.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Only Paula and Terrance team 1, who could speak only English, Chinese, Arabic, or French.

The following final table is derived

Team Number	Team Members	Languages
1	Robert, Paula, Terrance	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Hence, Quentin is not a member of Team 2.

The correct option is D

14. Who among the following four people is a part of exactly two teams?

- A. Robert
- B. Quentin
- C. Sally
- D. Paula

Answer ||| C

Solution |||

From the data given we get the languages of Paula and Sally and combining that to points 4 and 2 we get the following table.

Team Members	Languages
Paula, Sally	English, Chinese, Basque
Paula, Sally	English, Chinese, Basque
	English, Chinese

Robert cannot be in the teams of Paula and Sally as he can speak 2 different languages that would violate the condition that each team can speak 4 languages. Robert is in team 1 and Quentin is in team 3.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally	English, Chinese, Basque
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Form 2, Basque and French are spoken by two teams. Hence, team 2 should consist of a person who could speak French. Since only Robert and Terrance speak French but team 2 does not contain Arabic language so Terrance would be in team 2.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Only Paula and Terrance team 1, who could speak only English, Chinese, Arabic or French.

The following final table is derived

Team Number	Team Members	Languages
1	Robert, Paula, Terrance	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Sally is part of exactly two teams.

The correct option is C.

15. Who among the five people is a member of all teams?

- A. No one
- B. Terence
- C. Paula
- D. Sally

Answer ||| C

Solution |||

From the data given we get the languages of Paula and Sally and combining that to points 4 and 2 we get the following table.

Team Members	Languages
Paula, Sally	English, Chinese, Basque
Paula, Sally	English, Chinese, Basque
	English, Chinese

Robert cannot be in the teams of Paula and Sally as he can speak 2 different languages that would violate the condition that each team can speak 4 languages.

Robert is in team 1 and Quentin is in team 3.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally	English, Chinese, Basque
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Form 2, Basque and French are spoken by two teams. Hence, team 2 should consist of a person who could speak French. Since only Robert and Terrance speak French but team 2 does not contain Arabic language so Terrance would be in team 2.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Only Paula and Terrance team 1, who could speak only English, Chinese, Arabic or French.

The following final table is derived

Team Number	Team Members	Languages
1	Robert, Paula, Terrance	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Paula is a member of all teams.

The correct option is C.

16. Apart from Chinese and English, which languages are spoken by Team 1?

- A. Basque and Dutch
- B. Arabic and French
- C. Arabic and Basque
- D. Basque and French

Answer ||| B

Solution |||

From the data given we get the languages of Paula and Sally and combining that to points 4 and 2 we get the following table.

Team Members	Languages
Paula, Sally	English, Chinese, Basque
Paula, Sally	English, Chinese, Basque
	English, Chinese

Robert cannot be in the teams of Paula and Sally as he can speak 2 different languages that would violate the condition that each team can speak 4 languages.

Robert is in team 1 and Quentin is in team 3.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally	English, Chinese, Basque
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Form 2, Basque and French are spoken by two teams. Hence, team 2 should consist of a person who could speak French. Since only Robert and Terrance speak French but team 2 does not contain Arabic language so Terrance would be in team 2.

Team Number	Team Members	Languages
1	Robert	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Only Paula and Terrance team 1, who could speak only English, Chinese, Arabic or French.

The following final table is derived

Team Number	Team Members	Languages
1	Robert, Paula, Terrance	English, Chinese, Arabic and French
2	Paula, Sally, Terrance	English, Chinese, Basque, French
3	Paula, Sally, Quentin	English, Chinese, Basque, Dutch

Apart from Chinese and English Team 1 speaks Arabic and French.

The correct option is B.

17. Direction: The first year students in a business school are split into six sections. In 2019 the Business Statistics course was taught in these six sections by Annie, Beti, Chetan, Dave, Esha, and Fakir. All six sections had a common midterm (MT) and a common endterm (ET) worth 100 marks each. ET contained more questions than MT. Questions for MT and ET were prepared collectively by the six faculty members. Considering MT and ET together, each faculty member prepared the same number of questions. Each of MT and ET had at least four questions that were worth 5 marks, at least three questions that were worth 10 marks, and at least two questions that were worth 15 marks. In both MT and ET, all the 5-mark questions preceded the 10-mark questions, and all the 15-mark questions followed the 10-mark questions.

The following additional facts are known:

- Annie prepared the fifth question for both MT and ET. For MT, this question carried 5 marks.
- Annie prepared one question for MT. Every other faculty member prepared more than one questions for MT.
- All questions prepared by a faculty member appeared consecutively in MT as well as ET.
- Chetan prepared the third question in both MT and ET; and Esha prepared the eighth question in both.
- Fakir prepared the first question of MT and the last one in ET. Dave prepared the last question of MT and the first one in ET.

The second question in ET was prepared by:

- Esha
- Beti
- Dave
- Chetan

Answer ||| C

Solution |||

Marks	Least number of Questions	Total Marks
5	4	20
10	3	30
15	2	30
Grand total		80

The total marks should be 100. The different number of ways in which both ET and MT questions can be asked are:

Marks	Case 1	Case 2	Case 3	Case 4
5	8	6	5	4
10	3	4	3	5
15	2	2	3	2
Total	13	12	11	11

Each faculty member should prepare the same number of questions. Hence, the total number of questions after adding ET and MT should be a multiple of 6 as there are 6 faculty members.

We can eliminate case 2 because adding 12 to any of the remaining totals, i.e., 13 or 11 would not give us a multiple of 6.

It is given that ET contained more questions than MT therefore Case 1 is of ET.

Further, from the given point (i) there are at least 5 questions of 5 marks in MT.

Hence, case 4 also gets eliminated and we get the following table:

Marks	ET	MT
5	8	5
10	3	3
15	2	3
Total	13	11

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2		5		5
3	Chetan	5	Chetan	5
4		5		5
5	Annie	5	Annie	5
6		10		5
7		10		5
8	Esha	10	Esha	5
9		15		10
10		15		10
11	Dave	15		10
12		-		15
13		-	Fakir	15

Annie prepared one question for MT.

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2	Fakir	5	Dave	5
3	Chetan	5	Chetan	5
4	Chetan	5	Chetan	5
5	Annie	5	Annie	5
6	Beti	10	Annie	5
7	Beti	10	Annie	5
8	Esha	10	Esha	5
9	Esha	15	Esha	10
10	Dave	15	Beti	10
11	Dave	15	Beti	10
12	-	-	Fakir	15
13	-	-	Fakir	15

The second question in ET was prepared by Dave.

The correct option is C.

18. How many 5-mark questions were there in MT and ET combined?

- A. 10
- B. 12
- C. Cannot be determined
- D. 13

Answer ||| D

Solution |||

Marks	Least number of Questions	Total Marks
5	4	20
10	3	30
15	2	30
	Grand total	80

The total marks should be 100. The different number of ways in which both ET and MT questions can be asked are:

Marks	Case 1	Case 2	Case 3	Case 4
5	8	6	5	4
10	3	4	3	5
15	2	2	3	2
Total	13	12	11	11

Each faculty member should prepare the same number of questions. Hence, the total number of questions after adding ET and MT should be a multiple of 6 as there are 6 faculty members.

We can eliminate case 2 because adding 12 to any of the remaining totals i.e, 13 or 11 would not give us the multiple of 6.

It is given that ET contained more questions than MT therefore Case 1 is of ET.

Further, from the given point (i) there are at least 5 questions of 5 marks in MT.

Hence, case 4 also gets eliminated and we get the following table:

Marks	ET	MT
5	8	5
10	3	3
15	2	3
Total	13	11

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2		5		5
3	Chetan	5	Chetan	5
4		5		5
5	Annie	5	Annie	5
6		10		5
7		10		5
8	Esha	10	Esha	5
9		15		10
10		15		10
11	Dave	15		10
12		-		15
13		-	Fakir	15

Annie prepared one question for MT.

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2	Fakir	5	Dave	5
3	Chetan	5	Chetan	5
4	Chetan	5	Chetan	5
5	Annie	5	Annie	5
6	Beti	10	Annie	5
7	Beti	10	Annie	5
8	Esha	10	Esha	5
9	Esha	15	Esha	10
10	Dave	15	Beti	10
11	Dave	15	Beti	10
12	-	-	Fakir	15
13	-	-	Fakir	15

There were (8 + 5), i.e., 13 questions in MT and ET combined for 5-marks.

The correct option is D.

19. Who prepared 15-mark questions for MT and ET?

- A. Only Dave, Esha and Fakir
- B. Only Esha and Fakir
- C. Only Beti, Dave, Esha and Fakir
- D. Only Dave and Fakir

Answer ||| A

Solution |||

Marks	Least number of Questions	Total Marks
5	4	20
10	3	30
15	2	30
Grand total		80

The total marks should be 100. The different number of ways in which both ET and MT questions can be asked are:

Marks	Case 1	Case 2	Case 3	Case 4
5	8	6	5	4
10	3	4	3	5
15	2	2	3	2
Total	13	12	11	11

Each faculty member should prepare the same number of questions. Hence, the total number of questions after adding ET and MT should be a multiple of 6 as there are 6 faculty members.

We can eliminate case 2 because adding 12 to any of the remaining totals i.e, 13 or 11 would not give us the multiple of 6.

It is given that ET contained more questions than MT therefore Case 1 is of ET.

Further, from the given point (i) there are at least 5 questions of 5 marks in MT.

