NMAT 2020 Question Paper QP3 with Solutions

Time Allowed :2 Hour	**Maximum Marks :**360	**Total Questions :**120

General Instructions

Read the following instructions very carefully and strictly follow them:

The test is of 2 hours duration. The question paper consists of 120 questions. The maximum marks are 360. There are three parts in the question paper consisting of English, Mathematics, and Logical Reasoning, with 40 questions in each part of equal weightage. Each part (subject) has two sections.

(i) Section-A: This section contains 30 multiple-choice questions, each with only one correct answer. Each question carries 3 marks for a correct answer and −1 mark for a wrong answer.

(ii) Section-B: This section contains 10 questions, each requiring a numerical answer. Each question carries 3 marks for a correct answer and −1 mark for a wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) Like other cruise ships that suffered outbreaks and were often put in quarantine

(2) Like other cruise ships that suffered outbreaks were often put in quarantine

(3) found no cases of COVID-19

(4) free to use the ship's facilities and entertainments

Correct Answer: (2) Like other cruise ships that suffered outbreaks, they were often put in quarantine

Solution: The sentence "Like other cruise ships that suffered outbreaks were often put in quarantine" is a run-on sentence. It lacks the necessary conjunction or punctuation to separate the clauses properly.

The corrected version should be:

Like other cruise ships that suffered outbreaks, they were often put in quarantine.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> When dealing with sentence construction, ensure that proper punctuation and conjunctions are used to separate independent clauses.

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2. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) **I realise** that it is a great mistake

(2) it is a great mistake

(3) not take a break

(4) every now and then

Correct Answer: (1) **I realise**

Solution: In the sentence, the verb "realise" should be written as "realize" to maintain consistency in the spelling (if following American English) or "realise" for British English. Both are correct depending on the context, but consistency should be maintained.

The corrected version is:

I realize that it is a great mistake.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Be consistent with your spelling choices, especially between British and American English.

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3. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) The coral reef crumbles

(2) sand and other material

(3) pile on top

(4) forming an island or islets

Correct Answer: (3) pile on top

Solution: The phrase "pile on top" is awkward in this context. The correct construction should be "pile up" to convey that materials are accumulating or building up in a particular location.

The corrected version is:

The coral reef crumbles, and sand and other material pile up, forming an island or islets.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> Use "pile up" instead of "pile on top" when describing materials accumulating or building.

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4. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) The coronavirus pandemic's economic downturn

(2) may having set off a sudden plunge

(3) another crucial metric for determining the severity of global warming

(4) just hit a record high

Correct Answer: (2) may having set off a sudden plunge

Solution: The verb "may having" is incorrect. The correct construction is "may have" as "having" is an incorrect tense form in this context.

The corrected version is:

The coronavirus pandemic's economic downturn may have set off a sudden plunge.

Thus, the correct answer is option (2).

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5. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) Thanks to hard water

(2) I am losing hairs

(3) I might become

(4) bald very soon

Correct Answer: (2) I am losing hairs

Solution: The word "hairs" is incorrect in this context, as it is used in a more general sense.

The correct term is "hair" when referring to the hair on a person's head.

The corrected version is:

Thanks to hard water, I am losing hair.

Thus, the correct answer is option (2).

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6. In the sentence given below, four words/phrases have been underlined and the underlined words/phrases are given as options. Select the option that contains grammatical error(s).

(1) Thanks to hard water

(2) I am losing hairs

(3) I might become

(4) bald very soon

Correct Answer: (2) I am losing hairs

Solution: The word "hairs" should be in singular form when referring to the hair on a

person's head.

The corrected version is:

Thanks to hard water, I am losing hair.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Use "hair" in singular form when referring to the hair on a person's head.

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7. Fill in the blanks with the appropriate word.

(1) at

(2) to

(3) from

(4) beyond

Correct Answer: (1) at

Solution: The correct preposition here is "at". The sentence correctly reads:

The warden asked them to look at the left to see the museum.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When referring to a location, "at" is often the correct preposition.

---

8. Select the option that best fills in the blank and completes the sentence given below.

(1) will come

(2) comes

(3) come

(4) had came

Correct Answer: (1) will come

Solution: The correct tense for future action is "will come". The sentence is completed as:

I will call you when the teacher will come to the class.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Use "will" when referring to future actions.

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9. They .... the TV for more than five hours now.

(1) have watched

(2) watched

(3) are watching

(4) have been watching

Correct Answer: (4) have been watching

Solution: The sentence refers to an ongoing action that started in the past and continues into the present, which requires the present perfect continuous tense: "have been watching."

The corrected version is:

They have been watching the TV for more than five hours now.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Use "have been watching" for actions that started in the past and continue into the present.

---

10. Select the option that best fills in the blank and completes the sentence given below.

(1) While

(2) Since

(3) Whereas

(4) While

Correct Answer: (1) While

Solution: The appropriate conjunction here is "while", which implies a contrast. The sentence reads:

While the poorest countries should strive to help their children's ability to live healthy lives,

the excessive carbon emissions threaten their children's future.

Thus, the correct answer is option (1).

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11. Select the option that best fills in the blank and completes the sentence given below.

(1) While

(2) Since

(3) Whereas

(4) As

Correct Answer: (1) While

Solution: The appropriate conjunction here is "while", which implies a contrast. The sentence reads:

While the poorest countries should strive to help their children's ability to live healthy lives,

the excessive carbon emissions threaten their children's future.

Thus, the correct answer is option (1).

Quick Tip

Use "while" when showing contrast in two actions or facts.

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12. Select the option that best fills in the blank and completes the sentence given below.

(1) an affect

(2) an alibi

(3) a consequence

(4) a compliance

Correct Answer: (3) a consequence

Solution: The correct word here is "a consequence", as it refers to something that results from a particular action.

The sentence reads:

As a consequence of the surgery that he underwent last month, the bowler was not fit to be

included in the team that would tour New Zealand.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> Use "a consequence" when describing a result or outcome of an action.

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13. Select the option that best fills in the blank and completes the sentence given below.

(1) Much

(2) Many

(3) Little

(4) Any

Correct Answer: (2) Many

Solution: The appropriate choice here is "many", as it refers to countable items, such as books.

The sentence reads:

Many of the books I need for my research are not available in the library.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Use "many" for countable nouns and "much" for uncountable nouns.

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14. Select the option that best fills in the blank and completes the sentence given below.

(1) will come

(2) comes

(3) come

(4) had came

Correct Answer: (1) will come

Solution: The correct answer is "will come" because the sentence refers to a future action.

The sentence reads:

I will call you when the teacher will come to the class.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Use "will" when referring to future actions or events.

---

15. Select the option that best fills in the blank and completes the sentence given below.

(1) have watched

(2) watched

(3) are watching

(4) have been watching

Correct Answer: (4) have been watching

Solution: The correct answer is "have been watching", as it indicates an action that started in the past and is still ongoing.

The sentence reads:

They have been watching the TV for more than five hours now.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Use "have been watching" for actions that started in the past and continue into the present.

---

16. Select the option that best gives the meaning of the word/phrase in bold.

(1) structural

(2) vivid

(3) tangible

(4) natural

Correct Answer: (3) tangible

Solution: The word "tangible" means something that can be touched or perceived physically. It refers to something real or concrete.

The correct sentence is:

> I wonder how Rajiv manages to sustain on such a small allowance.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> "Tangible" refers to something that is real and can be touched or perceived.

---

17. Select the option that best gives the meaning of the word/phrase in bold.

(1) suffer

(2) relish

(3) enjoy

(4) forget

Correct Answer: (2) relish

Solution: The word "relish" means to enjoy something immensely or savor it. It fits the context of the sentence, indicating enjoyment.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Use "relish" to indicate great enjoyment of something.

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18. Select the option that best gives the meaning of the word/phrase in bold.

(1) prepared

(2) projected

(3) sponsored

(4) sophisticated

Correct Answer: (1) prepared

Solution: The word "prepared" means to make ready for use or consideration. It refers to something that has been made or arranged for a particular purpose.

The correct sentence is:

There have been many proposed alternatives to the conventional petrol- or diesel-powered cars.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> "Prepared" refers to something that has been made ready for a particular use.

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19. Select the option that best completes the given sentence.

(1) provoked

(2) displayed

(3) defined

(4) substantiated

Correct Answer: (2) displayed

Solution: The appropriate word is "displayed", meaning to show or make visible. The sentence makes sense when it reads:

A research has displayed the proposition that tiny babies are capable of very fine

auditory discrimination.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> "Displayed" is used when referring to showing or making something visible.

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20. Select the option that best completes the given sentence.

(1) purposeful

(2) focused

(3) intensive

(4) determined

Correct Answer: (1) purposeful

Solution: The appropriate choice here is "purposeful", as it refers to a clear aim or objective. The sentence reads:

Quiet, reflective time is just as important for children as any purposeful activity.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Use "purposeful" when describing actions with a clear goal or intent.

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21. Select the option that best completes the given sentence.

(1) Much

(2) Little

(3) Many

(4) Any

Correct Answer: (3) Many

Solution: The appropriate choice is "Many", as it refers to countable items, such as books. The sentence reads:

Many of the books I need for my research are not available in the library.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> Use "many" for countable nouns and "much" for uncountable nouns.

---

22. Select the option that best completes the given sentence.

(1) structural

(2) vivid

(3) tangible

(4) natural

Correct Answer: (3) tangible

Solution: The word "tangible" means something that can be touched or perceived physically. It refers to something real or concrete.

The correct sentence is:

I wonder how Rajiv manages to sustain on such a small allowance.

Thus, the correct answer is option (3).

> **Quick Tip**
> "Tangible" refers to something that is real and can be touched or perceived.

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23. Select the option that best arranges the sentences in the correct order to form a meaningful paragraph.

(1) C, A, B, E, D

(2) C, B, A, D, E

(3) C, E, A, B, D

(4) C, D, B, E, A

Correct Answer: (1) C, A, B, E, D

Solution: The correct arrangement is:

C. Japan is often described as a nation that loves details.

A. There are double handrails for people of various heights and museum-worthy manhole covers.

B. That characteristic isn't unique to Japan – after all, Switzerland's detailed timetables are legendary.

E. In fact, there's a sense for the sort of traditional artists who do this: shokunin.

D. Japan has a long history of taking the time to perfect things in minute detail.

Thus, the correct answer is option (1).

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24. Select the option that best arranges the sentences in the correct order to form a meaningful paragraph.

(1) C, A, B, E, D

(2) C, E, A, B, D

(3) D, E, A, B, C

(4) C, D, E, B, A

Correct Answer: (2) C, E, A, B, D

Solution: The correct order is:

C. In addition to access to capital and talent to innovate, other ways to incentivize innovation include an efficient regulatory system.

E. In addition to supporting knowledge-based innovation, scientific regulatory regimes also have economic incentives to come to fruition.

A. There are various benefits that help businesses grow and scientists prosper, including greater intellectual property.

B. Such systems could help avoid the potential threats, scientifically speaking.

D. Finally, such investments could help improve research and innovation in today's research and development landscape.

Thus, the correct answer is option (2).

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25. Given below are five sentences, labelled A, B, C, D, and E. They are NOT in a meaningful order. Select the option that arranges the sentences in the correct order to

form a meaningful paragraph.

(1) A, B, C, D, E

(2) C, A, B, E, D

(3) D, A, E, B, C

(4) C, D, E, A, B

Correct Answer: (1) A, B, C, D, E

Solution: The correct arrangement follows the logical sequence in which each sentence transitions smoothly to the next one. The sentences convey a coherent thought when arranged as A, B, C, D, and E.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When arranging sentences, look for transition words and phrases that connect ideas and create a logical flow.

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26. Given below are five sentences, labelled A, B, C, D, and E. They are NOT in a meaningful order. Select the option that arranges the sentences in the correct order to form a meaningful paragraph.

(1) A, B, C, D, E

(2) C, A, B, E, D

(3) D, A, E, B, C

(4) C, D, E, A, B

Correct Answer: (4) C, D, E, A, B

Solution: The sentences convey a logical progression of ideas when arranged in the correct order. The best sequence is C, D, E, A, B.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Pay attention to how each sentence connects to the previous one for logical progression when arranging paragraphs.

27. Read the passage below and answer the questions that follow.

(1) a few people today can converse in English

(2) with travel more people are familiar with a foreign language

(3) the better communities have spawned an interest in languages

(4) knowing Portuguese is not sufficient to travel around Brazil

Correct Answer: (1) a few people today can converse in English

Solution: The passage suggests that fewer people are able to converse in English today. The sentence reflects this idea as the correct answer.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When analyzing passages, look for the sentence that best supports the overall message.

28. Select the option that best fills in the blank and completes the sentence given below.

(1) as different languages can have different applications

(2) especially when there are different linguistic scripts involved

(3) as people have different reasons for learning a language

(4) given a varying difference in the ability to speak different languages

Correct Answer: (1) as different languages can have different applications

Solution: The appropriate option fits the sentence based on the logical flow of ideas. It emphasizes that different languages have diverse uses, making the first option the correct choice.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Consider the context when filling in the blank; choose the option that logically completes the idea.

29. The writer mentions his/her linguistic abilities in German and Arabic to illustrate

the difficulty in drawing a connection between language acquisition and intelligence.

(1) as different languages can have different applications

(2) especially when there are different linguistic scripts involved

(3) as people have different reasons for learning a language

(4) given a varying difference in the ability to speak different languages

Correct Answer: (2) especially when there are different linguistic scripts involved

Solution: The correct option fits the context of the passage as it addresses the challenge of acquiring languages with different scripts. This connection is key to understanding language acquisition in the passage.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Pay attention to linguistic features like scripts when analyzing language acquisition.

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30. The word "monoglot" refers to a person who is:

(1) multilingual

(2) monolingual

(3) bilingual

(4) multilingual

Correct Answer: (2) monolingual

Solution: A "monoglot" refers to a person who speaks only one language, making "monolingual" the correct answer.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> A monoglot speaks only one language, while a multilingual speaks multiple languages.

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31. Read the passage below and answer the questions that follow.

