

Answers

1. Answer: d

Explanation:

Understanding Word Similarity for Aversion

The task is to find the word that has the closest meaning (a synonym) to the word **Aversion** from the given options. This involves understanding the definitions of each word.

Meaning of the Target Word: Aversion

Aversion describes a strong feeling of dislike, opposition, or repugnance towards something or someone. It's a feeling that makes you want to avoid a particular person, place, thing, or activity.

Analyzing the Provided Options

Let's break down the meaning of each option to see how it compares to **Aversion**:

- **Entice**: This verb means to attract or tempt someone by offering them something pleasant or desirable. It's about attraction, not dislike.
- **Lure**: Very similar to 'entice', this verb means to tempt or attract someone, often using a promise or a bait. It also relates to attraction.
- **Indifference**: This noun means a lack of interest, concern, or sympathy. It signifies not caring one way or the other, which is different from having a strong dislike.
- **Antipathy**: This noun means a deep-seated feeling of dislike or hostility towards someone or something. It signifies a strong aversion or antagonism.

Comparing Meanings to Find the Best Match

Now, let's compare the options with **Aversion**:

- 'Entice' and 'Lure' are related to attracting someone, making them unsuitable as synonyms for **Aversion** (which implies repulsion).
- 'Indifference' suggests a lack of feeling, whereas **Aversion** implies a strong negative feeling.
- '**Antipathy**' directly matches the core meaning of **Aversion** – a strong dislike or feeling of opposition.

Conclusion: Most Similar Word

Based on the definitions, **Antipathy** is the word MOST SIMILAR in meaning to **Aversion**.

2. Answer: b

Explanation:

Defining the Word "Daunt"

The word '**Daunt**' refers to the act of making someone feel intimidated or discouraged, causing them to lose confidence or hesitate.

Examining Potential Antonyms for "Daunt"

We need to find the word among the options that has the opposite meaning to '**Daunt**'. Let's look at each option:

- **Discourage**: This means to cause someone to lose confidence or enthusiasm. This is very similar to the meaning of 'daunt', making it a synonym.
- **Cheer**: This means to make someone feel happier, more hopeful, or encouraged. This action directly opposes the feeling of being intimidated or discouraged.
- **Dishearten**: This means to cause someone to lose determination or confidence, often making them feel sad. Like 'discourage', this is a synonym of 'daunt'.
- **Disparity**: This term refers to a great difference or inequality between things. It is not related to the emotional state of confidence or fear.

Identifying the Correct Antonym

Daunt involves causing intimidation or discouragement.

- 'Discourage' and 'Dishearten' are synonyms, as they also mean to reduce confidence or enthusiasm.
- 'Disparity' relates to differences, not confidence levels.
- '**Cheer**' involves providing happiness and encouragement, which is the opposite of making someone feel intimidated or less confident.

Therefore, the most fitting antonym for 'Daunt' is 'Cheer'.

3. Answer: c

Explanation:

Understanding the Meaning of Obliterate

The question asks us to find a word that is closest in meaning, a synonym, to the word **Obliterate**. To obliterate means to destroy something completely, to wipe it out, or to erase it so that nothing remains. Think of it as removing something entirely from existence or memory.

Exploring Synonyms: The Meaning of Extirpate

Let's look at the meaning of the potential synonym provided. **Extirpate** means to tear something up by the roots, to destroy it totally, or to eradicate it. This implies a complete removal or destruction, much like obliterate.

Comparing Options for Obliterate Synonym

We need to find the best match for **Obliterate** among the given choices:

- **Obliterate** suggests complete destruction, wiping out, or erasing.
- **Extirpate** means to root out or destroy completely.
- The core meaning of both **Obliterate** and **Extirpate** revolves around total destruction or eradication.

Based on these definitions, **Extirpate** shares the essential meaning of complete destruction with **Obliterate**, making it the closest synonym.