Hence, case 4 also gets eliminated and we get the following table:

Marks	ET	MT
5	8	5
10	3	3
15	2	3
Total	13	11

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2		5		5
3	Chetan	5	Chetan	5
4		5		5
5	Annie	5	Annie	5
6		10		5
7		10		5
8	Esha	10	Esha	5
9		15		10
10		15		10
11	Dave	15		10
12		-		15
13		-	Fakir	15

Annie prepared one question for MT.

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2	Fakir	5	Dave	5
3	Chetan	5	Chetan	5
4	Chetan	5	Chetan	5
5	Annie	5	Annie	5
6	Beti	10	Annie	5
7	Beti	10	Annie	5
8	Esha	10	Esha	5
9	Esha	15	Esha	10
10	Dave	15	Beti	10
11	Dave	15	Beti	10
12	-	-	Fakir	15
13	-	-	Fakir	15

Only Dave, Esha, and Fakir prepared 15-mark questions.

The correct option is A.

20. Which of the following questions did Beti prepare in ET?

- A. Tenth question
- B. Fourth question
- C. Ninth question
- D. Seventh question

Answer ||| A

Solution |||

Marks	Least number of Questions	Total Marks
5	4	20
10	3	30
15	2	30
	Grand total	80

The total marks should be 100. The different number of ways in which both ET and MT questions can be asked are:

Marks	Case 1	Case 2	Case 3	Case 4
5	8	6	5	4
10	3	4	3	5
15	2	2	3	2
Total	13	12	11	11

Each faculty member should prepare the same number of questions. Hence, the total number of questions after adding ET and MT should be a multiple of 6 as there are 6 faculty members.

We can eliminate case 2 because adding 12 to any of the remaining totals i.e, 13 or 11 would not give us the multiple of 6.

It is given that ET contained more questions than MT therefore Case 1 is of ET.

Further, from the given point (i) there are at least 5 questions of 5 marks in MT.

Hence, case 4 also gets eliminated and we get the following table:

Marks	ET	MT
5	8	5
10	3	3
15	2	3
Total	13	11

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2		5		5
3	Chetan	5	Chetan	5
4		5		5
5	Annie	5	Annie	5
6		10		5
7		10		5
8	Esha	10	Esha	5
9		15		10
10		15		10
11	Dave	15		10
12		-		15
13		-	Fakir	15

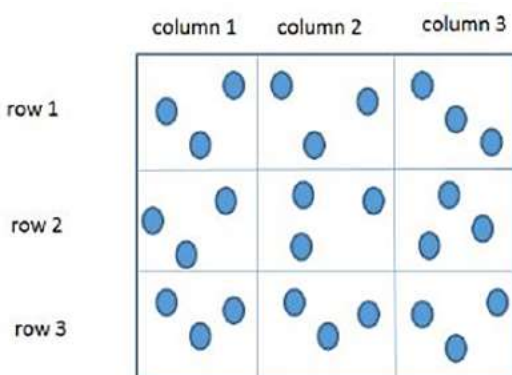
Annie prepared one question for MT.

Question number	MT		ET	
	Faculty Name	Marks	Faculty Name	Marks
1	Fakir	5	Dave	5
2	Fakir	5	Dave	5
3	Chetan	5	Chetan	5
4	Chetan	5	Chetan	5
5	Annie	5	Annie	5
6	Beti	10	Annie	5
7	Beti	10	Annie	5
8	Esha	10	Esha	5
9	Esha	15	Esha	10
10	Dave	15	Beti	10
11	Dave	15	Beti	10
12	-	-	Fakir	15
13	-	-	Fakir	15

Beti prepared the tenth question in ET.

The correct option is A.

21. Direction:



	Column 1	Column 2	Column 3
Row 1	(2,4)	(6, 8)	(1, 3)
Row 2	(3,5)	(1,1)	(6, 20)
Row 3	(1,2)	(1,2)	(2,5)

Three pouches (each represented by a filled circle) are kept in each of the nine slots in a 3×3 grid, as shown in the figure. Every pouch has a certain number of one-rupee coins.

The minimum and maximum amounts of money (in rupees) among the three pouches in each of the nine slots are given in the table. For example, we know that among the three pouches kept in the second column of the first row, the minimum amount in a pouch is Rs. 6 and the maximum amount is Rs. 8. There are nine pouches in any of the three columns, as well as in any of the three rows. It is known that the average amount of money (in rupees) kept in the nine pouches in any column or in any row is an integer. It is also known that the total amount of money kept in the three pouches in the first column of the third row is Rs. 4.

|||End|||

What is the total amount of money (in rupees) in the three pouches kept in the first column of the second row?

Answer ||| 13

Solution |||

Since the minimum and maximum value is the same in row 2 of column 2, the number of coins were 1,1,1.

The total amount of money kept in the three pouches in the first column of the third row is Rs. 4. Hence, the number of coins in these pouches is in the order 1,1,2.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8)	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	
Total				

The average amount of money (in rupees) kept in the nine pouches in any column or in any row is an integer which means the total of every row or column is a multiple of 9.

We can see the least and maximum sum possible in Row 3 is from 17 to 21.

Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	Total
Least	1,1,2	1,1,2	2,2,5	17
Maximum	1,1,2	1,2,2	2,5,5	21

The only multiple of 9 in this range is 18. Hence, the sum of row three would be 18. Similarly looking at Column 2, we get that the minimum and maximum sum which can be obtained is 27 and 30.

The only multiple of 9 in that range is 27. Hence, the sum of column 2 is 27.

In order to make the sum of column 2 as 27, the only possible way is by arranging the pouches in the following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5)	18
Total		27		

From 3, the sum of Row 3 is 18. Hence, when we deduct 8 from 18 we get 10. The only possible way to arrange the cell of Column 3 in Row 3 is 2,3,5.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total		27		

For Column 1, we get the minimum and maximum sum as 23 and 27. The only multiple of 9 in that range is 27, therefore, the sum of column 1 is 27.

To make the sum of column 1 as 27 the only possible way is by arranging the pouches in the following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 1, the minimum and maximum sum is 35 and 37.

The only multiple of 9 in that range is 36.

To make the sum of Row 1 as 36 the only possible way is by arranging the pouches in the following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) -	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 2, the minimum and maximum sum which can be obtained is 48 and 62. The only multiple of 9 in that range is 54. Hence, the sum of Row 2 is 54.

To make the sum of Row 2 as 54 the only possible way is by arranging the pouches in the following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) - 6,12,20	54
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27	54	

The total amount of money (in rupees) in the three pouches kept in the first column of the second row is 13.

The correct answer is 13.

22. How many pouches contain exactly one coin?

Answer ||| 8

Solution |||

Since the minimum and maximum value is same in row 2 of column 2, the number of coins were 1,1,1.

The total amount of money kept in the three pouches in the first column of the third row is Rs. 4. Hence, the number of coins in these pouches is in the order 1,1,2.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8)	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	
Total				

The average amount of money (in rupees) kept in the nine pouches in any column or in any row is an integer which means the total of every row or column is a multiple of 9.

We can see the least and maximum sum possible in Row 3 is from 17 to 21.

Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	Total
Least	1,1,2	1,1,2	2,2,5	17
Maximum	1,1,2	1,2,2	2,5,5	21

The only multiple of 9 in this range is 18. Hence, the sum of row three would be 18. Similarly looking at Column 2, we get that the minimum and maximum sum which can be obtained is 27 and 30.

The only multiple of 9 in that range is 27. Hence, the sum of column 2 is 27.

In order to make the sum of column 2 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5)	18
Total		27		

From 3, the sum of Row 3 is 18. Hence, when we deduct 8 from 18 we get 10.

The only possible way to arrange the cell of Column 3 in Row 3 is 2,3,5.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total		27		

For Column 1 we get that the minimum and maximum sum as 23 and 27. The only multiple of 9 in that range is 27 therefore the sum of column 1 is 27.

To make the sum of column 1 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 1, the minimum and maximum sum is 35 and 37.

The only multiple of 9 in that range is 36.

To make the sum of Row 1 as 36 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) -	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 2, the minimum and maximum sum which can be obtained is 48 and 62. The only multiple of 9 in that range is 54. hence, the sum of Row 2 is 54.

To make the sum of Row 2 as 54 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) - 6,12,20	54
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27	54	

8 pouches contain exactly one coin.

The correct answer is 8.

23. What is the number of slots for which the average amount (in rupees) of its three pouches is an integer?

Answer ||| 2

Solution |||

Since the minimum and maximum value is the same in row 2 of column 2, the number of coins were 1,1,1.

The total amount of money kept in the three pouches in the first column of the third row is Rs. 4. Hence, the number of coins in these pouches is in the order 1,1,2.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8)	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	
Total				

The average amount of money (in rupees) kept in the nine pouches in any column or in any row is an integer which means the total of every row or column is a multiple of 9.

We can see the least and maximum sum possible in Row 3 is from 17 to 21.

Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	Total
Least	1,1,2	1,1,2	2,2,5	17
Maximum	1,1,2	1,2,2	2,5,5	21

The only multiple of 9 in this range is 18. Hence, the sum of row three would be 18. Similarly looking at Column 2, we get that the minimum and maximum sum which can be obtained is 27 and 30.

The only multiple of 9 in that range is 27. Hence, the sum of column 2 is 27.

In order to make the sum of column 2 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5)	18
Total		27		

From 3, the sum of Row 3 is 18. Hence, when we deduct 8 from 18 we get 10. The only possible way to arrange the cell of Column 3 in Row 3 is 2,3,5.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total		27		

For Column 1 we get that the minimum and maximum sum as 23 and 27. The only multiple of 9 in that range is 27 therefore the sum of column 1 is 27.