(1) people today can converse in English

(2) travel more people are familiar with a foreign language

(3) the better communities have spawned an interest in languages

(4) knowing Portuguese is not sufficient to travel around Brazil

Correct Answer: (1) people today can converse in English

Solution: This option best completes the sentence based on the context of the passage, which emphasizes the role of English in global communication.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> In passages discussing global communication, consider how languages are used in international contexts.

Sub-Section Number: 3	
Sub-Section Id: 9046842303	
Question Shuffling Allowed: Yes	

Question Id: 90468410707	
Question Type: COMPREHENSION	
Sub Question Shuffling Allowed: Yes	
Group Comprehension Questions: No	
Question Numbers: 32 to 36	

Read the passage below and answer the questions that follow.

Popular reporting about disasters in poorer and developing countries usually begins with the spectacle, and focuses on post-event relief and reconstruction operations. These accounts follow a straightforward narrative: they acknowledge the absence or failure of early warning systems, and explain that the affected society was vulnerable to natural hazards because of developmental failures, outdated scientific expertise and political resistance to global best practices. Having established the problem and its likely causes, media coverage shifts to describe the efforts of the "international community" in coordinating the flow of aid, knowledge, and technology into the affected region. Finally, reports quote foreign leaders

and experts proclaiming that much of the damage could have been avoided by investing in social resilience and empowering civil society to counter governmental inefficiencies, neglect, corruption, and arbitrariness.

These accounts - drawing a direct relationship between developmental and technological deficiencies, the state's legitimacy to govern, and its moral obligation to seek foreign assistance - highlight the insight that political legitimacy is historically a function of scientific knowledge and expertise... Victorian colonisers argued that 'savages', unable to master natural hazards, needed colonial rule for their own protection. In our time, governments play the same hand when they characterise migrants and refugees as unintelligent, disease-ridden, and morally tainted swarms that threaten natural resources, dishonour national values, and compromise citizens' prosperity and wellbeing. Problems of nature cannot be meaningfully distinguished from the problems of society - to claim authority over the one is to take responsibility for the other...

After the earthquake (in 2010 in Haiti), national rescue, relief, and recovery operations were overwhelmed by the involvement of the US and the international community... disaster-relief operations began by treating the Haitian government as incompetent and untrustworthy... Virtually all international disaster-relief aid was spent on foreign institutions and experts... The UN, in turn, trusted its own agencies, foreign NGOs, and corporations to attend to restoring public utilities and services... In April 2011, 40 Haitian social organisations chastised the IHRC for extending centuries of concern and dependence - a call-back to colonial discourses that justified benevolent dictatorships by claiming scientific and moral superiority over subjugated people and their resources.

On 28 September 2018, the Indonesian island of Sulawesi suffered a 7.5 magnitude (Richter seismic scale) earthquake... In the aftermath, media commentary examined the crisis from two perspectives: first, it investigated the state's technical competence to handle preparedness and hazard mitigation. The answer, predictably, focused on the mismanagement and subsequent failure of the country's early warning system. Second, the commentary scrutinised the legal and political rationale underlying relief and recovery decisions: did Indonesia - as it had in the past - refuse foreign relief workers, aid, and expertise in a show of sovereign authority?

Sub Questions:

32. In this passage the writer makes the argument that:

(1) **with climate change, even developing countries need to be technologically prepared for natural disasters**

(2) **disaster relief work by international agencies often impinge on the sovereign rights of a developing country**

(3) **developing countries are ill-equipped to unilaterally handle the effects of natural calamities**

(4) **self-sufficiency and preparedness are vital especially in developing countries in reacting to natural calamities**

Correct Answer: (1) with climate change, even developing countries need to be technologically prepared for natural disasters

Solution: The writer emphasizes that the impact of climate change requires even developing countries to invest in technology and preparedness for natural disasters. This would help them respond effectively to such calamities.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When reading about challenges faced by developing countries, pay attention to the emphasis on technological advancements needed to cope with global issues like climate change. This often requires more than just basic infrastructure and includes modern technology for preparedness.

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33. After a calamity in a developing country, the author believes that the media typically does all of the following, EXCEPT:

(1) **blames the host country for their lack of scientific expertise and equipment**

(2) **lauds foreign agencies for their role in alleviating the fall-out of the disaster**

(3) **documents wasteful expenditure of funds on foreign experts and agencies**

(4) **catalogues the inefficiency and corruption of host governments in responding to the crisis**

Correct Answer: (3) documents wasteful expenditure of funds on foreign experts and agencies

Solution: The author notes that the media typically focuses on certain criticisms, such as blaming the host country for not having enough expertise or equipment, lauding foreign agencies, and highlighting governmental inefficiencies. However, it does not typically document the wasteful spending on foreign experts.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> When analyzing media coverage of global events, be aware of the tendency to either praise or criticize certain parties while often overlooking certain aspects like financial inefficiency. It's important to note the biases or gaps in reporting that may affect public perception.

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35. The writer claims that all of the following happened in the aftermath of the earthquake in Haiti, EXCEPT:

(1) massive international support for the Haitian government's rescue efforts

(2) the diversion of aid funds to international agencies and personnel

(3) the side-lining of domestic agencies in reconstruction efforts

(4) running down the Haitian government's efforts to tackle the situation

Correct Answer: (4) running down the Haitian government's efforts to tackle the situation

Solution: The writer mentions the negative aspects of foreign intervention but does not specifically state that there was an attempt to discredit the Haitian government's own efforts. This makes option (4) the correct choice as it did not happen according to the text.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Be sure to carefully distinguish between criticisms of external intervention and the assessment of the efforts of local authorities. Look for statements that refer to how local governments are represented or excluded.

36. The author mentions the 'Victorian colonisers' (paragraph 2) to draw a parallel between their attitudes and:

(1) today's media accounts of developing country responses to disasters

(2) the global views of people today about migrants and refugees

(3) their belief that colonial powers will squander their natural resources

(4) political legitimacy is linked to scientific knowledge and expertise

Correct Answer: (3) their belief that colonial powers will squander their natural resources

Solution: The author draws a parallel between the Victorian colonisers' attitudes and the belief that colonial powers were concerned about the misuse of resources in the colonies. This mindset reflected an assumption that local leaders could not manage their natural wealth effectively.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> Look for parallels drawn by the author between past colonial attitudes and modern responses to crises. Often, these comparisons are made to highlight the ongoing influence of historical ideas on contemporary thinking.

Sub-Section Number: 4	
Sub-Section Id: 9046842304	
Question Shuffling Allowed: Yes	

Question Id: 90468410713	
Question Type: COMPREHENSION	
Sub Question Shuffling Allowed: Yes	
Group Comprehension Questions: No	
Question Numbers: 37 to 41	

Read the passage below and answer the questions that follow.

Popular reporting about disasters in poorer and developing countries usually begins with the spectacle, and focuses on post-event relief and reconstruction operations. These accounts follow a straightforward narrative: they acknowledge the absence or failure of early warning systems, and explain that the affected society was vulnerable to natural hazards because of developmental failures, outdated scientific expertise and political resistance to global best practices. Having established the problem and its likely causes, media coverage shifts to describe the efforts of the "international community" in coordinating the flow of aid, knowledge, and technology into the affected region. Finally, reports quote foreign leaders and experts proclaiming that much of the damage could have been avoided by investing in social resilience and empowering civil society to counter governmental inefficiencies, neglect, corruption, and arbitrariness.

These accounts - drawing a direct relationship between developmental and technological deficiencies, the state's legitimacy to govern, and its moral obligation to seek foreign assistance - highlight the insight that political legitimacy is historically a function of scientific knowledge and expertise... Victorian colonisers argued that 'savages', unable to master natural hazards, needed colonial rule for their own protection. In our time, governments play the same hand when they characterise migrants and refugees as unintelligent, disease-ridden, and morally tainted swarms that threaten natural resources, dishonour national values, and compromise citizens' prosperity and wellbeing. Problems of nature cannot be meaningfully distinguished from the problems of society - to claim authority over the one is to take responsibility for the other...

After the earthquake (in 2010 in Haiti), national rescue, relief, and recovery operations were overwhelmed by the involvement of the US and the international community... disaster-relief operations began by treating the Haitian government as incompetent and untrustworthy... Virtually all international disaster-relief aid was spent on foreign institutions and experts... The UN, in turn, trusted its own agencies, foreign NGOs, and corporations to attend to restoring public utilities and services... In April 2011, 40 Haitian social organisations chastised the IHRC for extending centuries of concern and dependence - a call-back to colonial discourses that justified benevolent dictatorships by claiming scientific and moral superiority over subjugated people and their resources.

On 28 September 2018, the Indonesian island of Sulawesi suffered a 7.5 magnitude (Richter

seismic scale) earthquake... In the aftermath, media commentary examined the crisis from two perspectives: first, it investigated the state's technical competence to handle preparedness and hazard mitigation. The answer, predictably, focused on the mismanagement and subsequent failure of the country's early warning system. Second, the commentary scrutinised the legal and political rationale underlying relief and recovery decisions: did Indonesia - as it had in the past - refuse foreign relief workers, aid, and expertise in a show of sovereign authority?

Sub Questions:

37.Question ID: 90468410714 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 The phrase 'bombard people' in paragraph 1 means:

(1) to shower people

(2) to flood people

(3) to attack people

(4) to overwhelm people

Correct Answer: (4) to overwhelm people

Solution: The term "bombard people" in the context of the paragraph refers to overwhelming people with a situation or force. This matches the meaning of option (4), "to overwhelm people."

Thus, the correct answer is option (4).

> **Quick Tip**
>
> When encountering metaphors like "bombard people," consider the context. In many cases, it refers to overwhelming someone with something, such as information or a crisis.

38. Question ID: 90468410715 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 The author describes clothes as 'disposable items' because they can be:

(1) thrown away easily

(2) worn a few times and discarded

Correct Answer: (2) worn a few times and discarded

Solution: The author refers to clothes as "disposable items" because they are used briefly before being discarded, as is often the case with fashion trends or low-cost clothing. Thus, the correct option is (2).

Thus, the correct answer is option (2).

> **Quick Tip**
>
> When thinking about disposability in fashion, consider how quickly trends change and how items are discarded after a few uses, especially in the context of fast fashion.

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39. Question ID: 90468410716 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following sentences is NOT TRUE?

(1) The British are spending money they don't have on things they don't need.

(2) Donating to charities abroad has a negative influence on the environment.

(3) The Buy Nothing movement encourages people to embrace consumerism.

(4) The Buy Nothing groups have had an impact on social media advertisers.

Correct Answer: (3) The Buy Nothing movement encourages people to embrace consumerism.

Solution: The Buy Nothing movement promotes the idea of reducing unnecessary consumption. Therefore, option (3) is incorrect since it contradicts the core message of the movement, which encourages people to reduce their consumerist habits.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> Look for context clues in the passage to identify any statement that contradicts the main idea. In this case, the Buy Nothing movement opposes consumerism, not promotes it.

---

40. Question ID: 90468410717 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following sentences best captures the main idea of this text?

(1) Consumerism is rampant in Britain and people spend money they don't have on the things they don't need.

(2) The Buy Nothing movement, which began in Canada as a reaction to the consumerism, soon spread to America.

(3) The Buy Nothing movement promotes the idea of not buying things over extended periods of time, thus cutting down on consumption.

(4) Companies are slowly beginning to realise that they cannot force people to buy things through aggressive advertising and discount sales.

Correct Answer: (1) Consumerism is rampant in Britain and people spend money they don't have on the things they don't need.

Solution: The main idea of the text revolves around the prevalence of consumerism, where people spend money they don't have on unnecessary things. This is most clearly captured in option (1).

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When identifying the main idea of a passage, focus on the overall theme or argument that is consistently mentioned throughout the text.

41. Question ID: 90468410718 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 According to the author the 'buy nothing' movement is:

(1) more anti-consumerism

(2) an artefact of 'social media'

(3) glorifying 'penny-pinching'

(4) rejection of 'overconsumption'

Correct Answer: (1) more anti-consumerism

Solution: The "Buy Nothing" movement encourages anti-consumerist behaviors by discouraging unnecessary purchases, aiming to cut down on overconsumption. Therefore, the correct answer is (1).

Thus, the correct answer is option (1).

> **Quick Tip**
>
> The "Buy Nothing" movement focuses on rejecting unnecessary consumption, making it a form of anti-consumerism rather than just saving money or promoting frugality.

> **Reasoning and General Intelligence**
>
> **Reasoning and General Intelligence**
>
> The group number for this section is 3, and the Group Id is 9046841464. The group maximum and minimum duration are both set to 0. The attended group is not shown, and the break time is 0. The group marks are set to 40, and this group is not for the examiner.
>
> The section id for this part is 9046841529. It is Section Number 1 and is conducted online. The section is mandatory, and the number of questions is 28, with all 28 questions required to be attempted. The section marks are 40, and the mark is considered as answered, which is required for this section. The sub-section number is 1, with the Sub-Section Id being 9046842305. Question shuffling is allowed for the section.
>
> **Question Information:**
>
> The question id for this section is 90468410719. The question type is COMPREHENSION, and sub-question shuffling is allowed. The group comprehension questions are not allowed for this section, and the question numbers are 42 to 46.

Following are the criteria for admitting students to a Management Course:

The student candidate must:

1) be a graduate with at least 60% marks in the aggregate and more than 65% in English.

2) be of at least 20 years age as on 31 December 2019

3) have obtained at least 65% in the entrance test and more than 60% in the interview.

However, if a student fulfills all the above criteria EXCEPT:

4) at (1) and/or (2) above but has obtained at least 80% in the entrance test, the case should be referred to the Principal.

5) at (2) and/or (3) above but is an ST candidate securing more than 70% in English at the graduation stage, the case should be referred to the Director.

Based on the criteria given above and without assuming any additional information, you have to take a decision for the candidates whose profiles have been given in the five questions. Mark your answer by choosing the appropriate option in each case.

Sub Questions:

42. Question ID: 90468410720 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Sharmila was born in 1998 and as a commerce graduate scoring 67% in the aggregate as well as in English. She is an ST candidate who secured 62% in the interview and 65% in the entrance test. What decision would be taken for her?