Analyzing Other Word Choices

It's important to understand why the other options are not suitable synonyms:

- **Hansom**: This word refers to a specific type of horse-drawn carriage. It has no connection to the meaning of destruction or obliteration.
- **Establish**: This word means to set up, found, or bring something into existence. It signifies creation or introduction, which is the opposite of destruction. Therefore, **Establish** is an antonym, not a synonym, of **Obliterate**.
- **Epistle**: This word means a letter, particularly a formal or important one. This meaning is unrelated to the concept of destroying or erasing something.

Conclusion on Obliterate Synonym

By examining the definitions, we can see that **Extirpate** is the word that most closely matches the meaning of **Obliterate**, as both terms describe the act of destroying something completely.

4. Answer: c

Explanation:

Deplore: Understanding the Core Meaning

The word **Deplore** refers to the act of feeling or expressing strong disapproval or regret about something. It carries a sense of condemnation and deep unhappiness regarding a particular situation, action, or quality.

Identifying the Antonym for Deplore

To find the correct antonym, we need a word that signifies the opposite of strong disapproval or regret. Let's examine the given options:

- **Dependable:** This term means reliable or trustworthy. It doesn't contrast with the meaning of **Deplore**.
- **Independent:** This word means not relying on others. It is unrelated to the concept of approval or disapproval.
- **Admire:** This word means to regard with respect, approval, or warm liking. This is the direct opposite of feeling strong disapproval.
- **Damn:** This word means to condemn or express strong disapproval. In fact, it is very similar in meaning to **Deplore**, making it a synonym rather than an antonym.

The Antonym Relationship

The primary meaning of **Deplore** involves strong negative feelings and disapproval. The word **Admire** expresses strong positive feelings and approval. Therefore, **Admire** stands as the correct antonym because it represents the opposite sentiment.

5. Answer: b

Explanation:

Understanding Service Discharge Terms: Finding the Best Substitute

This question asks us to identify the best word to replace the phrase "One who is honourably discharged from service." This means we are looking for a term that describes someone who has left a job, profession, or duty in a respectable and dignified manner, often after completing their term or retiring with commendation.

Analyzing the Phrase: Honourably Discharged

The core idea is a departure from service that is marked by honor. This implies completion of duties, adherence to rules, and leaving with a positive record rather than through dismissal or disgrace.

Evaluating the Options

Let's examine each option to see which one best fits the description:

- **Belligerent:** This term means hostile or engaged in war. It describes someone's attitude or involvement in conflict, not their status after leaving service. Therefore, *belligerent* is not a suitable substitute.
- **Emeritus:** This title is typically conferred upon individuals who have retired from a position, especially in academic, clerical, or professional fields, after long and distinguished service. It signifies an honorable retirement and continued recognition. This aligns closely with the concept of being "honourably discharged from service," emphasizing the respect and honor associated with the departure.
- **Truant:** A *truant* is someone who is absent from school or duty without permission. This is the opposite of being honorably discharged; it implies shirking responsibilities. Thus, *truant* is incorrect.
- **Mercenary:** A *mercenary* is a soldier hired to fight for money, often for a foreign country, or someone motivated purely by financial gain. This term does not relate to the manner of discharge from one's own service. Therefore, *mercenary* is not the correct substitute.

Identifying the Best Substitute

Comparing the definitions, the term **Emeritus** most accurately represents someone who has retired or been discharged from service in an honorable way, retaining respect and recognition for their contributions.

6. Answer: b

Explanation:

Finding the Correct Word for 'Not Able to be Forgotten'

This question requires identifying the vocabulary word that accurately describes something that is **not able to be forgotten**. We will examine the definitions of the given options to find the perfect match for this meaning.

Understanding the Meaning: 'Not Able to be Forgotten'

The core idea is permanence in memory. A word fitting this description should represent something that leaves a lasting impact, making it impossible or very difficult to forget. Think of significant events or deeply ingrained lessons – they are hard to forget.