To make the sum of column 1 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 1, the minimum and maximum sum is 35 and 37.

The only multiple of 9 in that range is 36.

To make the sum of Row 1 as 36 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) -	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 2, the minimum and maximum sum which can be obtained is 48 and 62. The only multiple of 9 in that range is 54. hence, the sum of Row 2 is 54.

To make the sum of Row 2 as 54 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) - 6,12,20	54
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27	54	

There are 2 slots (Row 2 - column 2 and Row 1 - Column 3) for which the average amount (in rupees) of its three pouches is an integer.

The correct answer is 2.

24. The number of slots for which the total amount in its three pouches strictly exceeds Rs. 10 is

Answer ||| 3

Solution |||

Since the minimum and maximum value is same in row 2 of column 2, the number of coins were 1,1,1.

The total amount of money kept in the three pouches in the first column of the third row is Rs. 4. Hence, the number of coins in these pouches is in the order 1,1,2.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8)	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	
Total				

The average amount of money (in rupees) kept in the nine pouches in any column or in any row is an integer which means the total of every row or column is a multiple of 9.

We can see the least and maximum sum possible in Row 3 is from 17 to 21.

Row 3	(1,2) - 1,1,2	(1,2)	(2,5)	Total
Least	1,1,2	1,1,2	2,2,5	17
Maximum	1,1,2	1,2,2	2,5,5	21

The only multiple of 9 in this range is 18. Hence, the sum of row three would be 18. Similarly looking at Column 2, we get that the minimum and maximum sum which can be obtained is 27 and 30.

The only multiple of 9 in that range is 27. Hence, the sum of column 2 is 27.

To make the sum of column 2 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5)	18
Total		27		

From 3, the sum of Row 3 is 18. Hence, when we deduct 8 from 18 we get 10.

The only possible way to arrange the cell of Column 3 in Row 3 is 2,3,5.

	Column 1	Column 2	Column 3	Total
Row1	(2,4)	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5)	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total		27		

For Column 1 we get that the minimum and maximum sum as 23 and 27. The only multiple of 9 in that range is 27 therefore the sum of column 1 is 27.

To make the sum of column 1 as 27 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3)	
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20)	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 1, the minimum and maximum sum is 35 and 37.

The only multiple of 9 in that range is 36.

To make the sum of Row 1 as 36 the only possible way is by arranging the pouches in a following way:

	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) -	
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27		

In Row 2, the minimum and maximum sum which can be obtained is 48 and 62. The only multiple of 9 in that range is 54. hence, the sum of Row 2 is 54.

To make the sum of Row 2 as 54 the only possible way is by arranging the pouches in a following way:

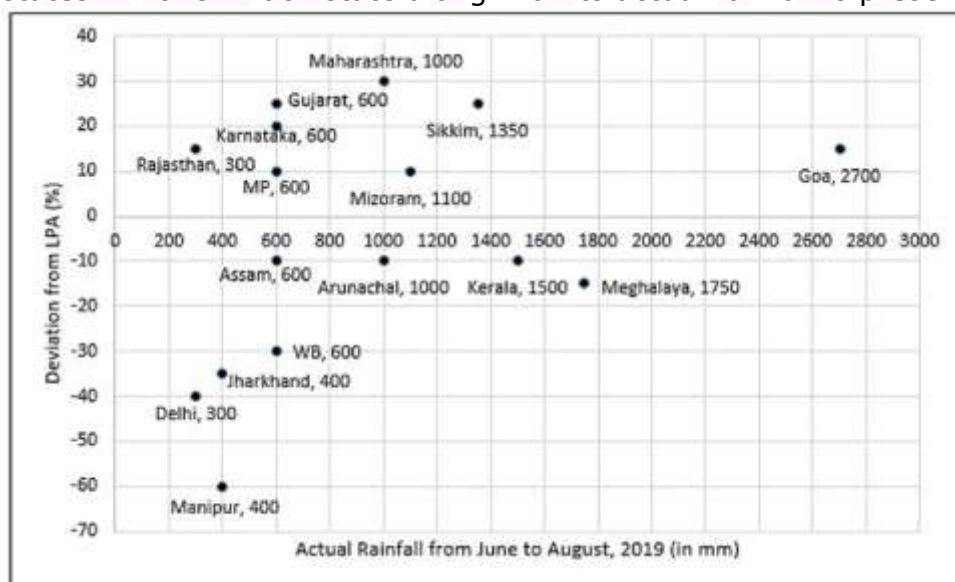
	Column 1	Column 2	Column 3	Total
Row1	(2,4) - 2,4,4	(6,8) - 6,6,8	(1,3) - 1,2,3	36
Row 2	(3,5) - 3,5,5	(1,1) - 1,1,1	(6,20) - 6,12,20	54
Row 3	(1,2) - 1,1,2	(1,2) - 1,1,2	(2,5) - 2,3,5	18
Total	27	27	54	

There are 3 slots for which the total amount in its three pouches strictly exceeds Rs. 10.

The correct answer is 3.

###TOPIC###Data Interpretation||Mixed Charts and Graphs||Mixed Charts and Graphs###

25. **Direction:** To compare the rainfall data, India Meteorological Department (IMD) calculated the Long Period Average (LPA) of rainfall during period June-August for each of the 16 states. The figure given below shows the actual rainfall (measured in mm) during June-August, 2019 and the percentage deviations from LPA of respective states in 2018 . Each state along with its actual rainfall is presented in the figure.



If a 'Heavy Monsoon State' is defined as a state with actual rainfall from June-August, 2019 of 900 mm or more, then approximately what percentage of 'Heavy Monsoon States' have a negative deviation from respective LPAs in 2019?

- A. 42.86
- B. 57.14
- C. 75.00
- D. 14.29

Answer ||| A

Solution |||

There are 7 states according to the given definition of the 'Heavy Monsoon State' and out of them 3 have negative deviations from the respective LPAs in 2019.

$$\text{Required percentage} = \frac{3}{7}(100\%) = 42.86\%$$

The correct option is A.

26.If a 'Low Monsoon State' is defined as a state with actual rainfall from June-August, 2019 of 750 mm or less, then what is the median 'deviation from LPA' (as defined in the Y-axis of the figure) of 'Low Monsoon States'?

- A. -20%
- B. 10%
- C. -10%
- D. -30%

Answer ||| C

Solution |||

There are 9 states categorised as 'Low Monsoon State' and the median value (fifth value) out of these 9 states is of Assam with a value of -10%.

The median 'deviation from LPA' (as defined in the Y-axis of the figure) of 'Low Monsoon States' is -10%.

The correct option is C.

27.What is the average rainfall of all states that have actual rainfall of 600 mm or less in 2019 and have a negative deviation from LPA?

- A. 450 mm
- B. 500 mm
- C. 460 mm
- D. 367 mm

Answer ||| C

Solution |||

There are 5 states (Assam, WB, Jharkhand, Delhi, Manipur) that have actual rainfall of 600 mm or less in 2019 and have a negative deviation from LPA. The total rainfall of these states is 2300 mm (600+600+400+300+400) and the average = $2300/5 = 460$ mm.

The correct option is C

28.The LPA of a state for a year is defined as the average rainfall in the preceding 10 years considering the period of June-August. For example, LPA in 2018 is the average rainfall during 2009-2018 and LPA in 2019 is the average rainfall during 2010-2019 . It is also observed that the actual rainfall in Gujarat in 2019 is 20% more than the rainfall in 2009. The LPA of Gujarat in 2019 is closest to

- A. 490 mm
- B. 525 mm
- C. 505 mm
- D. 475 mm

Answer ||| A

Solution |||

In 2019 the rainfall in Gujarat is 600mm with a positive deviation of 25%. Hence, in 2018 the LPA of Gujarat must be 480 and the total rain from 2009-18 is 4800 mm. The actual rainfall in Gujarat in 2019 is 20% more than the rainfall in 2009.

Hence, the actual rainfall in 2009 was 500 mm.

To calculate the LPA of Gujarat in 2019, we need to calculate the total rainfall from 2010-2019. In 2009, the rainfall was 500 mm and the total rainfall from 2009-18 is 4800 mm. Hence, the total rainfall from 2010-2019 is $4800 - 500 + 600 = 4900$ mm. The LPA of Gujarat in 2019 is 490 mm ($4900/10$).

The correct option is A.

###TOPIC###Data Interpretation||Mixed Charts and Graphs||Mixed Charts and Graphs###

29.

|||Common|||

Direction: Students in a college are discussing two proposals --

A: a proposal by the authorities to introduce dress code on campus, and

B: a proposal by the students to allow multinational food franchises to set up outlets on college campus.

A student does not necessarily support either of the two proposals.

In an upcoming election for student union president, there are two candidates in fray: Sunita and Ragini. Every student prefers one of the two candidates.

A survey was conducted among the students by picking a sample of 500 students. The following information was noted from this survey.

- 1) 250 students supported proposal A and 250 students supported proposal B
- 2) Among the 200 students who preferred Sunita as student union president, 80% supported proposal A
- 3) Among those who preferred Ragini, 30% supported proposal A
- 4) 20% of those who supported proposal B preferred Sunita.
- 5) 40% of those who did not support proposal B preferred Ragini.
- 6) Every student who preferred Sunita and supported proposal B also supported proposal A
- 7) Among those who preferred Ragini, 20% did not support any of the proposals.