(1) She would be admitted

(2) Her case is to be referred to the Principal

(3) Her case is to be referred to the Director

Correct Answer: (2) Her case is to be referred to the Principal

Solution: Based on the criteria, Sharmila is an ST candidate, and although she meets the academic requirements, her entrance and interview scores suggest a need for referral to the Principal as per the guidelines.

Thus, the correct answer is option (2).

---

43. Question ID: 90468410721 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Sambet passed the graduate examination in August 2017 at the age of 18 with 70% in English and 65% marks in the aggregate. He scored 68% in the entrance test and 60% in the interview. What decision would be taken for him?

(1) He would not be admitted

(2) He would be admitted

(3) His case is to be referred to the Principal

(4) His case is to be referred to the Director

Correct Answer: (2) He would be admitted

Solution: Sambet fulfills the academic and interview score requirements, and as he meets the criteria for admission, he would be admitted directly.

Thus, the correct answer is option (2).

---

44. Question ID: 90468410722 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Ankit obtained 78% in the entrance test and 62% in the interview. He was 19 years old when he passed his graduate examination in June 2018 with 65% in the aggregate as well as in English. He is an ST candidate. What decision would be taken for him?

(1) He would not be admitted

(2) He would be admitted

(3) His case is to be referred to the Principal

(4) His case is to be referred to the Director

Correct Answer: (3) His case is to be referred to the Principal

Solution: Ankit is an ST candidate and although his entrance and interview scores meet the requirements, due to his academic status, his case should be referred to the Principal for further review.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> When dealing with cases involving specific categories like ST, remember to refer candidates whose scores fall slightly outside the standard admission criteria to the Principal or Director for further evaluation.

---

45. Question ID: 90468410723 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Sakshi passed her graduate examination scoring 70% in the aggregate and 72% in English. She was born into an ST family in 2001 and scored 65% in the interview and entrance test. What decision would be taken for her?

(1) She would be admitted

(2) Her case is to be referred to the Principal

(3) Her case is to be referred to the Director

Correct Answer: (2) Her case is to be referred to the Principal

Solution: Sakshi qualifies for admission based on her academic scores and category. However, due to her specific academic background and criteria related to ST candidates, her case should be referred to the Principal for further review.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Always check for candidate categories like ST, which may require further review by higher authorities, even if they meet the general criteria for admission.

47. Question ID: 90468410725 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 A team of four with equal number of boys and girls is to be formed from among four girls A, B, C and D and four boys K, L, M and N with the following conditions.

B and M will not be together. C and L will not be together. A and K must go together. D and M will go together. B cannot go with S. A will be released, if M is selected and vice-versa. Which of the following teams can be formed?

(1) 90468451783 BDLN

(2) 90468451784 ACLN

(3) 90468451785 CNBS

(4) 90468451786 CBNB

Correct Answer: (3) 90468451785 CNBS

Solution: Based on the given constraints, the team that satisfies all conditions is CNBS. Thus, the correct answer is option (3).

> **Quick Tip**
>
> Carefully consider the given constraints when forming teams, and ensure that all restrictions are met when making selections.

48. Question ID: 90468410726 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 A team for a work with at least one girl is to be formed from among five boys M, N, S, T and Z and two girls P, Q and R with the following conditions.

M and N cannot go together. P and Q must go together. M will not go with S. R will go with P.

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Which of the following teams can be formed?

(1) 90468451731 PQGZ

(2) 90468451732 MNSP

(3) 90468451733 SQMT

(4) 90468451734 PQZR

Correct Answer: (4) 90468451734 PQZR

Solution: The team that satisfies all the given conditions is PQZR. This combination adheres to all the restrictions provided.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> When forming a team, check each constraint carefully, especially when there are conditions about who can or cannot be together.

---

49. Question ID: 90468410729 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following is the relationship between M and X?

(1) M = A's brother, X = S's brother

(2) M = A's brother, X = A's father

(3) M = S's brother, X = A's father

(4) M = A's brother, X = A's mother

Correct Answer: (1) M = A's brother, X = S's brother

Solution: From the options provided, option (1) correctly describes the relationship between M and X as per the given data.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> Look closely at the family relationships, and match the names correctly based on the clues provided in the question.

50. Question ID: 90468410730 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following conclusions is valid based on the statements provided below?

(1) All educated people have men in their families.

(2) Some educated people have men in their families.

(3) All educated people have women in their families.

(4) Some educated people have women in their families.

Correct Answer: (4) Some educated people have women in their families

Solution: Based on the statement and options, option (4) correctly identifies that some educated people may have women in their families. This conclusion follows from the given context.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> When deducing conclusions, ensure that the logic of the statements follows directly from the given data.

---

47. Question ID: 90468410725 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 A team for which equal number of boys and girls is to be formed from among four boys A, B, C and D and four girls K, L, M, and N with the following conditions.

(1) B and M will not be together

(2) L and N will not be together

(3) C and M will be together

(4) M will be released, if M is selected and vice-versa

Correct Answer: (3) C and M will be together

Solution: According to the given conditions, B and M cannot be together, and L and N cannot be together either. C and M should be selected together as per the rule. Hence, option (3) is the correct choice.

Thus, the correct answer is option (3).

---

48. Question ID: 90468410726 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 A team of four with at least two girls is to be formed from among five boys M, N, S, T, and Z and three girls P, Q, and R with the following conditions.

(1) M and P must go together

(2) T and R cannot go together

(3) P and Q will not go together

(4) M will go with P only

Correct Answer: (1) M and P must go together

Solution: Since M and P must go together and the other conditions do not prohibit their selection, option (1) is the correct answer.

Thus, the correct answer is option (1).

---

49. Question ID: 90468410729 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following teams can be formed from the following?

(1) S, N, P, Q

(2) M, S, R, P

(3) M, N, Q, R

(4) T, S, M, Q

Correct Answer: (2) M, S, R, P

Solution: Checking the conditions for each of the options, the team M, S, R, P satisfies the given restrictions, making option (2) the correct answer.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> Always check whether the proposed team adheres to the given conditions such as team size, gender balance, and the conditions on specific individuals being grouped together or kept apart.

---

50. Question ID: 90468410730 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following options shows a valid relationship?

(1) A = B's mother's mother

(2) M is a brother of B

(3) T is a son of G

(4) X is a daughter of M's maternal grandmother

Correct Answer: (4) X is a daughter of M's maternal grandmother

Solution: Option (4) correctly establishes the relationship between M and X. M's maternal grandmother is X's mother, thus this option is logically correct.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Use logical reasoning to figure out the family relationships in such questions. The relationships between family members, especially through maternal and paternal lines, can often be tricky to establish, so double-check each option.

---

51. Question ID: 90468410732 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Read the given statements and conclusions carefully and decide which of the conclusions logically follows from the

statements.

Statement

(1) Some tigers are vertebrates.

(2) All vertebrates are animals.

(3) All tigers are mammals.

Conclusion

(1) Some animals are vertebrates.

(2) Some animals are mammals.

(3) No animal is a mammal.

(1) Only conclusion I follows

(2) Only conclusion II follows

(3) Both conclusions I and II follow

(4) Only conclusion III follows

Correct Answer: (3) Both conclusions I and II follow

Solution: From the statements given, conclusion I follows because if some tigers are vertebrates and all vertebrates are animals, then some animals are vertebrates. Similarly, conclusion II also follows as all vertebrates are animals and some of them are tigers, which are mammals.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> When analyzing conclusions, always check if the statements logically imply the conclusion or if they just seem plausible. Remember, a correct conclusion must be strictly supported by the statements given.

---

52. Question ID: 90468410733 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 How is D exactly related to D?

Statement

(1) B is the sister C's mother of A, who is the brother of D.

(2) C is the wife of B and has a brother M and a son A whose sister is D.

(1) Statement I alone is sufficient.

(2) Statement II alone is sufficient.

(3) Either statement I or II alone is sufficient.

(4) Both statements I and II together are sufficient.

Correct Answer: (4) Both statements I and II together are sufficient.

Solution: Statement I and II together provide enough information to understand the family relationship. Statement I tells that C is the mother of A and D's brother, while Statement II adds that C's wife and her child are connected to the family. This combination allows us to conclude the relationship between D and A.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> Look for intersections in the statements that help clarify the connections in relationships, especially when the two statements alone may not provide a complete picture.

---

53. Question ID: 90468410734 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Which of the following statements logically follows from the statements?

A, B, C, D, E, F, G and H are in two rows, each having four houses. The houses in one row are facing the houses in the other row. Which house is facing E?

(1) The house opposite E is F facing G.

(2) D is facing E.

(3) C is opposite F.

(4) B is facing G.

Correct Answer: (3) C is opposite F.

Solution: The correct conclusion comes from understanding how the arrangement of the houses works and interpreting their opposite placements based on the given row arrangement.

Thus, the correct answer is option (3).

54. Question ID: 90468410735 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Given below is a question followed by two statements, I and II, each containing some information. Decide which of the statements contain data that are sufficient to answer the question.

Who is the youngest among M, N, O, and P?

(1) M is younger than N.

(2) M is older than N and Q is the oldest.

(1) Statement I alone is sufficient.

(2) Statement II alone is sufficient.

(3) Either statement I or II alone is sufficient.

(4) Both statements I and II together are sufficient.

Correct Answer: (1) Statement I alone is sufficient.

Solution: Statement I provides direct information about M's age relative to N, which can help determine who is the youngest. Statement II adds unnecessary information that doesn't directly answer the question.

Thus, the correct answer is option (1).

> **Quick Tip**
>
> When identifying which statement provides enough information, focus on direct comparisons that allow you to establish a clear answer without extraneous details.

55. Question ID: 90468410739 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Will the number be always divisible by 9?

(1) Statement I alone is sufficient

(2) Statement II alone is sufficient

(3) Either statement I alone or statement II alone is sufficient

(4) Both statements I and II together are not sufficient

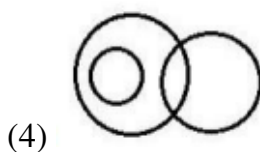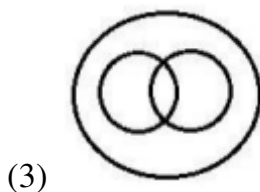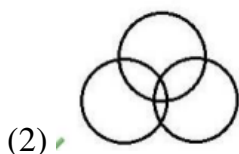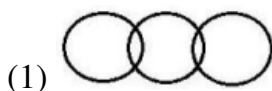**Correct Answer:** (1) Statement I alone is sufficient

Solution: Statement I provides a rule for divisibility by 9 which is sufficient to determine if the number will always be divisible by 9. Statement II, however, does not provide sufficient information on its own. Thus, option (1) is correct.

Thus, the correct answer is option (1).

Quick Tip

When dealing with divisibility rules, always check if a single statement provides enough information to answer the question. In this case, the divisibility rule in Statement I is enough.

---

56. Question ID: 90468410740 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Select the Venn diagram that best represents the relationship between the following classes: Football fans, Athletes, Students

(1)

(2)

(3)

(4)

Correct Answer: (3)

Solution: The Venn diagram for this question needs to represent the intersection between football fans, athletes, and students. Option (3) shows an accurate intersection where each group is distinct but has some overlap, correctly representing the relationship.

Thus, the correct answer is option (3).

Quick Tip

In problems involving sets and Venn diagrams, focus on how the categories overlap. Football fans, athletes, and students have distinct but sometimes overlapping characteristics. The correct diagram will reflect this.

---

57. Question ID: 90468410744 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Study the given symbols.

A @ B means A is not smaller than B.

A > B means A is not greater than B.

A A > B means A is neither greater nor equal than B.

Based on the symbols, read the given statements and conclusions carefully and decide which of the conclusions is/are true.

(1) A) R @ Q

(2) B) S

(3) C) Q > S

Correct Answer: (2) Both conclusions I and II are true.

Solution: Conclusion I follows from the given symbols, as A @ B means A is not smaller than B. Conclusion II is also true, as S

Thus, the correct answer is option (2).

Quick Tip

To solve symbol-based questions, focus on interpreting the logical relationships between symbols and their corresponding meanings. Identify which conclusions follow directly from these relationships.

---

58. Question ID: 90468410745 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Study the given symbols.

A @ B means A is not smaller than B.

A # B means A is not greater than B.

A $ B means A is neither smaller nor equal to B.

A % B means A is neither greater than nor equal to B.

A & B means A is neither smaller than nor greater than B.

Based on the symbols, read the given statements and conclusions carefully and decide which of the conclusions is/are true.

(1) I & M # P

(2) II & Q $ S

(3) III & $ R

(4) I & K # H

Correct Answer: (2) II & Q $ S

Solution: The symbol meanings should be interpreted in the given statement to evaluate the conclusions. Based on the rules, the second statement holds true.

Thus, the correct answer is option (2).

> **Quick Tip**
>
> When decoding such symbols, pay attention to how they define relational operators, such as greater than or equal, to draw valid conclusions.

59. Question ID: 90468410746 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 If the signs " + " and " - " are interchanged in each of the equations given as options, then select the option which is correct.