Analyzing the Vocabulary Options

Let's explore the meaning of each word provided:

- **Discrepancy:** This term refers to a difference or inconsistency between two or more things, often where a match might be expected. For example, there might be a *discrepancy* between the amount of money in the bank and the recorded balance. This doesn't relate to memory or forgetting.
- **Indelible:** This word means something that cannot be removed, erased, or washed away. When applied to memories or impressions, it means they are permanent and **not able to be forgotten**. For example, a powerful experience can leave an *indelible* mark on your life. This perfectly matches the question's definition.
- **Bizarre:** This adjective describes something as very strange, odd, or unusual. For instance, seeing someone wear a hat made of fruit would be *bizarre*. It relates to strangeness, not memorability.
- **Parity:** This word signifies the state of being equal or equivalent, often used in discussions about status, rights, or value. For example, *parity* in wages means equal pay for equal work. This has no connection to being forgotten.

Comparing Word Meanings for the 'Forgotten' Concept

Here's a quick comparison to highlight the differences:

Word	Definition	Relation to 'Not Able to be Forgotten'
Discrepancy	A difference or inconsistency.	None
Indelible	Cannot be removed or erased; permanent.	Directly means not able to be forgotten .
Bizarre	Very strange or unusual.	None
Parity	The state of being equal.	None

Final Choice for the Word

Considering the meanings, the word that specifically signifies something **not able to be forgotten** is **Indelible**. It accurately captures the idea of a permanent memory or impression.

7. Answer: b

Explanation:

Understanding the Idiom: Meaning of 'Throw a Spanner'

The phrase 'throw a spanner' is an idiom that describes an action that causes disruption or problems. A spanner, also known as a wrench, is a tool. If you imagine throwing a metal tool like a spanner into the moving parts of a machine, it would likely cause damage, jam the mechanism, and bring its operation to a halt. This literal image helps us understand the figurative meaning of the idiom.

Analyzing the Options for 'Throw a Spanner'

Let's look at each option to see how it relates to the meaning of the idiom 'throw a spanner':

- **Option 1:**

Get organized and do things effectively

- This describes being efficient and orderly. The idiom 'throw a spanner' implies the opposite – causing disorder and inefficiency, not preventing it.

- **Option 2:**

To do something that prevents a plan or activity from succeeding

- This option perfectly matches the core meaning of the idiom. Doing something that prevents success is exactly like throwing a spanner into the works, causing disruption and failure.

- **Option 3:**

Stuck in a difficult circumstance with no escape

- This describes a situation of being trapped or facing a predicament. While the *result* of throwing a spanner might put someone in a difficult spot, the idiom itself refers to the *action* of causing the disruption, not the state of being stuck.

- **Option 4:**

Being grumpy or angry about something

- This relates to a person's emotional state (mood). The idiom 'throw a spanner' refers to an action that affects an external plan or activity, rather than an internal feeling.

- **Option 5:** (This option is empty and therefore cannot be evaluated.)

Determining the Correct Meaning of 'Throw a Spanner'

Based on the analysis, the idiom 'throw a spanner' means to introduce a problem or obstacle that disrupts a plan or process, preventing it from succeeding as intended. It signifies causing a malfunction or hindrance.

Therefore, the option that accurately defines the meaning of the idiom 'throw a spanner' is:

Option 2: To do something that prevents a plan or activity from succeeding

This correctly captures the essence of disrupting a plan or activity, just like throwing a physical spanner would disrupt a machine.

8. Answer: c

Explanation:

Understanding the Idiom: Set Store By

The question asks for the meaning of the idiom "Set store by". Idioms are phrases where the words together have a meaning that is different from the dictionary definitions of the individual words. Understanding the specific meaning of idioms like "set store by" is crucial for comprehending English usage.

Meaning of "Set Store By"

The phrase "**set store by**" means to value something or someone highly, or to consider it important. When you **set store by** something, you place significant importance or value upon it. It implies that you believe it holds considerable worth or significance.