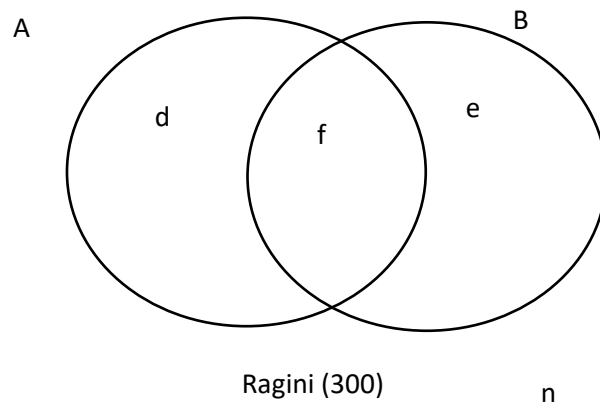
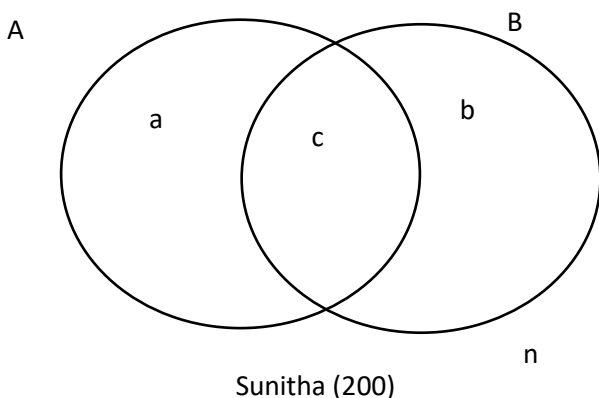
|||End|||

Among the students surveyed who supported proposal A, what percentage preferred Sunita for student union president?

Answer ||| 64

Solution |||

Let us take 2 venn diagrams.



From ii, 200 preferred Sunitha and 300 preferred Ragini.

From i, $a + c + d + f = 250$ and $b + c + e + f = 250$

From ii, $a + c = 80\% (200) = 160$

Hence, $d + f = 90$

From iv, $b + c = 20\% (250) = 50$

Hence, $e + f = 200$

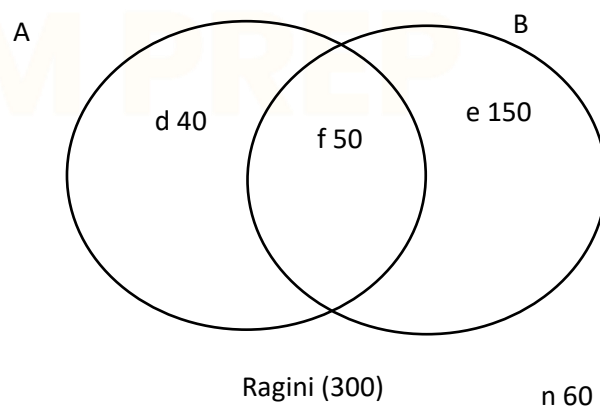
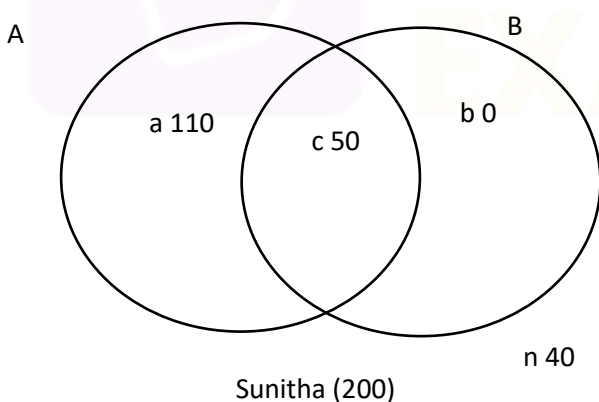
From vi, $c = 50$ and hence, $b = 0$

$a = 110$. Hence, $n(\text{Sunitha}) = 40$

From vii, $n(\text{Ragini}) = 60$

From v, $d + n = 40\% (250) = 100$

Hence, $d = 40$



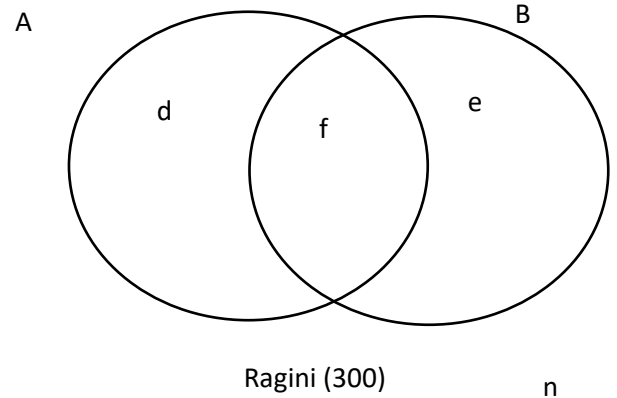
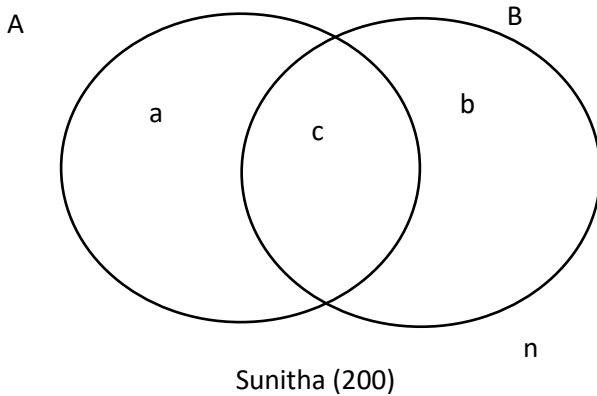
Required answer = $\frac{160}{250} (100\%) = 64\%$

30. What percentage of the students surveyed who did not support proposal A preferred Ragini as student union president?

Answer ||| 84

Solution |||

Let us take 2 venn diagrams.



From ii, 200 preferred Sunitha and 300 preferred Ragini.

From i, $a + c + d + f = 250$ and $b + c + e + f = 250$

From ii, $a + c = 80\% (200) = 160$

Hence, $d + f = 90$

From iv, $b + c = 20\% (250) = 50$.

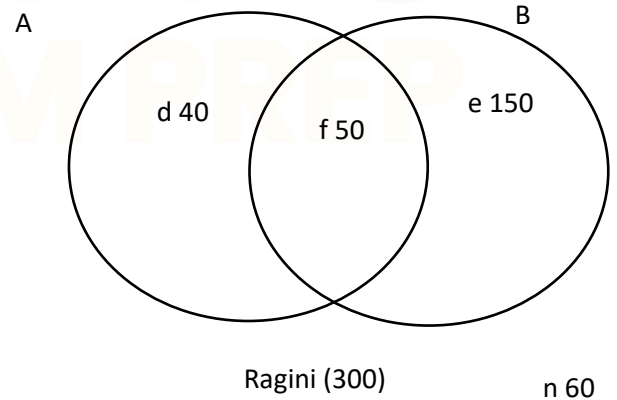
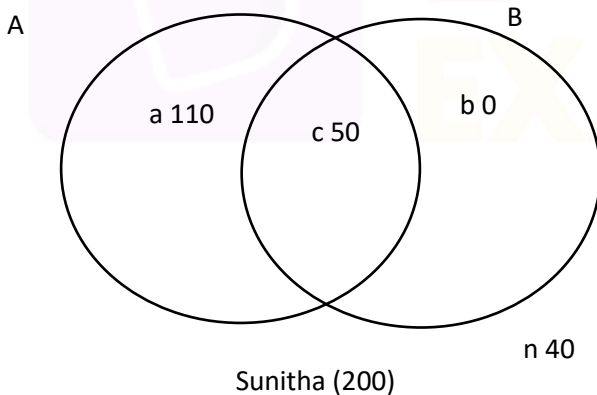
Hence, $e + f = 200$

From vi, $c = 50$ and hence, $b = 0$

$a = 110$. Hence, $n(\text{Sunitha}) = 40$

From vii, $n(\text{Ragini}) = 60$.

From v, $d + n = 40\% (250) = 100$. Hence, $d = 40$.



$$\text{Required percentage} = \frac{210}{250} (100\%) = 84\%$$

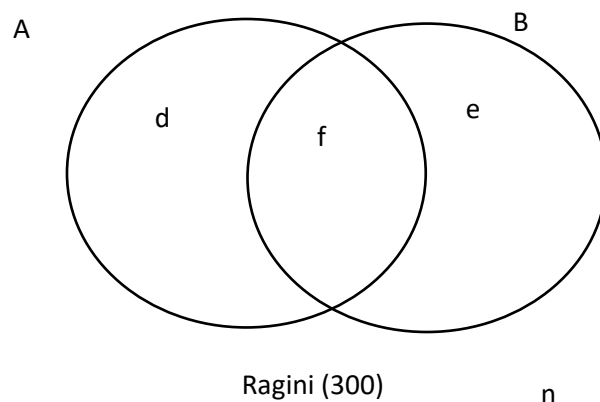
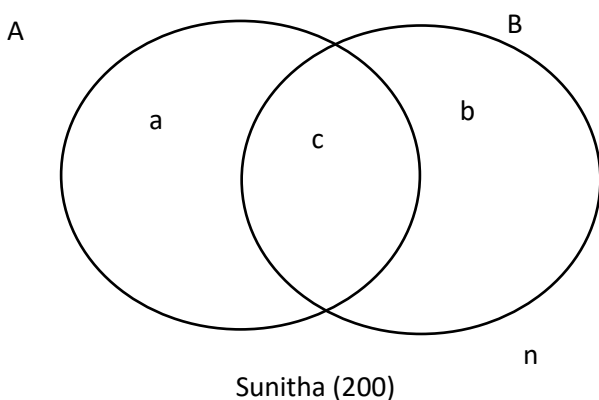
31. What percentage of the students surveyed who supported both proposals A and B preferred Sunitha as student union president?