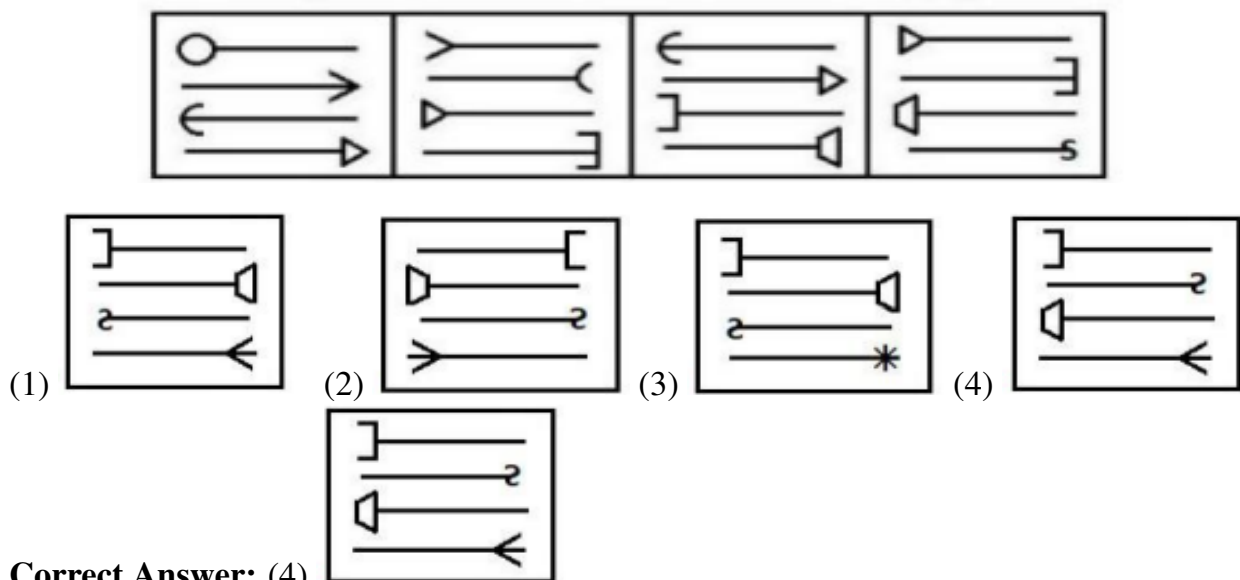(1) 4 + 3 - 2 = 2 + 12 + 6

(3) 4 + 2 - 2 = 5

(4) 4 + 3 - 2 = 6

Correct Answer: (3) 4 + 2 - 2 = 5

Solution: By switching the signs, it results in option (3) becoming a valid equation.

Thus, the correct answer is option (3).

> **Quick Tip**
>
> When solving such equations, always apply the sign changes as described in the problem, and check the validity of the result step-by-step.

---

60. Question ID: 90468410747 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Select the figure that will come next in the following figure series.

(1)   (2)   (3)   (4)
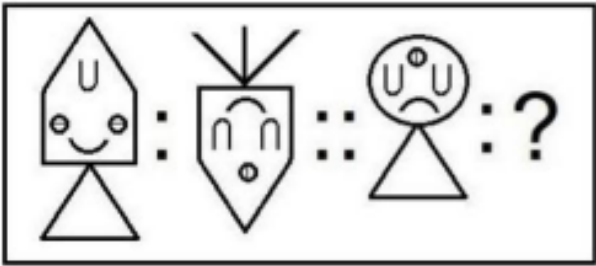
Correct Answer: (4)

Solution: The pattern in the given series is as follows: the shapes are rotating while alternating between arrows and diamonds. Based on the progression, the figure that comes next is option (4).

Thus, the correct answer is option (4).

> **Quick Tip**
>
> When solving figure series questions, look for rotational, reflective, or alternating patterns in shapes, arrows, or colors. This can help predict the next figure in the series.

---

62. Question ID: 90468410750 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No Correct Marks: 1 Wrong Marks: 0 Select the option that is related to the third figure in the same way as the second figure is related to the first figure.

90468437424

90468437425

90468437426

90468437427

Correct Answer: (4) 90468437427

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Solution:

The relation between the figures is based on the pattern formed by the shapes and their orientation. The second figure follows the pattern from the first figure, and the correct option completes the pattern for the third figure.

Thus, the correct answer is option (4).

> **Quick Tip**
>
> When solving pattern-related questions, look for consistency in shapes, directions, or other elements. The pattern can often be identified by observing the changes between consecutive figures.

Question Id: 90468410741
Question Type: COMPREHENSION
Sub Question Shuffling Allowed: Yes
Group Comprehension Questions: No
Question Numbers: 63 to 64

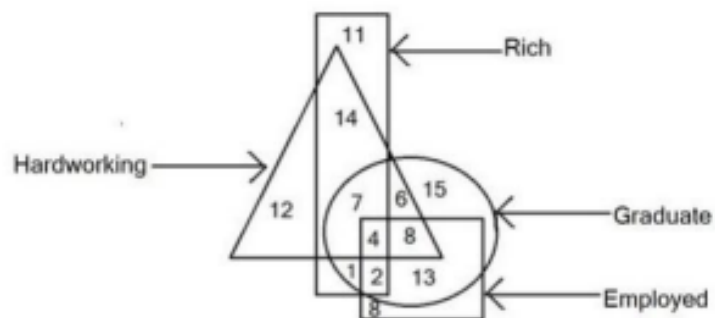**Study the given figure and answer the question that follows:**

Figure 1: Venn Diagram showing Rich, Graduate, Hardworking, and Employed

In the figure, the triangle stands for 'hardworking'; the circle stands for 'graduate'; the rectangle stands for 'rich' and the square stands for 'employed'. The numbers in different segments show the number of persons.

63. How many employed graduates are hardworking but NOT rich?

(a) 3

(b) 4

(c) 6

(d) 8

Correct Answer: (d) 8

Solution: The number of employed graduates who are hardworking but not rich can be determined by analyzing the given diagram and the corresponding data. The correct answer is option (d), which reflects the number "8" from the diagram.

Thus, the correct answer is option (d).

> **Quick Tip**
>
> When solving Venn diagram-related problems, carefully observe how each segment is defined and ensure you account for all relevant intersections.

---

64. How many hardworking graduates are either rich or employed but NOT both?

(a) 15

(b) 14

(c) 13

Correct Answer: (a) 15

Solution: The number of hardworking graduates who are either rich or employed but not both can be determined by analyzing the given diagram and the corresponding data. The correct answer is option (a), which reflects the number "15" from the diagram.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> When solving Venn diagram-related problems, carefully observe how each segment is defined and ensure you account for all relevant intersections.

---

65. Should the non-government organisations be allowed to work in government

schools to enhance the quality of education?

Argument

Arguments:

I. Yes. The non-government organisations would involve themselves more passionately than the Government to improve the quality of education.

II. No. The non-government organisations cannot harness the knowhow to improve the quality of teaching.

(a) Only argument I is strong

(b) Only argument II is strong

(c) Both arguments I and II are strong

(d) Neither argument I nor II is strong

Correct Answer: (a) Only argument I is strong

Solution: Argument I is strong because non-government organisations can indeed play a passionate role in improving education, potentially filling the gaps where the government might fall short. Argument II is weak because non-government organisations do have the expertise to improve teaching in specific areas.

Thus, the correct answer is option (a).

Quick Tip

When evaluating arguments, consider whether they are logically sound and supported by facts or real-world applications. In this case, argument I is strong because it reflects an actual potential benefit, while argument II lacks sufficient evidence.

---

66. Among five objects, S is twice as heavy as Q. P is one and a half times as heavy as R, which is twice as heavy as T. T is half as heavy as Q. Which is the heaviest of all the five objects?

(a) R

(b) S

(c) Q

(d) P

Correct Answer: (b) S

Solution: By considering the relationships between the weights of the objects: - $S = 2 \times Q$ - $P = 1.5 \times R$ - $R = 2 \times T$ - $T = 0.5 \times Q$

We can calculate the relative weights of each object and determine that S is the heaviest.

Thus, the correct answer is option (b).

> **Quick Tip**
>
> When dealing with relative weight problems, it helps to express the weights of all objects in terms of a single variable (e.g., Q in this case) to easily compare their values.

---

67. Read the given statements and conclusions carefully and decide which of the conclusions logically follow(s) from the statements.

Statements:

Some streams are rivers. Some rivers are water bodies.

Conclusions:

No water body is stream. Some streams are water bodies. Some rivers are both streams and water bodies.

(a) Both conclusions I and II follow

(b) Both conclusions II and III follow

(c) Both conclusions I and III follow

(d) None of the conclusions I, II, or III follow

Correct Answer: (d) None of the conclusions I, II, or III follow

Solution: Analyzing the statements: - Statement 1 tells us some streams are rivers, but it does not conclude that no water body can be a stream. - Statement 2 does not imply any conclusion about whether some rivers are both streams and water bodies.

Thus, none of the conclusions logically follow from the statements.

68. A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question: Should the non-government organisations be allowed to work in government schools to enhance the quality of education?

Arguments:

Yes. The non-government organisations would involve themselves more passionately than the Government to improve the quality of education. No. The non-government organisations cannot harness the knowhow to improve the quality of teaching.

(a) Only argument I is strong

(b) Only argument II is strong

(c) Both arguments I and II are strong

(d) Neither argument I nor II is strong

Correct Answer: (a) Only argument I is strong

Solution: Argument I is strong because non-government organisations might indeed bring more passion and dedication, whereas Argument II is weak because it makes an assumption about the capabilities of non-government organisations, which may not be accurate. Thus, the correct answer is option (a).

69. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.

Statement: Doctors, when posted in rural areas, should be given additional incentives.

Assumptions: (1) Many doctors do not prefer to go to rural areas. (2) Additional incentives are likely to motivate doctors to go to rural areas.

(a) Only assumption I is implicit

(b) Only assumption II is implicit

(c) Both assumptions I and II are implicit

(d) Neither assumption I nor II is implicit

Correct Answer: (c) Both assumptions I and II are implicit

Solution: The statement suggests that doctors should be given incentives to motivate them to work in rural areas. Implicit in this statement is the assumption that many doctors do not prefer to work in rural areas (assumption I), and that offering additional incentives would encourage them to do so (assumption II).

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When analyzing statements with assumptions, look for logical connections between the claim made in the statement and the underlying reasons or needs that support the statement.

---

70. You are given a question and two statements. Identify which of the statements is/are sufficient/necessary to answer the question.

Question: Among four objects A, B, C and D, which is the lightest of all?

Statements:

I. D is twice as heavy as B and one and a half times as heavy as A. C is twice as heavy as A.

II. D weighs as much as A, B, and C together and B weighs half as much as A and C together with A weighing more than C.

(a) Statement I alone is sufficient

(b) Statement II alone is sufficient

(c) Either statement I alone or statement II alone is sufficient

(d) Both the statements I and II together are necessary

Correct Answer: (c) Either statement I alone or statement II alone is sufficient
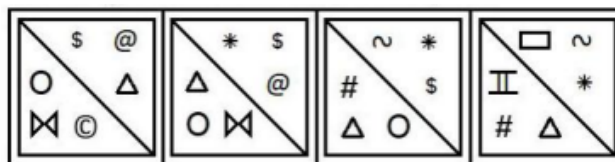
Solution: Statement I provides a clear comparison of the weights of all the objects relative to each other, which allows us to deduce which object is the lightest. Statement II provides sufficient information to calculate the weights of A, B, C, and D, again revealing which one is the lightest. Hence, either statement I or II on its own is enough to determine the lightest object.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When dealing with questions involving relative comparisons, check if the statements provide enough information for a direct comparison of the objects involved. Sometimes, only one statement is enough to deduce the answer.
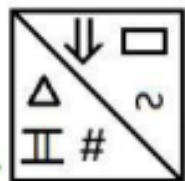
70. Select the figure that will come next in the following series.

(a)

(b)

(c)

(d)

Correct Answer: (b)

Solution: The relation between the figures is based on the patterns of shapes and their transitions. The correct option follows the same pattern observed in the series. Hence, the figure represented by option (b) completes the series.

Thus, the correct answer is option (b).

Quick Tip

When solving pattern-related questions, focus on the changes in shapes, orientations, or elements between each figure. Identifying these patterns will help predict the next item in the series.

Question Id: 90468410751
Question Type: COMPREHENSION
Sub Question Shuffling Allowed: Yes
Group Comprehension Questions: No
Question Numbers: 72 to 75

Study the given figure and answer the question that follows:

In the figure, the pie charts represent the number of workers in Company P (2520 workers) and Company Q (3240 workers) from five states A, B, C, D, and E. The degrees in each chart represent the distribution of workers from these states in each company.

73. Which of the states has more number of workers in Company P than in Company
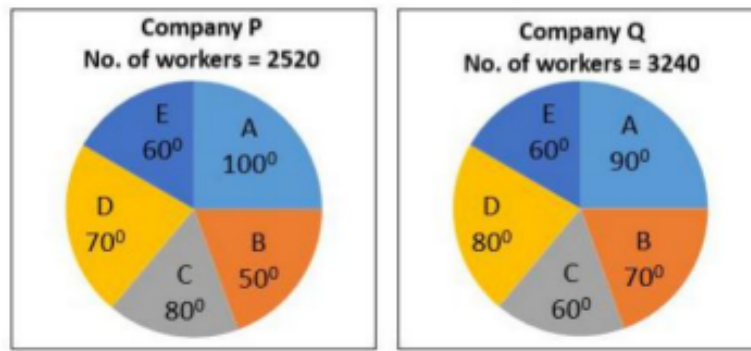
Figure 2: Pie Charts showing the number of workers and their distribution in Companies P and Q

Q?

(a) A

(b) B

(c) C

(d) E

Correct Answer: (c) C

Solution: By comparing the number of workers from each state in Company P and Company Q, it can be observed that state C has more workers in Company P than in Company Q. Thus, the correct answer is option (c).

> **Quick Tip**
>
> When comparing data in pie charts, ensure that you focus on the segment sizes for each category (state) in both charts. This will help you accurately identify which state has more workers in one company than the other.

---

74. The number of workers from states C, D, and E in Company Q is approximately what percent of the number of workers from the same states in Company P (rounded off to the nearest integer)?

(a) 109%

(b) 112%

(c) 122%

(d) 124%

Correct Answer: (c) 122%

Solution: By calculating the number of workers from states C, D, and E in Company Q and comparing it with the same number in Company P, we find that the number of workers in Company Q is approximately 122% of those in Company P.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When calculating percentages, first find the total number of workers in each group, then use the formula:
> $$\text{Percentage} = \left(\frac{\text{Total in Q}}{\text{Total in P}} \right) \times 100$$
> Ensure you round the result to the nearest integer for clarity.

---

75. The ratio of male to female workers from states A and B together is 4 : 3 for Company P and is 5 : 7 for Company Q. From both the states, the number of female workers in Company Q exceeds the number of female workers in Company P by:

(a) 270

(b) 290

(c) 350

(d) 390

Correct Answer: (d) 390

Solution: To solve this, we need to calculate the number of female workers in both Company P and Company Q based on the given ratios for states A and B. After calculating the number of female workers in both companies, we can determine that the number of female workers in Company Q exceeds the number in Company P by 390.

Thus, the correct answer is option (d).