- A. 20
- B. 25
- C. 40
- D. 50

Answer ||| D

Solution |||

Let us take 2 venn diagrams.



From ii, 200 preferred Sunitha and 300 preferred Ragini.

From i, $a + c + d + f = 250$ and $b + c + e + f = 250$

From ii, $a + c = 80\% (200) = 160$

Hence, $d + f = 90$

From iv, $b + c = 20\%(250) = 50$.

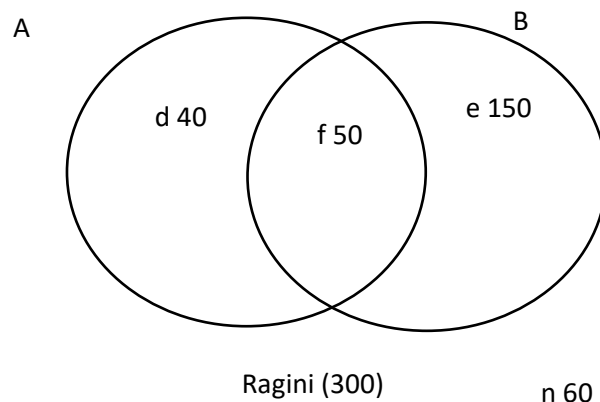
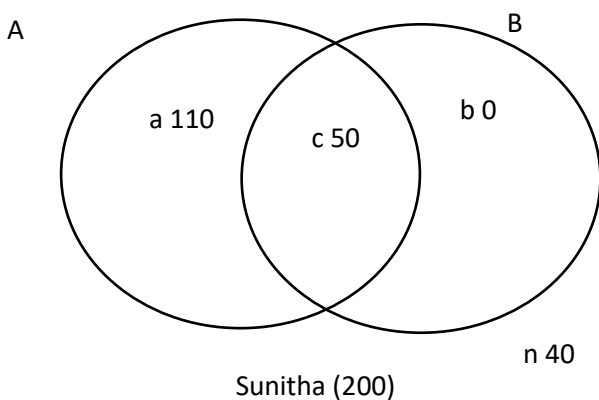
Hence, $e + f = 200$

From vi, $c = 50$ and hence, $b = 0$

$a = 110$. Hence, $n(\text{Sunitha}) = 40$

From vii, $n(\text{Ragini}) = 60$.

From v, $d + n = 40\% (250) = 100$. Hence, $d = 40$.



$$\text{Required percentage} = \frac{50}{100} (100\%) = 50\%$$

The correct option is D

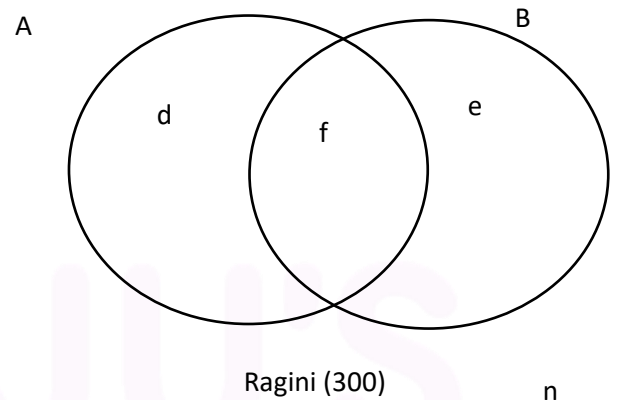
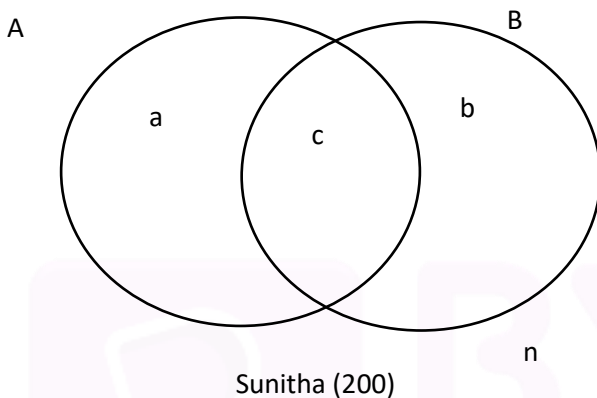
32. How many of the students surveyed supported proposal B, did not support proposal A and preferred Ragini as student union president?

- A. 150
- B. 200
- C. 40
- D. 210

Answer ||| A

Solution |||

Let us take 2 venn diagrams.



From ii, 200 preferred Sunitha and 300 preferred Ragini.

From i, $a + c + d + f = 250$ and $b + c + e + f = 250$

From ii, $a + c = 80\% (200) = 160$

Hence, $d + f = 90$

From iv, $b + c = 20\% (250) = 50$.

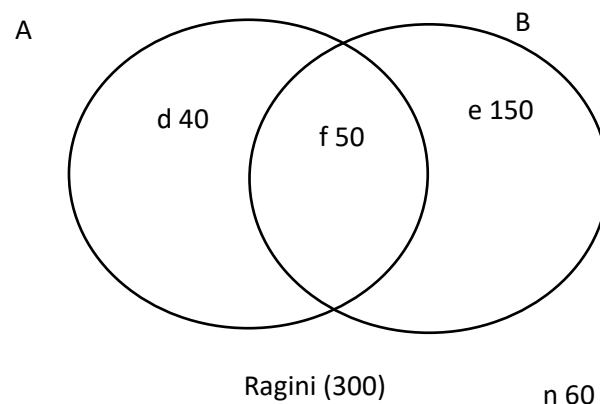
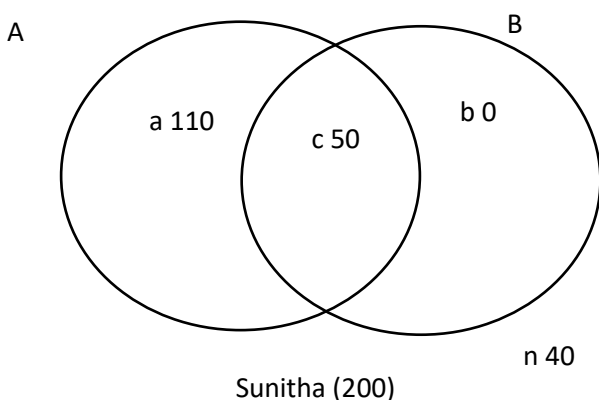
Hence, $e + f = 200$

From vi, $c = 50$ and hence, $b = 0$

$a = 110$. Hence, $n(\text{Sunitha}) = 40$

From vii, $n(\text{Ragini}) = 60$.

From v, $d + n = 40\% (250) = 100$. Hence, $d = 40$.



$$e = 150$$

The correct option is A.

Slot-2 QA

1. The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

- A. $\log_2 3$
- B. $\log_2 9$
- C. $\log_3 27$
- D. $\log_2 27$

Answer: A

Solution:

The given equation is $2^{6x} + 2^{3x+2} - 21 = 0$

$$(2^{3x})^2 + 2^2 \times (2^{3x}) - 21 = 0$$

Taking $(2^{3x}) = a$, we get

The equation as $a^2 + 4a - 21 = 0$

$$(a + 7)(a - 3) = 0$$

$$a = (-7) \text{ or } 3$$

$$2^{3x} = (-7) \text{ or } 3$$

Negative value is impossible,

$$2^{3x} = 3$$

$$3x = \log_2 3$$

Hence, option (A) is the correct answer.

2. The average of 30 integers is 5. Among these 30 integers, there are exactly 20 which do not exceed 5. What is the highest possible value of the average of these 20 integers?

- A. 4
- B. 5
- C. 4.5
- D. 3.5

Answer: C

Solution:

As 20 values do not exceed 5. All of them can be 5.

As all 30 values have a mean 5, if all 20 in the first group are equal to 5 then all the remaining 10 should also be equal to 5, which will violate the condition given in the question that "exactly 20 do not exceed 5".

It is also given that all the values are integers. Hence, if none of the second group of 10 integers is equal to 5 then all of them can be 6.

Since we need the maximum average of the group of 20, we must have the minimum average of the group of 10, that is why we have increased them the minimum possible.

So, the sum of those 10 is 60.

Since all 30 values have an average of 5, the sum of all 30 is 150.

So, the remaining 20 of the first group must have a sum of $150 - 60 = 90$

So, the average $= 90/20 = 4.5$

Hence, option (C) is the correct answer.