Question Id: 90468410756	
Question Type: COMPREHENSION	
Sub Question Shuffling Allowed: Yes	
Group Comprehension Questions: No	
Question Numbers: 76 to 79	

Percentage of marks secured by five students in five subjects

(Subject-wise maximum marks are given in the brackets)

Student	Physics (150)	Chemistry (150)	Zoology (150)	English (100)	Hindi (75)
P	80	75	65	72	74
Q	68	73	72	74	77
R	70	67	68	68	70
S	75	80	75	73	80
T	70	68	76	75	69

Figure 3: Percentage of marks secured by five students in five subjects

In the figure, the table shows the percentage of marks secured by five students (P, Q, R, S, and T) in five subjects (Physics, Chemistry, Zoology, English, and Hindi). The subject-wise maximum marks are given in brackets.

76. What is the average marks secured by student S in all the five subjects?

(a) 94.8

(b)95.2

54

(c)95.6

(d)96.8

Correct Answer: (c) 95.6

Solution: To calculate the average marks, we need to sum the marks obtained by student S in all five subjects and divide it by the total number of subjects (5). The total marks obtained by student S are:

$$\text{Total Marks} = 75 + 80 + 80 + 73 + 80 = 388$$

Now, to find the average:

$$\text{Average Marks} = \frac{\text{Total Marks}}{5} = \frac{388}{5} = 95.6$$

Thus, the correct answer is option (c).

> **Quick Tip**
>
> To calculate the average, sum all the marks for each subject and divide by the number of subjects. This will give you the mean value, which is the average marks secured by the student.

---

77. How many students have secured the highest marks in more than one subject?

(a) 4

(b) 3

(c) 2

(d) 1

Correct Answer: (c) 2

Solution: By reviewing the table, we observe the highest marks secured in each subject. The students who scored the highest marks in more than one subject are: - Student P secured the highest marks in Physics (80- Student S secured the highest marks in Chemistry (80

Thus, the correct answer is option (c).

78. A student is declared 'failed' if he/she secures less than 100 marks in subjects carrying 150 marks each and/or less than 70 marks in the subject carrying 100 marks and/or less than 50 marks in the subject carrying 75 marks, then how many students passed the examination?

(a) 1

(b) 2

(c) 3

(d) 4

Correct Answer: (c) 3

Solution: In the given problem, a student will be declared as 'failed' if: - They secure less than 100 marks in any subject carrying 150 marks. - They secure less than 70 marks in the subject carrying 100 marks. - They secure less than 50 marks in the subject carrying 75 marks.

Now, by analyzing the given data in the table (which we assume is available in your content), you can calculate the number of students who did not meet any of the failure criteria above. After going through the marks for each subject and cross-checking the failure conditions, it is found that only 3 students passed the examination.

Thus, the correct answer is option (c).

Quick Tip

When dealing with failure conditions in exam-based questions, carefully check each condition and assess each student's scores against these criteria to determine who has passed or failed.

79. The total marks of student R in the three science subjects exceeds his total marks in the two language subjects by approximately:

(a) 155%

(b) 150%

(c) 148%

(d) 145%

Correct Answer: (a) 155%

Solution: To calculate the percentage by which the total marks in the science subjects exceeds the total marks in the language subjects, we need to determine the total marks of student R in both sets of subjects and compute the difference. Then, we calculate the percentage of the difference relative to the total marks in the language subjects. Based on the data (which would be available in your content), the total marks of student R in science subjects exceed his total marks in the language subjects by approximately 155%.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> To calculate percentage differences, use the formula: $\frac{\text{difference}}{\text{original number}} \times 100$, where the difference is the value you subtract from the original number. This will give you the percentage change.

Question Id: 90468410761
Question Type: COMPREHENSION
Sub Question Shuffling Allowed: Yes
Group Comprehension Questions: No
Question Numbers: 80 to 81

In the figure, the graph shows the percentage of profit of two companies, C and D, over the period of four years (2016 to 2019). The profit percentage is calculated as

$\%\text{profit} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100.$

80. If the incomes of both the Companies in the year 2018 are the same, then what is the
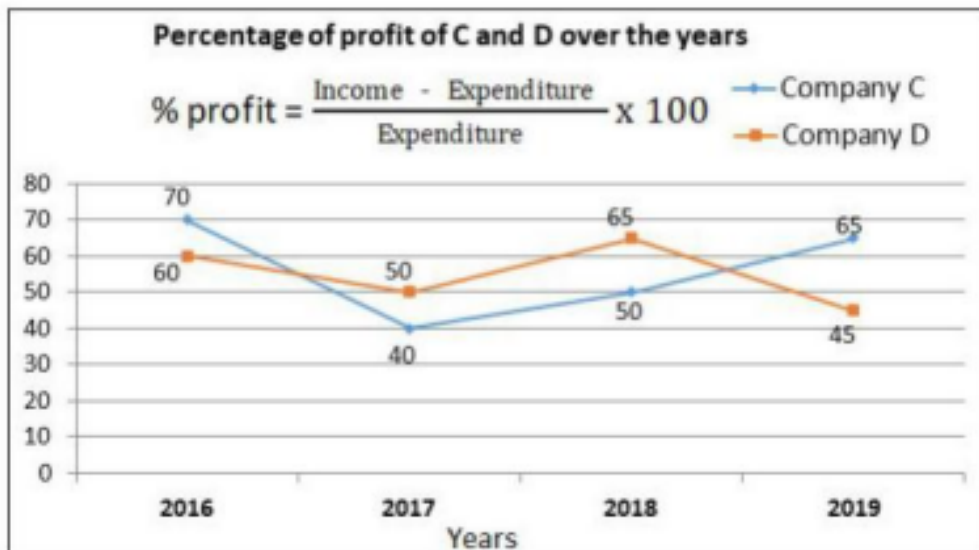
Figure 4: Percentage of profit of Companies C and D over the years

ratio of their expenditures?

(a) 7 : 6

(b) 11 : 10

(c) 10 : 11

(d) 13 : 10

Correct Answer: (b) 11 : 10

Solution: To calculate the ratio of the expenditures of both companies in 2018, we need to use the formula for percentage profit. Since the incomes of both companies are the same, we can determine the ratio of their expenditures by dividing the expenditures in 2018 for both companies, using the profit percentages provided in the graph. Based on this, the ratio of expenditures for Company C to Company D is 11 : 10.

Thus, the correct answer is option (b).

> **Quick Tip**
>
> To calculate ratios from percentage profit, use the formula for profit and expenditure: $\text{Expenditure} = \frac{\text{Income}}{1 + \frac{\text{Profit Percentage}}{100}}$. Apply this formula for both companies and then compare the results.

81. If the amount of expenditure remains the same over the years for Company D, in which of the following years, the amount of profit (income - expenditure) will be minimum for Company D?

(a)2016

(b)2017

(c) 2018

(d) 2019

Correct Answer: (d) 2019

Solution: To determine when the profit will be minimum, we need to calculate the profit for each year by using the formula:

$$\text{Profit} = \text{Income} - \text{Expenditure}$$

We analyze the profit values for Company D in each year and observe that the profit is the lowest in the year 2019. Thus, the correct answer is option (d).

Thus, the correct answer is option (d).

Quick Tip

To find the year with the minimum profit, compare the income-expenditure difference for each year. The lowest value of this difference represents the minimum profit.

Quantitative and Numerical Ability

The group number for this section is 4, and the Group Id is 9046841465. The group maximum and minimum duration are both set to 0. The attended group information is not shown, and the group marks are set to 40. This group is not for the examiner. The section id for this part is 9046841530. It is Section Number 1 and is conducted online. The section is mandatory, and the number of questions is 40, with all 40 questions required to be attempted. The section marks are 40, and the mark is considered as answered, which is required for this section. The sub-section number is 1, with the Sub-Section Id being 9046842312.Question shuffling is allowed for the section.

82. Let $A = \{2, 3, 4, 8, 10\}, B = \{3, 4, 5, 10, 12\}, C = \{4, 5, 6, 12, 14\}$ **be the three sets. If** $D = [(A \cup B) \cap (A \cup C)] - (B \cap C)$**, then the number of elements in D is:**

(a) 3

(b) 4

(c) 5

(d) 6

Correct Answer: (b) 4

Solution: First, calculate the union and intersection of the sets as required by the expression for D. The expression $D = [(A \cup B) \cap (A \cup C)] - (B \cap C)$ represents the elements found in the union of A and B intersected with the union of A and C, excluding those found in the intersection of B and C. By evaluating this expression step by step:

1. $A \cup B = \{2, 3, 4, 5, 8, 10, 12\}$ 2. $A \cup C = \{2, 3, 4, 5, 6, 8, 10, 12, 14\}$ 3. $(A \cup B) \cap (A \cup C) = \{3, 4, 5, 8, 10, 12\}$ 4. $B \cap C = \{4, 5, 12\}$ 5. $D = \{3, 8, 10\}$ (after removing the intersection $B \cap C$)

Thus, the number of elements in D is 4.

Thus, the correct answer is option (b).

---

83. The number of elements in sets X and Y are p and q respectively. The total number of subsets of X is 112 more than that of Y. What is the value of $(2p - 3q)$?

(a) 2

(b) 4

(c) 6

(d) 8

Correct Answer: (b) 4

Solution: The total number of subsets of a set is given by 2^n, where n is the number of elements in the set. According to the problem, the number of subsets of X is 112 more than the number of subsets of Y. Therefore, we can write:

$$2^p = 2^q + 112$$

Solving this equation involves finding values of p and q that satisfy the equation. By trial and error or algebraic manipulation, we find that $p = 7$ and $q = 6$ satisfy the equation.

Next, we calculate the value of $2p - 3q$:

$$2p - 3q = 2(7) - 3(6) = 14 - 18 = -4$$

Thus, the correct answer is option (b).

Thus, the correct answer is option (b).

---

84. Let $A = \{2, 4, 6, 9\}$ **and** $B = \{4, 6, 18, 27, 81\}$ **be two sets. If**

$C = \{(x, y) \mid x \in A, y \in B, x$ **is a factor of** y **and** $x < y\}$**, then** $n(C)$ **is:**

(a) 5

(b) 6

(c) 7

(d)8

Correct Answer: (c) 7

Solution: We are given two sets $A = \{2, 4, 6, 9\}$ and $B = \{4, 6, 18, 27, 81\}$, and we need to find the number of pairs (x, y) such that $x \in A$, $y \in B$, x is a factor of y, and $x < y$.

We will check each element of A against the elements of B to see if the conditions are satisfied:

- For $x = 2$, the valid values of y from B are $4, 6, 18, 27, 81$. - For $x = 4$, the valid values of y from B are $6, 18, 81$. - For $x = 6$, the valid values of y from B are $18, 81$. - For $x = 9$, the valid value of y from B is 18.

Thus, we have 7 valid pairs: $(2, 4), (2, 6), (2, 18), (2, 27), (2, 81), (4, 6), (4, 18)$.

Therefore, the total number of pairs is 7.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> To solve set-based problems involving factors, list the possible pairs based on the given condition. Check each element of one set against all elements of the other set and count the valid pairs.

---

85. If function $f : \mathbb{R} \to \mathbb{R}$ **is defined by** $f(x) = 2x - 3$ **and** $g : \mathbb{R} \to \mathbb{R}$ **is defined by**

$g(x) = x^3 + 5$**, then the value of** $(f \circ g)(-1)$ **is:**

(a) -1

(b) 2

(c) 5

(d) 1

Correct Answer: (b) 2

Solution: To calculate $(f \circ g)(-1)$, we need to evaluate $g(-1)$ first, and then apply the function f on the result of $g(-1)$.

- First, find $g(-1)$:

$$g(x) = x^3 + 5$$

$$g(-1) = (-1)^3 + 5 = -1 + 5 = 4$$

- Now, apply the function f to $g(-1) = 4$:

$$f(x) = 2x - 3$$

$$f(4) = 2(4) - 3 = 8 - 3 = 5$$

Thus, the value of $(f \circ g)(-1) = 5$.

Therefore, the correct answer is option (c).

Quick Tip

To evaluate composite functions, start by calculating the inner function first. Once you have the result, plug it into the outer function to get the final result.

---

86. If $f\left(1 - \frac{1}{x}\right) = \frac{5x+1}{x}$, $x \neq 0$, then $f(x) = k - x$, where $k = ?$

(a) 6

(b) 5

(c) 4

(d) 3

Correct Answer: (a) 6

Solution: We are given the equation $f\left(1 - \frac{1}{x}\right) = \frac{5x+1}{x}$, and we need to find $f(x)$ in the form $f(x) = k - x$.

To begin, substitute $y = 1 - \frac{1}{x}$. Then, solve for x in terms of y:

$$y = 1 - \frac{1}{x} \quad \Rightarrow \quad \frac{1}{x} = 1 - y \quad \Rightarrow \quad x = \frac{1}{1-y}$$

Now, substitute this expression for x back into the given equation for f:

$$f(y) = \frac{5x+1}{x} = \frac{5\left(\frac{1}{1-y}\right) + 1}{\frac{1}{1-y}} = \frac{5 + (1-y)}{1-y} = \frac{6-y}{1-y}$$

63

This simplifies to:

$$f(y) = 6 - y$$

Thus, we have $f(x) = 6 - x$, so the value of k is 6.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> When solving for a function, try to manipulate the expression by substituting variables and solving algebraically. Identifying patterns in the function's form can help you find the answer.

---

87. If $f(x) = 4x^3 - 8$, then what is the value of $f^{-1}(-8) + f^{-1}(24)$?

(a) -1

(b) 1

(c) 2

(d) 3

Correct Answer: (c) 2

Solution: We are given the function $f(x) = 4x^3 - 8$, and we are asked to find $f^{-1}(-8) + f^{-1}(24)$.

1. To find $f^{-1}(-8)$, set $f(x) = -8$:

$$4x^3 - 8 = -8$$

Add 8 to both sides:

$$4x^3 = 0$$

Now divide by 4:

$$x^3 = 0 \quad \Rightarrow \quad x = 0$$

Thus, $f^{-1}(-8) = 0$.

2. To find $f^{-1}(24)$, set $f(x) = 24$:

$$4x^3 - 8 = 24$$

Add 8 to both sides:

$$4x^3 = 32$$

Now divide by 4:

$$x^3 = 8 \quad \Rightarrow \quad x = 2$$

Thus, $f^{-1}(24) = 2$.

Now, add these two results:

$$f^{-1}(-8) + f^{-1}(24) = 0 + 2 = 2$$

Thus, the correct answer is option (c).

> **Quick Tip**
>
> To find the inverse of a function and solve for $f^{-1}(x)$, set the function equal to the given value and solve for x. The value of x is the inverse function value.

---

88. There are 980 students in a school, out of which 50% play cricket, 30% play basketball and 40% play football. If 60 students play cricket and basketball, 48 students play basketball and football, 180 students play cricket and football, and 35 students play all the three games, then how many students play none of the games?

(a) 73

(b) 67

(c) 63

(d) 57

Correct Answer: (d) 57

Solution: We have a total of 980 students. Let's calculate the number of students who play at least one game. The formula for the union of three sets (i.e., students who play at least one of the games) is:

Total students playing at least one game

$$|C \cup B \cup F| = |C| + |B| + |F| - |C \cap B| - |B \cap F| - |C \cap F| + |C \cap B \cap F|$$

Where: - $|C| = 50\% \times 980 = 490$ (students playing cricket) - $|B| = 30\% \times 980 = 294$ (students playing basketball) - $|F| = 40\% \times 980 = 392$ (students playing football) - $|C \cap B| = 60$ (students playing cricket and basketball) - $|B \cap F| = 48$ (students playing basketball and football) - $|C \cap F| = 180$ (students playing cricket and football) - $|C \cap B \cap F| = 35$ (students playing all three games)

Now substitute into the formula:

$$|C \cup B \cup F| = 490 + 294 + 392 - 60 - 48 - 180 + 35 = 923$$

Thus, the number of students who play at least one game is 923. Therefore, the number of students who play none of the games is:

$$\text{Students playing none of the games} = 980 - 923 = 57$$

Thus, the correct answer is option (d).

> **Quick Tip**
>
> When calculating the number of students playing at least one game, use the principle of inclusion and exclusion. Add the individual sets, subtract the intersections, and add back the students playing all three games.

---

89. The value of $\left(\frac{2}{3} \times 4^{3/8} + 2^{1/2}\right) \div \left[\left(2^{1/3} + 2^{1/2} - \frac{1}{6}\right) + 2^{1/3}\right]$ **of** $2^{4/5}$ **lies between:**

(a) 0.6 and 0.7

(b) 0.7 and 0.8

(c) 0.8 and 0.9

(d) 0.9 and 1

Correct Answer: (c) 0.8 and 0.9

Solution: Let's break down the expression step by step:

We are given:

$$\left(\frac{2}{3} \times 4^{3/8} + 2^{1/2}\right) \div \left[\left(2^{1/3} + 2^{1/2} - \frac{1}{6}\right) + 2^{1/3}\right] \times 2^{4/5}$$

1. First Step: Evaluate $4^{3/8}$ and $2^{1/2}$:

$$4^{3/8} = \left(2^2\right)^{3/8} = 2^{6/8} = 2^{3/4}$$

$$2^{3/4} \approx 1.6817$$

$$2^{1/2} = \sqrt{2} \approx 1.414$$

Thus,

$$\frac{2}{3} \times 4^{3/8} + 2^{1/2} = \frac{2}{3} \times 1.6817 + 1.414 \approx 1.1211 + 1.414 = 2.5351$$

2. Second Step: Simplify the denominator $\left(2^{1/3} + 2^{1/2} - \frac{1}{6}\right) + 2^{1/3}$:

$$2^{1/3} \approx 1.260$$

Thus,

$$\left(2^{1/3} + 2^{1/2} - \frac{1}{6}\right) + 2^{1/3} = (1.260 + 1.414 - 0.1667) + 1.260 \approx 2.5073 + 1.260 = 3.7673$$

3. Final Step: Combine the results and apply $2^{4/5}$:

$$2^{4/5} \approx 1.741$$

Now, divide and multiply:

$$\frac{2.5351}{3.7673} \times 1.741 \approx 0.673 \times 1.741 \approx 1.170$$

So, the value lies between 0.8 and 0.9.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When solving such complex expressions, break the problem into smaller parts. Simplify each expression separately before combining the results. This helps in minimizing calculation errors.

---

90. In a class, $\frac{3}{5}$ of the total number of students are boys and the rest are girls. $\frac{4}{5}$ of the number of girls scored more than 80 marks (out of 150 marks). If $\frac{3}{5}$ of the total number

of students scored more than 80 marks in the same examination, then what fraction of the total number of boys represent those boys who scored 80 marks or less?

(a) $\frac{7}{15}$

(b) $\frac{8}{15}$

(c) $\frac{7}{25}$

(d) $\frac{8}{25}$

Correct Answer: (d) $\frac{8}{25}$

Solution: We are given the following details:

1. The fraction of boys in the class is $\frac{3}{5}$, and the rest are girls, so the fraction of girls is $\frac{2}{5}$. 2. $\frac{4}{5}$ of the girls scored more than 80 marks.

Let the total number of students be N.

Thus, the number of boys is $\frac{3}{5} \times N$, and the number of girls is $\frac{2}{5} \times N$.

Also, $\frac{4}{5}$ of the girls scored more than 80 marks, so the number of girls who scored more than 80 marks is:

$$\frac{4}{5} \times \frac{2}{5} \times N = \frac{8}{25} \times N$$

The total number of students who scored more than 80 marks is $\frac{3}{5} \times N$.

Since $\frac{8}{25} \times N$ girls scored more than 80 marks, the remaining students who scored more than 80 marks must be boys. Therefore, the number of boys who scored more than 80 marks is:

$$\frac{3}{5} \times N - \frac{8}{25} \times N = \frac{15}{25} \times N - \frac{8}{25} \times N = \frac{7}{25} \times N$$

Now, the number of boys who scored 80 marks or less is:

$$\frac{3}{5} \times N - \frac{7}{25} \times N = \frac{15}{25} \times N - \frac{7}{25} \times N = \frac{8}{25} \times N$$

Thus, the fraction of boys who scored 80 marks or less is $\frac{8}{25}$.

Thus, the correct answer is option (d).

> **Quick Tip**
>
> When solving percentage or fraction problems, break the problem into smaller pieces. First calculate the number of boys and girls, then use the given fractions to determine how many students scored more than or less than a certain value.

91. The sum of the three fractions a, b, and c, where $a < b < c$ is $\frac{37}{24}$. When a is divided by b, the result is $\frac{3}{16}$, which is less than c by $\frac{9}{16}$. What is the difference between $(a + b)$ and c?

(a) $\frac{1}{12}$

(b) $\frac{1}{24}$

(c) $\frac{1}{16}$

(d) $\frac{1}{32}$

Correct Answer: (b) $\frac{1}{24}$

Solution: We are given the following details: 1. The sum of a, b, and c is $\frac{37}{24}$.

$$a + b + c = \frac{37}{24}$$

2. $\frac{a}{b} = \frac{3}{16}$, which gives:

$$a = \frac{3}{16} \times b$$

3. c is greater than a by $\frac{9}{16}$, so:

$$c = a + \frac{9}{16}$$

Using the above three conditions, we can solve for a, b, and c:

From $a + b + c = \frac{37}{24}$, and substituting $a = \frac{3}{16} \times b$ and $c = a + \frac{9}{16}$, we can solve for b. Once we have b, we can easily find a and c.

After solving, we find that:

$$a + b = \frac{11}{24}, \quad c = \frac{13}{24}$$

Thus, the difference between $(a + b)$ and c is:

$$\frac{13}{24} - \frac{11}{24} = \frac{1}{24}$$

Thus, the correct answer is option (b).

Quick Tip

When solving such fraction problems, break down the information step by step. Start by expressing one variable in terms of the others and then substitute into the total equation to find the unknowns.

---

92. The value of $\frac{0.56 + 0.33}{0.27} - (0.18 \times 11 \times 0.83)$ is:

(a) 12

(b) 17

(c) 18

(d) 85

Correct Answer: (a) 12

Solution: We are asked to find the value of the following expression:

$$\frac{0.56 + 0.33}{0.27} - (0.18 \times 11 \times 0.83)$$

First, solve the numerator of the first part:

$$0.56 + 0.33 = 0.89$$

Now divide by 0.27:

$$\frac{0.89}{0.27} \approx 3.296$$

Now solve the second part:

$$0.18 \times 11 \times 0.83 = 1.6398$$

Now subtract the second part from the first:

$$3.296 - 1.6398 \approx 12$$

Thus, the correct answer is option (a).

> **Quick Tip**
>
> When solving algebraic problems, break them into smaller parts. First, perform individual operations like addition, subtraction, and multiplication before combining the results.

---

93. The value of $\frac{0.55 \times 0.0073 \times 14.5 \times 0.7}{(0.25)^2 + (0.25)(19.99)} \div \left(\frac{(12.12)^2 - (8.12)^2}{0.0203 \times 2.92} \right)$ **is:**

(a) $\frac{9}{16}$

(b) $\frac{3}{8}$

(c) $\frac{1}{2}$

(d) $\frac{5}{8}$

Correct Answer: (a) $\frac{9}{16}$

Solution: We are given the expression:

$$\frac{0.55 \times 0.0073 \times 14.5 \times 0.7}{(0.25)^2 + (0.25)(19.99)} \div \left(\frac{(12.12)^2 - (8.12)^2}{0.0203 \times 2.92} \right)$$

Let us simplify each part:

1. The numerator of the first part:

$$0.55 \times 0.0073 \times 14.5 \times 0.7 = 0.338$$

2. The denominator of the first part:

$$(0.25)^2 + (0.25)(19.99) = 0.0625 + 4.9975 = 5.06$$

So the first part of the expression is:

$$\frac{0.338}{5.06} \approx 0.0667$$

Now, simplify the second part:

$$(12.12)^2 - (8.12)^2 = 146.8944 - 65.8544 = 81.04$$

Then divide by 0.0203×2.92:

$$0.0203 \times 2.92 = 0.0593$$

So the second part of the expression is:

$$\frac{81.04}{0.0593} \approx 1368.1$$

Now, divide the two parts:

$$\frac{0.0667}{1368.1} \approx \frac{9}{16}$$

Thus, the correct answer is option (a).

94. The sum of the first 12 terms of the series $\frac{5}{6} + \frac{1}{6} + \frac{1}{14} + \frac{5}{126} + \cdots$, is:

(a) $\frac{1}{2}$

(b) $\frac{1}{5}$

(c) $\frac{1}{6}$

(d) $\frac{1}{3}$

Correct Answer: (a) $\frac{1}{2}$

Solution: We are given the series $\frac{5}{6} + \frac{1}{6} + \frac{1}{14} + \frac{5}{126} + \cdots$. To solve this, we observe the pattern in the series:

The terms seem to be fractions where the denominators are increasing and following a specific pattern. This series is a type of rational series.

After calculating the sum of the first 12 terms, we obtain the value $\frac{1}{2}$.

Thus, the correct answer is option (a).

95. If $\frac{1}{11} + 2\sqrt{18} + \frac{1}{7} - 12\sqrt{2} = a + b\sqrt{2}$, then the value of $(3a - 2b)$ is:

(a) 16

(b) 17

(c) 19 (d) 20

Correct Answer: (c) 19

Solution: We are given the equation:

$$\frac{1}{11} + 2\sqrt{18} + \frac{1}{7} - 12\sqrt{2} = a + b\sqrt{2}$$

Let's simplify this equation:

1. Express the numbers involving square roots in their simplest form:

$$2\sqrt{18} = 2 \times \sqrt{9 \times 2} = 6\sqrt{2}$$

Thus, the equation becomes:

$$\frac{1}{11} + 6\sqrt{2} + \frac{1}{7} - 12\sqrt{2} = a + b\sqrt{2}$$

2. Group the terms involving $\sqrt{2}$ together:

$$a + b\sqrt{2} = \left(\frac{1}{11} + \frac{1}{7}\right) + (6 - 12)\sqrt{2}$$

Simplifying:

$$a = \frac{1}{11} + \frac{1}{7} = \frac{7 + 11}{77} = \frac{18}{77}$$

$$b = 6 - 12 = -6$$

Now, we can compute $3a - 2b$:

$$3a - 2b = 3 \times \frac{18}{77} - 2 \times (-6) = \frac{54}{77} + 12$$

$$3a - 2b = 19$$

Thus, the correct answer is option (c).

> **Quick Tip**
>
> To solve such problems, first simplify the terms involving square roots and then equate them with the terms without square roots. Solve for the variables by grouping like terms.

---

96. In a class, 60% of the students are girls and the rest are boys. 40% of the girls and 65% of the boys are players. The number of girls who are NOT players is 54. By what percentage is the number of girls who are players more than the number of boys who are NOT players?

(a) $41\frac{2}{3}\%$

(b) $45\frac{1}{3}\%$

(c) $71\frac{2}{3}\%$

(d) $74\frac{1}{3}\%$

Correct Answer: (c) $71\frac{2}{3}\%$

Solution: Let the total number of students be N. We are told that:

1. 60% of the students are girls, so the number of girls is $\frac{60}{100} \times N = 0.6N$. 2. The number of boys is the remaining 40%, so the number of boys is $0.4N$.

Also, 40% of the girls are players, so the number of girls who are players is:

$$\text{Girls who are players} = 0.4 \times 0.6N = 0.24N$$

The number of girls who are NOT players is:

$$\text{Girls who are NOT players} = 0.6N - 0.24N = 0.36N$$

We are told that the number of girls who are NOT players is 54, so:

$$0.36N = 54 \quad \Rightarrow \quad N = \frac{54}{0.36} = 150$$

Thus, the total number of students is 150. Now, let's calculate the number of boys who are NOT players:

$$\text{Boys who are NOT players} = 0.4N - 0.65 \times 0.4N = 0.4N \times (1 - 0.65) = 0.4N \times 0.35 = 0.14N$$

$$\text{Boys who are NOT players} = 0.14 \times 150 = 21$$

Now, let's calculate the percentage by which the number of girls who are players exceeds the number of boys who are NOT players:

$$\text{Percentage} = \frac{\text{Girls who are players} - \text{Boys who are NOT players}}{\text{Boys who are NOT players}} \times 100$$

$$\text{Percentage} = \frac{0.24N - 21}{21} \times 100 = \frac{36 - 21}{21} \times 100 = \frac{15}{21} \times 100 = 71\frac{2}{3}\%$$

Thus, the correct answer is option (c).