3. Let a, b, x, y be real numbers such that $a^2 + b^2 = 25$, $x^2 + y^2 = 169$ and $ax + by = 65$. If $k = ay - bx$, then

A. $k = 0$

B. $k > 513513$

C. $k = 513513$

D. $0 < k \leq 513$

Answer: A

Solution:

$$a^2 + b^2 = 25 \dots\dots\dots(1)$$

$$x^2 + y^2 = 169 \dots\dots\dots(2)$$

$$ax + by = 65 \dots\dots\dots(3)$$

$$(1) \times (2) \text{ or } a^2x^2 + b^2y^2 + a^2y^2 + b^2x^2 = 25 \times 169 = 4225 \dots\dots\dots(4)$$

$$(3) \text{ squared or } a^2x^2 + 2abxy + b^2y^2 = 4225 \dots\dots\dots(5)$$

$$(4) - (5) \text{ or } a^2y^2 - 2abxy + b^2x^2 = 0$$

$$(ay - bx)^2 = 0$$

$$ay - bx = 0 = k$$

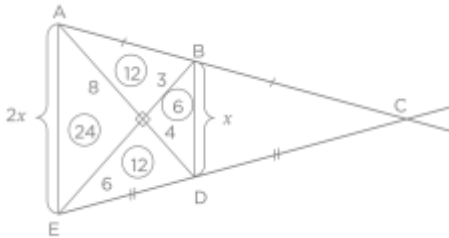
Hence, option (A) is the correct answer.

4. In a triangle ABC, medians AD and BE are perpendicular to each other, and have lengths 12 cm and 9 cm, respectively. Then, the area of triangle ABC, in sq. cm, is

- A. 80
- B. 68
- C. 72
- D. 78

Answer: C

Solution:



In the above diagram,

AD and BE are perpendicular to each other.

AD = 12 cm and BE = 9 cm. They intersect at the centroid G.

So, AG:GD = BG:GE = 2:1

So, AG = 8 cm, GD = 4 cm, BG = 6 cm and GE = 3 cm.

In the right angled triangle AGE,

Area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times AG \times GE = \frac{1}{2} \times 8 \times 3 = 12 \text{ cm}^2$

Similarly, we can find the other areas as shown in the diagram as,

AGB = 24 cm^2

BGD = 12 cm^2

And DGE = 6 cm^2

So, the area of the trapezium BDEA = 54 cm^2 , which is $\frac{3}{4}$ th of the triangle ABC.

So, the area of the triangle ABC is $54 \times \frac{4}{3} \text{ cm}^2 = 72 \text{ cm}^2$

Hence, option (C) is the correct answer.

5. Let a_1, a_2 be integers such that $a_1 - a_2 + a_3 - a_4 + \dots + (-1)^{n-1} a_n = n$, for $n \geq 1$.

Then $a_{51} + a_{52} + \dots + a_{1023}$ equals

- A. -1
- B. 1
- C. 0
- D. 10

Answer: B

Solution:

Given, $a_1 - a_2 + a_3 - a_4 + \dots + (-1)^{n-1} a_n = n \dots \dots \dots (1)$

So, $a_1 - a_2 + a_3 - a_4 + \dots + (-1)^{n-2} a_{n-1} = n - 1 \dots \dots \dots (2)$

(1) - (2) gives us ,

$(-1)^{n-1} a_n = n - (n - 1) = 1$

$a_n = (-1)^{1-n}$

So, the series becomes 1, -1, 1, -1,

So, any odd-numbered term is 1 and any even-numbered term is (-1).

So, we will get,

$a_{51} + a_{52} + \dots + a_{1023} = 1 - 1 + 1 - 1 + \dots 1 = 0 + 0 + \dots 0 + 1 = 1$

Hence, option (B) is the correct answer.

6. How many factors of $2^4 \times 3^5 \times 10^4$ are perfect squares which are greater than 1?

Answer: 44

Solution:

To get a perfect square, the powers of each prime factor must be an even number or zero.

We have been given $2^4 \times 3^5 \times 10^4 = 2^4 \times 3^5 \times 2^4 \times 5^4 = 2^8 \times 3^5 \times 5^4$

So, the powers of 2 can be zero or 2 or 4 or 6 or 8 that is, 5 ways.

Similarly, 3 can have powers of zero or 2 or 4, that is, 3 ways.

And 5 can also have powers of zero or 2 or 4, that is, 3 ways.

Total number of ways = $5 \times 3 \times 3 = 45$

But, out of these, there is a "1".

We have to exclude that.

So, the number of ways = $45 - 1 = 44$

Hence, 44 is the correct answer.

7. Two circles, each of radius 4 cm, touch externally. Each of these two circles is touched externally by a third circle. If these three circles have a common tangent, then the radius of the third circle, in cm, is

A. $\pi/3$

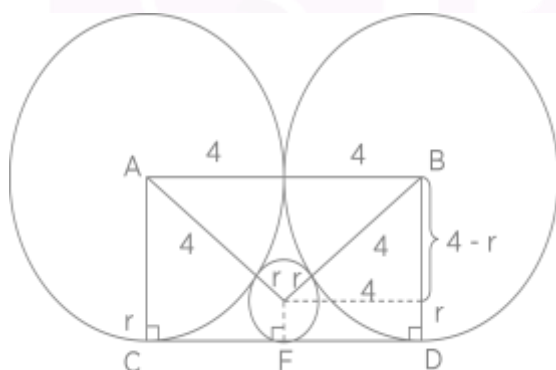
B. 1

C. $1/\sqrt{2}$

D. $\sqrt{2}$

Answer: B

Solution:



Let, the radius of the smaller third circle be r cm.

Since the radius and tangent are perpendicular to each other at the point of contact, EF is perpendicular to the common tangent CD.

Also, BD is perpendicular to the common tangent CD.

We drop a perpendicular from E on BD at G.

So, $EG = FD = 4$ and $BG = (4 - r)$

So, in the right-angled triangle BEG, using Pythagoras' Theorem, we will get,

$$4^2 + (4 - r)^2 = (4 + r)^2$$

$$16 = 16r$$

$$1 = r$$

Hence, option (B) is the correct answer.

8. What is the largest positive integer 'n' such that

$\frac{n^2+7n+12}{n^2-n-12}$ is also a positive integer?

- A. 6
- B. 8
- C. 16
- D. 12

Answer: D

Solution:

$$\frac{n^2+7n+12}{n^2-n-12} = \frac{(n+4)(n+3)}{(n-4)(n+3)} = \frac{n+4}{n-4}$$

Now we can check with the given options.

If we take the largest value option (C), $n=16$

$$\frac{n+4}{n-4} = \frac{20}{12} \text{ which is not a fraction.}$$

So, C cannot be our answer.

Let's consider, $n=12$, the value will be 2.

Hence, option (D) is the correct answer.

9. In 2010, a library contained a total of 11500 books in two categories - fiction and non-fiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was a 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

- A. 6600
- B. 6160
- C. 6000
- D. 5500

Answer: A

Solution:

Let, in the year 2010, in the library, the number of fiction books were 100F and the number of non-fiction books were 100N.

$$\text{So, } 100F + 100N = 11500$$

$$F + N = 115 \dots \dots \dots (1)$$

In the year 2015, the books became 110F and 112N, respectively.

$$\text{So, } 110F + 112N = 12760$$

$$55F + 56N = 6380 \dots \dots \dots (2)$$

We need to find the value of 110F.

$$\text{From (1), we get, } N = 115 - F \dots \dots \dots (3)$$

Substituting this value in (2), we will get, $55F + 56(115 - F) = 6380$

$$F = 60$$

$$110F = 6600$$

Hence, option (A) is the correct answer.

10. Let f be a function such that $f(mn) = f(m)f(n)$ for every positive integer m and n. If f (1), f (2) and f (3) are positive integers, $f(1) < f(2)$, and $f(24) = 54$, then f (18) equals

Answer: 12

Solution:

$$f(2) = f(2 \times 1) = f(2) \times f(1) \text{ or } f(1) = 1$$

$$F(24) = f(2^3 \times 3) = f(2 \times 2 \times 2 \times 3) = \{f(2)\}^3 \times f(3) = 54(\text{given}) = 3^3 \times 2$$

Comparing, we get, $f(2) = 3$ and $f(3) = 2$

$$\text{So, } f(18) = f(3 \times 3 \times 2) = \{f(3)\}^2 \times f(2) = 2^2 \times 3 = 12$$

Hence, 12 is the correct answer.

11. Let A and B be two regular polygons having a and b sides, respectively.

If $b = 2a$ and each interior angle of B is $\frac{3}{2}$ times each interior angle of A, then each interior angle, in degrees, of a regular polygon with $a + b$ sides is

Answer: 150

Solution:

We can draw the following table:

Polygon	Number of sides	Each int. angle
A	a	$180 - \frac{360}{a}$
B	$b=2a$	$180 - \frac{180}{a}$
Third	$a+b=3a$	$180 - \frac{120}{a}$

$$\text{Given, } 180 - \frac{180}{a} = \frac{3}{2} \times \left(180 - \frac{360}{a}\right)$$

Solving, we get, $a = 4$ or $3a = 12$

Hence, 150 is the correct answer.

12. A cyclist leaves A at 10 am and reaches B at 11 am. Starting from 10:01 am, every minute a motorcycle leaves A and moves towards B. Forty-five such motorcycles reach B by 11 am. All motorcycles have the same speed. If the cyclist had doubled his speed, how many motorcycles would have reached B by the time the cyclist reached B?

A. 22

B. 20

C. 15

D. 23

Answer: C

Solution:

Since 45 motorcyclists reach B by 11 am, we can infer that the last one to reach B was the motorcyclist who set out at 10:45 am.

So, he took 15 minutes to cover the distance from A to B.

Let us assume the speed of each motorcyclist to be M meters per minute.

So, the distance AB = 15M meters

Let us assume that the initial speed of the cyclist is C meters per minute.

So, the cyclist took $15M/C$ minutes to reach B, which is given to be 60.

$$\text{So, } 15M/C = 60$$

$$M = 4C$$

$$\text{Distance AB} = 60C = 15M$$

Now, if the speed is doubled, the speed of the cyclist becomes 2C meters per minute.

$$\text{So, time taken to reach B} = \frac{60C}{2C} = 30 \text{ minutes}$$

Now, since a motorcyclist takes 15 minutes to reach B, the last motorcycle to reach B at 10:30 will be the one who left A at 10:15 am.