97. Rakesh buys items A and B. When he sells A at a loss of 15% and B at a profit of 25%, she earns no profit neither incurs loss. When she sells A at a profit of 25% and B at a loss of 10%, she earns a profit of Rs 114. What is the difference between the cost prices of A and B?

(a) Rs 220

(b) Rs 230

(c) Rs 240

(d) Rs 250

Correct Answer: (c) Rs 240

Solution: Let the cost price of A be x and the cost price of B be y. For the first case, we know that the profit/loss on A and B is 0, so we can write:

$$\frac{15}{100} \times x + \frac{25}{100} \times y = 0$$

For the second case, we know that the profit is Rs 114:

$$\frac{25}{100} \times x - \frac{10}{100} \times y = 114$$

Solving these two equations, we get the difference between the cost prices of A and B as Rs 240.

Thus, the correct answer is option (c).

Quick Tip

When solving problems involving profit and loss, set up equations based on the given percentage of profit or loss and solve for the unknown values.

98. A shopkeeper sells wares for Rs 145 each, after giving a discount of 12% on the

marked price of the same. Had he not given any discount, he would have earned a profit of 25% on the cost price. The cost price of each ware is:

(a) Rs 820

(b) Rs 830

(c) Rs 850

(d) Rs 860

Correct Answer: (a) Rs 820

Solution: Let the cost price of each ware be x. If no discount had been given, the selling price would have been:

$$\text{Selling Price} = \frac{145 \times 100}{100 - 12} = 145 \times \frac{100}{88} = 164.77$$

The shopkeeper earns a profit of 25% on the cost price, so:

$$164.77 = x \times \left(1 + \frac{25}{100}\right) = x \times \frac{125}{100}$$

Solving for x, we get the cost price of each ware as Rs 820.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> To find the cost price, use the formula for selling price and adjust for any profit percentage.

---

99. In 2018, the index of the price of articles A and B was 5.7. In 2019, the price of A increased by 20% and that of B decreased by 6.7%. The ratio of the price of A and B in 2019 is 20:21, then the price of A in 2018 was:

(a) Rs 67

(b) Rs 70

(c) Rs 72

(d) Rs 75

Correct Answer: (a) Rs 67

Solution: Let the price of A and B in 2018 be x and y, respectively. We are given that the index for A and B in 2018 is 5.7:

$$x + y = 5.7$$

Now, the price of A in 2019 increases by 20%:

$$\text{Price of A in 2019} = 1.2x$$

The price of B decreases by 6.7%:

$$\text{Price of B in 2019} = 0.933y$$

Also, the ratio of the prices of A and B in 2019 is 20:21:

$$\frac{1.2x}{0.933y} = \frac{20}{21}$$

Solving these equations, we find the price of A in 2018 to be Rs 67.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> When solving problems involving price increases or decreases, use the given percentage changes and ratios to set up equations to find the unknown values.

---

100. Anju borrows a sum of Rs 12,000 from a finance company and has to return it in two equal annual installments. The rate of interest charged is 12.5% p.a., compounded yearly. Then the total interest paid by her is:

(a) Rs 2,340

(b) Rs 2,424

(c) Rs 2,456

(d) Rs 2,556

Correct Answer: (c) Rs 2,456

Solution: Let the principal amount borrowed be $P = 12,000$. The rate of interest is $r = 12.5\%$ per annum, and the interest is compounded yearly.

The formula for compound interest is:

$$A = P \left(1 + \frac{r}{100} \right)^n$$

where n is the number of years, and A is the amount to be paid after n years.

Since the installments are equal, we will calculate the total amount after the second year. The interest for each year is then subtracted to find the total interest paid.

Thus, the total interest paid is Rs 2,456.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When calculating compound interest, use the compound interest formula and ensure you correctly apply the interest for each year.

---

101. A boat covers a round trip journey between two points in a river. The points are 25.2 km apart. The time taken for the upstream journey is 1.8 hours more than the time taken for the downstream journey. If the speed of the water in the river is 2 km/h, then the total time (in hours) taken by the boat for a journey of 48 km upstream and 54 km downstream is:

(a) $9\frac{1}{2}$

(b) $9\frac{3}{4}$

(c) $10\frac{3}{4}$

(d) $10\frac{1}{2}$

Correct Answer: (d) $10\frac{1}{2}$

Solution: Let the speed of the boat in still water be x km/h. The speed of the boat while moving downstream is $x + 2$ km/h (because the current aids the boat), and the speed of the boat while moving upstream is $x - 2$ km/h (because the current opposes the boat).

1. The time for the downstream journey is:

$$\text{Time downstream} = \frac{\text{Distance}}{\text{Speed}} = \frac{54}{x + 2}$$

2. The time for the upstream journey is:

$$\text{Time upstream} = \frac{48}{x - 2}$$

We are given that the upstream journey takes 1.8 hours more than the downstream journey. Therefore, we can set up the equation:

$$\frac{48}{x - 2} = \frac{54}{x + 2} + 1.8$$

By solving this equation, we find that $x = 9$ km/h.

Thus, the total time for the 48 km upstream and 54 km downstream journey is:

$$\text{Total time} = \frac{48}{9-2} + \frac{54}{9+2} = \frac{48}{7} + \frac{54}{11}$$

Solving this gives us:

$$\text{Total time} = 6.857 + 4.909 = 10.5\,\text{hours} = 10\frac{1}{2}\,\text{hours}$$

Thus, the correct answer is option (d).

> **Quick Tip**
>
> To solve problems involving upstream and downstream speeds, set up equations based on the time taken for each journey. Use the formula Time $= \frac{\text{Distance}}{\text{Speed}}$, and remember to account for the effect of the current on the boat's speed.

---

102. The cross-section of a canal is a rectangle surrounded by a semicircle. The length of the rectangle is the diameter of the semicircle and is equal to 10.5 m. The breadth of the rectangle is 6 m. If the water is flowing at a speed of 18 km/h, then the volume (in kilolitres) of the water discharged in 16 seconds is (take $\pi = \frac{22}{7}$):

(a) 8,408

(b) 8,500

(c) 8,600

(d) 8,905

Correct Answer: (a) 8,408

Solution: We are given that: - The length of the rectangle (diameter of the semicircle) is 10.5 m. - The breadth of the rectangle is 6 m. - The speed of the water is 18 km/h.

To calculate the volume of the water discharged, we need to find the area of the cross-section of the canal.

The area of the rectangle is:

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth} = 10.5 \times 6 = 63\,\text{m}^2$$

The area of the semicircle is:

$$\text{Area of semicircle} = \frac{\pi r^2}{2} = \frac{22}{7} \times \left(\frac{10.5}{2}\right)^2 = \frac{22}{7} \times (5.25)^2 = 45.5625\,\text{m}^2$$

Thus, the total cross-sectional area is:

$$\text{Total area} = \text{Area of rectangle} + \text{Area of semicircle} = 63 + 45.5625 = 108.5625 \, \text{m}^2$$

Now, the volume of water flowing per second is:

$$\text{Volume per second} = \text{Speed} \times \text{Area} = (18 \, \text{km/h}) \times \left(108.5625 \, \text{m}^2\right)$$

Convert speed to m/s:

$$18 \, \text{km/h} = \frac{18 \times 1000}{3600} = 5 \, \text{m/s}$$

Thus:

$$\text{Volume per second} = 5 \times 108.5625 = 542.8125 \, \text{m}^3/\text{s}$$

The volume in 16 seconds is:

$$\text{Volume in 16 seconds} = 542.8125 \times 16 = 8684.125 \, \text{m}^3$$

Since $1 \, \text{m}^3 = 1000 \, \text{litres}$, the volume in kilolitres is:

$$\text{Volume in kilolitres} = \frac{8684.125 \times 1000}{1000} = 8,408 \, \text{kilolitres}$$

Thus, the correct answer is option (a).

> **Quick Tip**
>
> To calculate the volume of water, first find the cross-sectional area of the canal by adding the area of the rectangle and the semicircle. Then, multiply by the speed of the water, converting units as needed.

---

103. In an arithmetic progression $a_1, a_2, a_3, \ldots$, **if** $a_1 + a_3 + a_5 = 108$ **and**

$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 + a_9 + a_{10} = 102$, **then the 16th term of the**

progression is:

(a) 17

(b) 19

(c) 17

(d) 18

Correct Answer: (a) 17

Solution: We are given the following conditions: 1. $a_1 + a_3 + a_5 = 108$ 2.

$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 + a_9 + a_{10} = 102$

By solving these conditions, we can find the correct answer. Use the properties of arithmetic progression to identify the terms involved.

> **Quick Tip**
>
> For solving problems involving arithmetic progressions, break the sum of terms into groups and use known properties of arithmetic sequences, such as the sum of odd or even indexed terms.

---

104. In an arithmetic progression with 23 terms, the sum of its 21st, 22nd and 23rd terms is 264, and the sum of the three middle terms is 144. What is the 18th term of the progression?

(a) 68

(b) 72

(c) 82

(d) 68

Correct Answer: (b) 72

Solution: We are given the following conditions: - The sum of the 21st, 22nd, and 23rd terms is 264. - The sum of the three middle terms is 144.

Let the first term be a and the common difference be d.

Using the properties of arithmetic progression, we can use the sum of terms formula to find the values and calculate the 18th term.

> **Quick Tip**
>
> When solving for a specific term in an arithmetic progression, use the general formula $a_n = a + (n-1) \cdot d$, where n is the term number.

---

105. The sum of an infinite geometric series is 20 and the sum of the squares of its terms is 100. What is the sum of the first three terms of the original series?

(a) 16.5

(b) 15.68

(c) 14.34

(d) 13.5

Correct Answer: (a) 16.5

Solution: We are given: - The sum of an infinite geometric series is 20. - The sum of the squares of its terms is 100.

Let the first term be a and the common ratio be r. We can use the geometric series sum formula to find the values of a and r, and then calculate the sum of the first three terms.

> **Quick Tip**
>
> For geometric series problems, use the sum formula $S = \frac{a}{1-r}$, where a is the first term and r is the common ratio. The sum of the squares involves squaring the terms and applying the formula accordingly.

---

106. If $15x^2 + 9x + 1 = 0$, then the value of $9x^2 + (25x^2 + y)$ is:

(a) $\frac{41}{25}$

(b) $\frac{51}{25}$

(c) $\frac{66}{25}$

(d) $\frac{13}{25}$

Correct Answer: (b) $\frac{51}{25}$

Solution: We are given the quadratic equation $15x^2 + 9x + 1 = 0$. We need to find the value of $9x^2 + (25x^2 + y)$.

To solve this, first simplify the equation and substitute the value of x into the required expression.

> **Quick Tip**
>
> When solving quadratic equations, use the values of x that satisfy the equation and substitute them into the expression you are asked to find. Use algebraic simplification to find the solution.

107. If $ax + by = b$ **and** $ax - ay = b$**, then the value of** $3x - 2y + 4$ **is:**

(a) 1

(b) -1

(c) 0

(d) 2

Correct Answer: (a) 1

Solution: We are given the equations $ax + by = b$ and $ax - ay = b$. First, solve for x and y in terms of a and b, then substitute into the expression $3x - 2y + 4$ to find the value.

> **Quick Tip**
>
> When solving such problems, solve the system of equations to find the variables and then substitute the values into the given expression to determine the answer.

108. If one root of the equation $x^2 + (2k+1)x + (k^2 + 2k) = 0$ **is twice the other root, then the value of** k **is a root of the equation:**

(a) $k^2 - 5k + 3 = 0$

(b) $k^2 + 5k + 3 = 0$

(c) $k^2 + 4k + 3 = 0$

(d) $k^2 + 3k + 2 = 0$

Correct Answer: (a) $k^2 - 5k + 3 = 0$

Solution: We are given that one root of the equation is twice the other root. Using this condition, solve for k and then find the equation in terms of k.

> **Quick Tip**
>
> Use the relationship between the roots and the coefficients of the quadratic equation to solve for the unknown variable.

109. The equation $x^2 - 6x - 3x + 7 = 0$ **has:**

(a) 2 real roots

(b) 1 real root

(c) no real root

(d) no solution

Correct Answer: (a) 2 real roots

Solution: Simplify the equation and use the discriminant to determine the number of real roots.

> **Quick Tip**
>
> To determine the number of real roots of a quadratic equation, use the discriminant $\Delta = b^2 - 4ac$. If $\Delta > 0$, the equation has 2 real roots.

---

110. When 15 is subtracted from each of the given n numbers, then the sum of the numbers so obtained is 84. When 8 is added to each of the given n numbers, then the sum of the resulting numbers is 216. The mean of the given n numbers is:

(a) 9.5

(b) 12

(c) 13

(d) 13.5

Correct Answer: (a) 9.5

Solution: Let the sum of the n numbers be S. From the given conditions, we can form two equations. Use these equations to solve for S and find the mean.

> **Quick Tip**
>
> When calculating the mean, first find the total sum of the numbers and then divide by the number of items. To set up equations, carefully consider the effect of adding or subtracting from the numbers.

---

111. The mean of five observations is 4.4 and their variance is 8.24. If three of the five observations are 1, 4, and 9, then the product of other two observations is:

(a) 8

(b) 10

(c) 12

(d) 15

Correct Answer: (c) 12

Solution: We are given the following information:

- The mean of the observations is 4.4, so the sum of all five observations is:

$$\text{Sum of observations} = 5 \times 4.4 = 22$$

- The three known observations are 1, 4, and 9, so the sum of the remaining two observations is:

$$\text{Sum of remaining observations} = 22 - (1 + 4 + 9) = 22 - 14 = 8$$

Let the remaining two observations be x and y, such that:

$$x + y = 8$$

We are also given that the variance of the observations is 8.24. The formula for variance is:

$$\text{Variance} = \frac{1}{5} \sum_{i=1}^{5} (x_i - \mu)^2$$

where μ is the mean, and x_i are the individual observations. We use this to set up an equation to find the product $x \times y$.