So, he will be the 15th motorcyclist.

Hence, option (C) is the correct answer.

13. Let A be a real number. Then the roots of the equation $x^2 - 4x - \log_2 A = 0$ are real and distinct if and only if

- A. $A < 1/16$
- B. $A > 1/8$
- C. $A > 1/16$
- D. $A < 1/8$

Answer: C

Solution:

Since the roots are real and distinct, discriminant ($b^2 - 4ac > 0$) will be greater than zero. So, $(-4)^2 + 4 \log_2 A > 0$

$$16 + 4 \log_2 A > 0$$

$$4 > -\log_2 A$$

$$4 > \log_2 A^{-1}$$

$$16 > A^{-1}$$

$$A > 1/16$$

Hence, option (C) is the correct answer.

14. John jogs on track A at 6 kmph and Mary jogs on track B at 7.5 kmph. The total length of tracks A and B is 325 metres. While John makes 9 rounds of track A, Mary makes 5 rounds of track B. In how many seconds will Mary make one round of track A?

Answer: 48

Solution:

We can form the following table,

Name	Speed (kmph)	Speed mps	Track in m	Time per round
John	6	5/3	J (let)	3J/5
Mary	7.5	25/12	M (let)	12M/25

$$\text{So, } 9 \times (3J/5) = 5 \times (12M/25)$$

$$9J/5 = 4M/5$$

$$9J = 4M = 36K \text{ (let) where } k \text{ is a non zero constant}$$

$$\text{So, } J = 4K \text{ and } M = 9K$$

Name	Speed (kmph)	Speed mps	Track in m	Time per round
John	6	5/3	4K	12K/5
Mary	7.5	25/12	9K	108K/25

If Mary wants to cover track A, which is 4K long, she will take $48K/25$ seconds.

It is given that $4K + 9K = 325$ or $K = 25$

So, Mary will take $48k/25 = 48 \times 25/25 = 48$ seconds

Hence, 48 is the correct answer.

15. Anil alone can do a job in 20 days while Sunil alone can do it in 40 days. Anil starts the job, and after 3 days, Sunil joins him. Again, after a few more days, Bimal joins them and they finish the job. If Bimal has done 10% of the job, then in how many days was the job done?

- A. 13
- B. 12
- C. 15
- D. 14

Answer: A

Solution:

LCM of 20 and 40 = 40

Let the total work be 40W.

As Anil completes the work in 20 days, he completes 2W in a day.

Similarly, Sunil completes 1W in a day.

Let the total work be done in D days.

Anil worked for all D days.

So, work done by him = 2DW

Sunil joined 3 days later.

So, he worked for (D - 3) days, so, he did (D - 3)W work

Now, Bimal did 10% of the job

So, he did 4W.

So, Anil's work + Sunil's work + Bimal's work = 2DW + (D - 3)W + 4W = 40W

$2D + D - 3 + 4 = 40$

$3D = 39$

$D = 13$

Hence, option (A) is the correct answer.

16. In an examination, Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali. After a review, the score of each of them increased by 6. The revised scores of Anjali, Mohan, and Rama were in the ratio 11:10:3. Then Anjali's score exceeded Rama's score by

A. 26

B. 32

C. 24

D. 35

Answer: B

Solution:

Let, initially, Anjali, Mohan, and Rama scored A, M, and R respectively.

After review, their scores became (A+6), (M+6), and (R+6) respectively, which are in the ratio 11:10:3 = 11k:10k:3k where k is a non-zero constant.

So, $A + 6 = 11k$ or $A = 11k - 6$

Similarly, we will get, $M = 10k - 6$ and $R = 3k - 6$

It is given that $R = (M+A)/12$

Substituting the values, we will get,

$3k - 6 = (21k - 12)/12$

Or, $36k - 72 = 21k - 12$ or $k = 4$

$A - R = 11k - 6 - (3k - 6) = 8k = 32$

Hence, option (B) is the correct answer.

17. In an examination, the score of A was 10% less than that of B, the score of B was 25% more than that of C, and the score of C was 20% less than that of D. If A scored 72, then the score of D was

Answer: 80

Solution:

$A = 0.9 B$

$B = 1.25C$

$C = 0.8D$

Since $A = 72$, $0.9 B = 72$ or $B = 80$

$1.25 C = 80$

$$C = 64$$

$$0.8 D = 64$$

$$D = 80$$

Hence, 80 is the correct answer.

18. The base of a regular pyramid is a square and each of the other four sides is an equilateral triangle, the length of each side being 20 cm. The vertical height of the pyramid, in cm, is

A. $10\sqrt{2}$

B. $8\sqrt{3}$

C. 12

D. $5\sqrt{5}$

Answer: A

Solution:

The vertical height of the pyramid = H (let)

The slant edge of the pyramid = length of the side of equilateral triangles = 20 cm

For the square base, diagonal = $20\sqrt{2}$ cm and half of it = $10\sqrt{2}$ cm

Now, half of the diagonal, H, and 20 will form a vertical right-angled triangle.

So, using Pythagoras' Theorem, we will get, $H^2 + 200 = 400$ or $H = 10\sqrt{2}$ cm

Hence, option (A) is the correct answer.

19. If x is a real number, then $\sqrt{\log_e \left(\frac{4x-x^2}{3} \right)}$ is a real number, if and only if,

A. $-3 \leq x \leq 3$

B. $1 \leq x \leq 2$

C. $1 \leq x \leq 3$

D. $-1 \leq x \leq 3$

Answer: C

Solution:

$\sqrt{\log_e \left(\frac{4x-x^2}{3} \right)}$ will be real if the quantity inside the square root sign is non-negative.

If the quantity under the square root sign is zero, then $\frac{4x-x^2}{3} = 1$

$$4x - x^2 - 3 = 0$$

$$x = 3 \text{ or } 1$$

Now, among the given options, A and D include zero.

But, if we put $x = 0$, then we can not find the logarithm.

Hence, options A and D cannot be the answers.

Option B does not contain $x = 3$, hence, that is also not the answer.

Hence, option (C) is the correct answer.

20. Let ABC be a right-angled triangle with hypotenuse BC of length 20 cm. If AP is perpendicular on BC, then the maximum possible length of AP, in cm, is

A. 10

B. $8\sqrt{2}$

C. $6\sqrt{2}$

D. 5

Answer: A

Solution:

For any right-angled triangle, the median drawn from the right angular vertex onto the hypotenuse is half of the hypotenuse and for any isosceles triangle, median drawn on the unequal side is perpendicular to it.

So, in this case, AP will be maximum if P is the midpoint of BC.

So, AP max will be $\frac{1}{2} \times 20 = 10$ cm

Hence, option (A) is the correct answer.

###TOPIC###Quantitative Aptitude||Geometry||Lines, Angles, Triangles###

21. Two ants A and B start from a point P on a circle at the same time, with A moving clockwise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A. 10:27 am

B. 10:25 am

C. 10:45 am

D. 10:18 am

Answer: A

Solution:

Let the total track be 100T units long.

By the time A covered 60%, B covered the remaining 40%.

So, A covered 60T and B covered 40T.

Let, speed of A be a and that of B be b.

$$\text{So, } \frac{60T}{a} = \frac{40T}{b}$$

$$\frac{b}{a} = \frac{2}{3} = k \text{ (let), where } k \text{ is a non-zero constant.}$$

$$b = 2k, a = 3k$$

Now, A covered 40T in 12 minutes.

$$\frac{40T}{3k} = 12$$

$$10T = 9k$$

$$60T = 54k$$

To cover this distance, B will take $54k/2k$ minutes = 27 minutes

B will return to P at 10:27.

Hence, option (A) is the correct answer.

22. How many pairs (m,n) of positive integers satisfy the equation $m^2 + 105 = n^2$?

Answer: 4

Solution:

The equation is $m^2 + 105 = n^2$

$$\text{Or, } 105 = n^2 - m^2 = (n+m)(n-m)$$

Since 105 is odd, both the (n+m) and (n-m) must be odd

Now, we can form the following table:

Case	N	m	n+m	n-m	(n+m)(n-m)	acceptable?
1	Odd	Odd	Even	Even	Even	No
2	Odd	Even	Odd	Odd	Odd	Yes
3	Even	Even	Even	Even	Even	No
4	Even	Odd	Odd	Odd	Odd	Yes

$$\text{Now, } 105 = 1 \times 105 = 3 \times 35 = 5 \times 21 = 7 \times 15$$

So, we can form the following table:

Case	n+m	n-m	m	N
1	105	1	53	52
2	35	3	19	16
3	21	5	13	8
4	15	7	11	4

So, there are 4 possible pairs.

Hence, 4 is the correct answer.

23. The salaries of Ramesh, Ganesh and Rajesh were in the ratio 6:5:7 in 2010, and in the ratio 3:4:3 in 2015. If Ramesh's salary increased by 25% during 2010-2015, then the percentage increase in Rajesh's salary during this period is closest to

- A. 7
- B. 8
- C. 9
- D. 10

Answer: A

Solution:

In 2010, the salaries of Ramesh, Ganesh, and Rajesh were 600k, 500k, and 700k respectively.