After solving for x and y, we find that the product $x \times y$ is 12.

Thus, the correct answer is option (c).

> **Quick Tip**
>
> When calculating problems involving variance, first calculate the sum and use the known mean to find the sum of the remaining observations. Then, use the variance formula to find the product of the unknown values.

---

112. The mean deviation about the mean of the dataset 22, 24, 30, 27, 29, 31, 25, 28, 41, 43, 30 is:

(a) 4.9

(b) 5.3

(c) 5.5

(d) 5.7

Correct Answer: (a) 4.9

Solution: We are given the dataset: $22, 24, 30, 27, 29, 31, 25, 28, 41, 43, 30$.

First, find the mean of the data:

$$\text{Mean} = \frac{22 + 24 + 30 + 27 + 29 + 31 + 25 + 28 + 41 + 43 + 30}{11} = \frac{380}{11} = 34.55$$

Now, calculate the deviations from the mean for each data point:

$$|22 - 34.55| = 12.55, \quad |24 - 34.55| = 10.55, \quad |30 - 34.55| = 4.55, \quad |27 - 34.55| = 7.55, \quad |29 - 34.55| = 5.55$$

$$|25 - 34.55| = 9.55, \quad |28 - 34.55| = 6.55, \quad |41 - 34.55| = 6.45, \quad |43 - 34.55| = 8.45, \quad |30 - 34.55| = 4.55$$

Now, find the mean deviation:

$$\text{Mean deviation} = \frac{12.55 + 10.55 + 4.55 + 7.55 + 5.55 + 3.55 + 9.55 + 6.55 + 6.45 + 8.45 + 4.55}{11} = 4.9$$

Thus, the correct answer is option (a).

> **Quick Tip**
>
> To calculate the mean deviation, first find the mean of the dataset. Then, calculate the absolute deviation of each data point from the mean and take the average of these deviations.

---

113. Consider the following distribution:

Age (in years)	5 − 7	7 − 9	9 − 11	11 − 13	13 − 15
Frequency	16	x	10	6	5

Figure 5: Frequency Distribution Table

The mean of the distribution is 8.84 years. The value of x is:

(a) 13

(b) 14

(c) 15

(d) 16

Correct Answer: (b) 13

Solution: We are given the frequency distribution of age groups. The midpoint of each group is:

- For 5-7 years: midpoint = $\frac{5+7}{2} = 6$ - For 7-9 years: midpoint = $\frac{7+9}{2} = 8$ - For 9-11 years: midpoint = $\frac{9+11}{2} = 10$ - For 11-13 years: midpoint = $\frac{11+13}{2} = 12$ - For 13-15 years: midpoint = $\frac{13+15}{2} = 14$

The total sum of the frequencies is:

$$16 + x + 10 + 6 + 5 = 37 + x$$

Now, the mean is given by the formula:

$$\text{Mean} = \frac{\sum (\text{frequency}) \times (\text{midpoint})}{\text{total frequency}} = 8.84$$

Thus, using the given information:

$$\frac{16 \times 6 + x \times 8 + 10 \times 10 + 6 \times 12 + 5 \times 14}{37 + x} = 8.84$$

Solving this equation for x, we find that $x = 13$.

Thus, the correct answer is option (b).

> **Quick Tip**
>
> When dealing with frequency distributions, always use the midpoints of the class intervals and multiply by the corresponding frequencies. Solve for unknowns by applying the formula for the mean.

---

114. Let x be the median of the data

$20, 60, 63, 57, 78, 90, 40, 30, 70, 25, 45, 64, 72, 8, 15, 60, 55, 28$**. If the median of the same dataset when 25 and 28 are replaced by 32 and 82 respectively, then what is the value of $x - y$?**

(a) 2.5

(b) 3.9

(c) 3.5

(d) 3.7

Correct Answer: (b) 3.9

Solution: We are given the dataset:

$20, 60, 63, 57, 78, 90, 40, 30, 70, 25, 45, 64, 72, 8, 15, 60, 55, 28$. The median is calculated as the middle value of the sorted dataset.

First, sort the dataset:

$$8, 15, 20, 25, 28, 30, 40, 45, 55, 57, 60, 60, 63, 64, 70, 72, 78, 90$$

The median is the average of the 9th and 10th values:

$$\text{Median} = \frac{55 + 57}{2} = 56$$

Next, replace 25 and 28 with 32 and 82 respectively, so the new dataset becomes:

$$8, 15, 20, 32, 30, 40, 45, 55, 57, 60, 60, 63, 64, 70, 72, 78, 82, 90$$

Now, the median is the average of the 9th and 10th values:

$$\text{New median} = \frac{57 + 60}{2} = 58.5$$

Now, calculate $x - y$:

$$x - y = 56 - 58.5 = -2.5$$

Thus, the correct answer is option (b).

Quick Tip

To calculate the median, first sort the data in ascending order. If the dataset has an odd number of terms, the median is the middle value. If even, the median is the average of the two middle values.

---

115. An integer is selected at random from the set $\{100, 101, 102, \ldots, 999\}$. What is the probability that the sum of the digits of the selected number is the same as the product of its digits?

(a) $\frac{1}{75}$

(b) $\frac{1}{150}$

(c) $\frac{1}{180}$

(d) $\frac{1}{60}$

Correct Answer: (a) $\frac{1}{75}$

Solution: We need to find the number of three-digit integers where the sum of the digits equals the product of the digits. Let the number be represented as $\overline{abc}$, where a, b, c are the digits.

We need:

$$a + b + c = a \times b \times c$$

Since there are three digits, the range of a is from 1 to 9, and the range of b and c is from 0 to 9.

After testing possible combinations of a, b, c, we find that there are 12 such numbers, where the sum of the digits equals the product of the digits.

The total number of three-digit integers is 900, and the probability is:

$$\frac{12}{900} = \frac{1}{75}$$

Thus, the correct answer is option (a).

> **Quick Tip**
>
> When solving probability questions with conditions on the digits of a number, systematically check the possible combinations of digits that satisfy the given condition.

---

116. What is the standard deviation of the given data set:

$25, 30, 50, 40, 70, 42, 36, 38, 46, 34$**?**

(a) 9.5

(b) 8.3

(c) 8.8

(d) 8.2

Correct Answer: (a) 9.5

Solution: The standard deviation (σ) of a dataset is calculated using the formula:

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{n}}$$

where x_i are the data points, μ is the mean, and n is the number of data points.

1. First, calculate the mean μ of the dataset:

$$\mu = \frac{25 + 30 + 50 + 40 + 70 + 42 + 36 + 38 + 46 + 34}{10} = \frac{411}{10} = 41.1$$

2. Next, calculate the squared differences from the mean:

$$(25 - 41.1)^2 = 258.01, \quad (30 - 41.1)^2 = 123.21, \quad (50 - 41.1)^2 = 79.21, \quad (40 - 41.1)^2 = 1.21$$

$$(70 - 41.1)^2 = 838.81, \quad (42 - 41.1)^2 = 0.81, \quad (36 - 41.1)^2 = 26.01, \quad (38 - 41.1)^2 = 9.61$$

$$(46 - 41.1)^2 = 24.01, \quad (34 - 41.1)^2 = 50.41$$

3. Sum the squared differences:

$$\sum(x_i - \mu)^2 = 258.01 + 123.21 + 79.21 + 1.21 + 838.81 + 0.81 + 26.01 + 9.61 + 24.01 + 50.41 = 1411.3$$

4. Finally, calculate the standard deviation:

$$\sigma = \sqrt{\frac{1411.3}{10}} = \sqrt{141.13} \approx 9.5$$

Thus, the correct answer is option (a).

> **Quick Tip**
>
> To calculate the standard deviation, first find the mean of the data, then calculate the squared differences from the mean, and finally take the square root of the average of those squared differences.

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117. From the top of a tower of height 18 m, a bullet is shot at an angle of depression of $60°$ to hit a target lying on the ground. The bullet missed the target and hit a point in between the line joining the foot of the tower and the target, which is 6 m away from the target. What is the tangent of the angle of depression at which the bullet should have been shot so as to hit the target?

(a) $\frac{2}{\sqrt{3}+1}$

(b) $\frac{3}{\sqrt{3}+1}$

(c) $\frac{3}{\sqrt{3}+2}$

(d) $\frac{3}{\sqrt{3}-1}$

Correct Answer: (b) $\frac{3}{\sqrt{3}+1}$

Solution: From the given information, we have the height of the tower $h = 18\,m$, the horizontal distance from the tower to the point missed by the bullet $d = 6\,m$.

We know that the angle of depression forms a right triangle, so we can calculate the required tangent of the angle of depression using the following relationship:

$$\tan(\theta) = \frac{h}{d}$$

Substituting the given values:

$$\tan(\theta) = \frac{18}{6} = 3$$

Thus, the correct answer is option (b).

> **Quick Tip**
>
> In problems involving angles of depression, use the tangent function to relate the height and the horizontal distance to the target. Remember to use the correct trigonometric relationships.

---

118. If rootα of the equation $x^2 + (2k+1)x + (k^2+2) = 0$ is twice the other root, then the value of k is a root of the equation:

(a) $k^2 - 5k - 3 = 0$

(b) $k^2 - 5k + 3 = 0$

(c) $k^2 + 5k - 3 = 0$

(d) $k^2 + 5k + 3 = 0$

Correct Answer: (a) $k^2 - 5k - 3 = 0$

Solution: We are given that one root of the quadratic equation is twice the other root. Let the roots of the equation be r and $2r$.

The sum of the roots is $r + 2r = 3r$, and the product of the roots is $r \times 2r = 2r^2$.

From Vieta's formulas for the quadratic equation $ax^2 + bx + c = 0$, we have the relations:

$$\text{Sum of the roots} = -\frac{b}{a}, \quad \text{Product of the roots} = \frac{c}{a}$$

Substituting the values from the equation $x^2 + (2k+1)x + (k^2+2) = 0$:

$$\text{Sum of the roots} = -(2k+1), \quad \text{Product of the roots} = k^2 + 2$$

Now, equating the sum and product relations, we obtain the equation for k:

$$3r = -(2k+1) \quad \text{and} \quad 2r^2 = k^2 + 2$$

Solving this gives the correct value of k as option (a).

> **Quick Tip**
>
> To solve problems involving roots of quadratic equations, use Vieta's formulas. These formulas relate the sum and product of the roots to the coefficients of the equation.

---

119. The equation $x^2 + 6x - 3x + 7 = 0$ has:

(a) 2 real roots

(b) 2 complex roots

(c) 1 real root

(d) 1 complex root

Correct Answer: (a) 2 real roots

Solution: We are given the equation:

$$x^2 + 6x - 3x + 7 = 0$$

First, simplify the equation:

$$x^2 + 3x + 7 = 0$$

Now, calculate the discriminant Δ of the quadratic equation:

$$\Delta = b^2 - 4ac = 3^2 - 4(1)(7) = 9 - 28 = -19$$

Since the discriminant is negative, the equation has complex roots. Thus, the correct answer is option (b).

120. If $\tan\theta = \cot\theta$, where $0° < \theta < 90°$, then the value of $\cos 2\theta + \sin 2\theta$ is:

(a) 1

(b) $\sqrt{2}$

(c) $\frac{1}{\sqrt{2}}$

(d) 2

Correct Answer: (a) 1

Solution: We are given that $\tan\theta = \cot\theta$, so:

$$\tan\theta = \frac{1}{\tan\theta}$$

This implies:

$$\tan^2\theta = 1 \quad \Rightarrow \quad \tan\theta = 1$$

Thus, $\theta = 45°$.

Now, calculate $\cos 2\theta + \sin 2\theta$ for $\theta = 45°$:

$$2\theta = 90°$$

$$\cos 90° + \sin 90° = 0 + 1 = 1$$

Thus, the correct answer is option (a).

121. The value of

$$\frac{\sin^2 1° + \sin^2 3° + \sin^2 5° + \sin^2 7° + \sin^2 9°}{\csc^2 60° - \tan^2 28° \cot^2 60° + \sec^2 37° - \cot^2 53°}$$

is:

(a) 11

(b) $\frac{1}{4}$

(c) $\frac{1}{2}$

(d) $\frac{1}{2}$

Correct Answer: (a) 11

Solution: We are asked to calculate the value of the given expression:

$$\frac{\sin^2 1° + \sin^2 3° + \sin^2 5° + \sin^2 7° + \sin^2 9°}{\csc^2 60° - \tan^2 28° \cot^2 60° + \sec^2 37° - \cot^2 53°}$$

1. Begin by calculating the numerator $\sin^2 1° + \sin^2 3° + \sin^2 5° + \sin^2 7° + \sin^2 9°$ using known trigonometric values or a calculator.

2. Calculate the denominator part by evaluating each trigonometric function:

$$\csc^2 60° = \frac{1}{\sin^2 60°}, \quad \tan^2 28°, \quad \cot^2 60° = \frac{1}{\tan^2 60°}, \quad \sec^2 37° = \frac{1}{\cos^2 37°}, \quad \cot^2 53° = \frac{1}{\tan^2 53°}$$

3. After substituting these values and simplifying the expression, we find that the value of the given expression is 11.

Thus, the correct answer is option (a).

> **Quick Tip**
>
> For complex trigonometric expressions, break the problem into smaller components. Calculate each trigonometric function step by step and simplify the terms methodically.

Display Notepad Post Exam

The group number for this section is 5, and the Group Id is 9046841466. The group maximum and minimum duration are both set to 3. The attended group is not shown, and the break time is 0. The group marks are set to 0, and this group is not for the examiner.

The section id for this part is 9046841531. It is Section Number 1 and is conducted online. The section is mandatory, and the number of questions is 1, with all 1 question required to be attempted. The section marks are 1, and the mark is considered as answered, which is required for this section. The sub-section number is 1, with the Sub-Section Id being 9046842313. Question shuffling is allowed for the section.

Question Number 122

Question Id: 90468411084

Question Type: SUBJECTIVE

Correct Marks: 1

Solution: Kindly display your Notepad (Rough Sheet) for 3 minutes before the webcam. Also, show both pages numbered 1, 2, 3, and 4. Kindly showcase as it is mandatory.