Now, we can form the following table:

Name	Salary 2010	Increase %	Increase Rs.	Salary 2015
Ramesh	600k	25	150k	750k
Ganesh	500k			
Rajesh	700k	R (let)	7Rk	7k(100+R)

It is given that $750k : \{7k(100+R)\} = 3:3 = 1:1$

Solving, we get, $R = 50/7 = 7.142857 = 7$ (approx.)

Hence, option (A) is the correct answer.

24. A man makes complete use of 405 cc of iron, 783 cc of aluminium, and 351 cc of copper to make a number of solid right circular cylinders of each type of metal. These cylinders have the same volume and each of these has a radius of 3 cm. If the total number of cylinders is to be kept at a minimum, then the total surface area of all these cylinders, in sq. cm, is

- A. $1044(4 + \pi)$
- B. 8464π
- C. 928π
- D. $1026(1 + \pi)$

Answer: D

Solution:

Let, for each cylinder, the height be h cm.

So, volume of each cylinder = $9\pi h$ cm³

Since the number of cylinders is minimum, the volume of each cylinder will be maximum.

Now, HCF of (405, 783, 351) is 27

So, volume of each cylinder should be 27 cc and $9\pi h = 27$ or $h = \frac{3}{\pi}$

Total surface area of each cylinder = $2\pi r(r + h) = 6\pi \left(3 + \frac{3}{\pi}\right) = 18\pi + 18$

Total volume of metals available = (405+783+351) cc = 1539cc

Number of cylinders = $1539/27 = 57$

Total surface area of all cylinders = $57 \times (18\pi + 18) = 1026(\pi + 1)$

25. The quadratic equation $x^2 + bx + c = 0$ has two roots $4a$ and $3a$, where a is an integer. Which of the following is a possible value of $b^2 + c$?

- A. 3721
- B. 549
- C. 361
- D. 427

Answer: B

Solution:

Sum of the roots = $7a$

Product of the roots = $12a^2$

So, $7a = (-b)$ and $12a^2 = c$

Hence, $b^2 + c = 49a^2 + 12a^2 = 61a^2$

Let's check with the options:

Option	Value	Value/61	Square root	Integer?
A	3721	61	7.8	No
B	549	9	3	Yes
C	361	5.9	Not an integer	No
D	427	7	Not an integer	No

Hence, option (B) is the correct answer.

26. In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is

Answer: 7

Solution:

Let, from left to right, the digits be a, b, c, d, e , and f .

So, $f = a + b + c$(1)

$e = a + b$(2)

$a = c$(3)

$2a = b$(4)

$d = e + f$(5)

Substituting the value of b from (4) to (2), we get, $e = 3a$(6)

Substituting the value of b from (4) to (1), we get, $f = 3a + c$(7)

Substituting the value of c from (3) to (7) we get, $f = 4a$(8)

Combining (6) and (8), and substituting the values in (5), we get,

$d = 7a$(9)

Since a is an integer, and it is the leftmost digit of a six-digit number,

a can not be zero.

So, $d = 7a$ can also not be zero.

If $a = 1$, then $d = 7 \times 1 = 7$

If $a = 2$ then $d = 7 \times 2 = 14 > 9$ which is not possible

So, the only value of d is 7 and it is the maximum value.

Hence, 7 is the correct answer.

27. Mukesh purchased 10 bicycles in 2017, all at the same price. He sold six of these at a profit of 25% and the remaining four at a loss of 25%. If he made a total profit of Rs. 2000, then his purchase price of a bicycle, in Rupees, was

- A. 2000
- B. 6000
- C. 8000
- D. 4000

Answer: D

Solution:

Let, the CP of each bicycle be 100C.

So, we can form the following table:

Case	Number	Each cp	Each prof %	Each prof Rs	Each SP	Total SP
First	6	100C	25	25C	125C	750C
Second	4	100C	25	25C	75C	300C
Total	10	100C				1050C

Total CP = 1000C

Total SP = 1050C

So, total profit = 50C = 2000 (given) C = 40

100C = 4000

Hence, option (D) is the correct answer.

###TOPIC###Quantitative Aptitude||Arithmetic||Profit, Loss and Discount###

28. The number of common terms in the two sequences:

15, 19, 23, 27, , 415 and 14, 19, 24, 29, , 464 is

- A. 20
- B. 18
- C. 21
- D. 19

Answer: A

Solution:

Series	First term	Common diff	N th term
First	15	4	$11+4n$
Second	14	5	$9+5n$

Let, r^{th} term of the first series is equal to the s^{th} term of the second series

So, $11+4r=9+5s$ or $2+4r=5s$

Substituting $r = 2$, we get, $s = 2$

Substituting $r = 2+5 = 7$, we get, $s = 2+4 = 6$

Substituting $r = 7+5=12$, we get $s = 6+4 = 10$ etc.

Now, for the first series, the last term is $415 = 11+4n$ or $n = 101$ or there are 101 terms in the first series.

The maximum value of r can be 101, on the other hand, we can similarly find that the number of terms in the second series = 91

So the maximum value of s can be 91.

Now, we can tabulate the pairs of values of r and s as

Case	Value of r	Value of s
1	2	2
2	7	6
3	12	10

Now, the values of r and s also form AP and mth value of $r = 5m - 3 \leq 101$ and n th value of $s = 4n - 2 \leq 91$. So, $m \leq 20.8$ or max value of $m = 20$ and $n \leq 23.5$, max value of $n = 23$. So, the minimum value of 20 and 23 is 20. So, there will be 20 values that are common between the given two series.

Hence, option (A) is the correct answer.

29. If $(2n+1) + (2n+3) + (2n+5) + \dots + (2n+47) = 5280$, then what is the value of $1+2+3+\dots+n$?

Answer: 4851

Solution:

$(2n+1) + (2n+3) + (2n+5) + \dots + (2n+47) = 5280$ has 24 terms,

So, $48n + 1+3+5+\dots+47 = 5280$

$48n + 576 = 5280$

$n = 98$

$1+2+3+\dots+98 = 98(99)/2 = 4851$

Hence, 4851 is the correct answer.

30. The strength of a salt solution is p% if 100ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A. 15

B. 12

C. 13

D. 14

Answer: D

Solution:

Solution	Percent	In 100ml	In 500ml
A	10	10	50
B	22	22	110
C	32	32	160

At first, when 100 ml A was mixed with 500 ml B, the resultant mixture (let, D) had 600 ml with 120 g salt, that is, a 20% solution.

Now if 100 ml of D is mixed with C to get E (let) then E will have 600 ml with $160+20=180$ g salt, that is, a 30% solution.

Now, this 100 ml of E is mixed with A to get F, say.

Now, 100 ml of E has 30g salt and A previously had a 400 ml solution with 10 % or 40 g.

So, now, F has 500 ml with 70 g salt, or 14%.

Hence, option (D) is the correct answer.

31. If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then x+y equals

Answer: 13

Solution:

Let, $5^x = a$ and $3^y = b$

So, from the first equation, we get, $a - b = 13438$(1)

And from the second equation we will get, $a/5 + 3b = 9686$ (2)

Solving, we get, $a = 15625$, $b = 2187$

So, $5^x = 15625 = 5^6$ or $x = 6$

And $3^y = 2187 = 3^7$ or $y = 7$

So, $x + y = 6 + 7 = 13$

Hence, 13 is the correct answer.

32. Amal invests Rs 12000 at 8% interest, compounded annually, and Rs 10000 at 6% interest, compounded semi-annually, both investments being for one year. Bimal invests his money at 7.5% simple interest for one year. If Amal and Bimal get the same amount of interest, then the amount, in Rupees, invested by Bimal is

Answer: 20920

Solution:

Name	P	T (yrs.)	R	SI/CI	Compound	Int	Amt
Amal 1	12000	1	8	CI	Annually		
Amal 2	10000	1	6	CI	Semi annually		
Bimal	100B(let)	1	7.5	SI	NA	7.5B	

We can find the interest by Amal in the first case as 960 and second case as

$$10000 \left(1 + \frac{6}{2 \times 100}\right)^2 - 10000 = 609$$

So, total interest of Amal = 1569 = 7.5 B

So, $B = 209.2$ or $100B = 20920$

Hence, 20920 is the correct answer.

33. A shopkeeper sells two tables, each procured at cost price p , to Amal and Asim at a profit of 20% and at a loss of 20%, respectively. Amal sells his table to Bimal at a profit of 30%, while Asim sells his table to Barun at a loss of 30%. If the amounts paid by Bimal and Barun are x and y , respectively, then $(x - y) / p$ equals

A. 1

B. 1.2

C. 0.7

D. 0.50

Answer: A

Solution:

CP for Amal = $1.2p$

CP for Asim = $0.8p$

CP for Bimal = $1.2p \times 1.3 = 1.56p = x$ (given)

CP for Barun = $0.8 \times 0.7 p = 0.56p = y$ (given)

So, $x - y = p$

So, the answer is 1.

Hence, option (A) is the correct answer.

34. John gets Rs 57 per hour of regular work and Rs 114 per hour of overtime work. He works all together 172 hours and his income from overtime hours is 15% of his income from regular hours. Then, for how many hours did he work overtime?

Answer: 12

Solution:

We can form the following table:

Case	Hour	Rate per hour	Total
Normal	N	57	57N
Overtime	E	114	114E
Total	172	Not applicable	

So, $N + E = 172$(1)

And $57N \times 0.15 = 114E$(2)

$0.15 N = 2E$(3)

$E = 0.075N$(4)

Substituting for E in (1), we get, $1.075N = 172$ or $N = 160$

$E = 172 - 160 = 12$

Hence, 12 is the correct answer.



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