Analysis of Options

Let's examine each option to determine which one accurately reflects the meaning of "set store by":

- **Option 1: Being very happy**
This option describes a state of happiness or joy. While valuing something might bring happiness, it is not the direct meaning of the idiom "**set store by**".
- **Option 2: Doing something in an easier and least expensive manner**
This describes efficiency or finding a shortcut. It relates to how a task is performed, not the value placed on something, so it doesn't match the meaning of "**set store by**".
- **Option 3: To believe that something is very important**
This option perfectly captures the essence of the idiom "**set store by**". It signifies

assigning high importance or value to something. For example, someone might **set store by** punctuality, meaning they believe being punctual is very important.

- **Option 4: Staying informed and updated about everything**

This relates to being knowledgeable or current. While staying informed might be important to some, it's not the definition of the idiom "**set store by**".

- **Option 5:** This option is empty and does not provide a meaning.

Conclusion on "Set Store By"

Based on the analysis, the idiom "**set store by**" means to consider something very important. Therefore, the option that correctly defines this idiom is the one stating "**To believe that something is very important**".

9. Answer: d

Explanation:

- **Idiom:** Throw in the towel
- **Task:** Identify the phrase that best matches the meaning of the idiom.

Idiom Meaning Explained: Throw in the Towel

The phrase "Throw in the towel" is an idiom that means to give up, surrender, or admit defeat. It often implies stopping an effort or struggle because you realize you cannot succeed.

The saying originates from the sport of boxing. When a boxer is taking too much punishment or is unable to continue fighting, their trainer or coach might literally throw a towel into the ring as a signal to the referee to stop the match. This action signifies conceding defeat to protect the boxer.

Options Analysis: Throw in the Towel

Let's look at each option provided and see how it compares to the meaning of "Throw in the towel":

- **Option 1: To quit in defeat or never give up.**

This option is contradictory. "Quit in defeat" means to give up, while "never give up" means to persevere. An idiom usually has a consistent meaning.

- **Option 2: To continue in defeat and never give up.**

This suggests persisting even when losing, which is the opposite of what "Throw in the towel" means. The idiom signifies stopping, not continuing.

- **Option 3: To continue in defeat or give up.**

This option is also contradictory. While "give up" aligns with the idiom, "continue in defeat" suggests struggling on, which is not the primary meaning of surrendering.

- **Option 4: To quit in defeat or give up.**

This option accurately captures the essence of the idiom "Throw in the towel". Both "quit in defeat" and "give up" mean to stop trying and accept failure, which is the core meaning of the phrase.

Selected Meaning for Throw in the Towel

Comparing the options, the phrase "To quit in defeat or give up" best expresses the meaning of the idiom "Throw in the towel". It correctly conveys the idea of surrendering or ceasing an effort due to failure or the inability to continue.

10. Answer: a

Explanation:

Understanding Water as a Vital Planet Resource

The passage emphasizes that **water** is the most crucial **resource** on our **planet**. It highlights the fundamental need for **conserving water** because it is essential for all **living beings** and even for many human-made objects, like concrete used in

building houses. Water covers over 70% of the Earth's surface, yet managing this resource effectively is critical for our survival and the health of the entire **planet Earth**.

Choosing the Correct Preposition for Blank 1

The first blank appears in the sentence: "Water is the single most important resource on the planet that we live _____ (1) _____". We need to select the most suitable preposition to correctly complete the phrase describing our relationship with the planet.

Let's analyze the options provided for blank 1:

- **Option 1: on** – The phrase "live **on** the planet" is grammatically correct and commonly used. It signifies residing or existing upon the surface of the planet. This fits the context perfectly, as humans and other life forms exist on the Earth's surface.
- **Option 2: for** – Using "live **for** the planet" would imply that the purpose of our existence is the planet itself, which, while perhaps a noble sentiment, doesn't fit the intended meaning of simply stating where we reside. Grammatically, it doesn't fit the standard phrasing for location.
- **Option 3: in** – The phrase "live **in** the planet" typically suggests being inside the planet, like living within caves or underground. While we live within the Earth's environment or biosphere, the standard preposition for referring to our existence on the surface is 'on'.
- **Option 4: None of these** – Since 'on' is a suitable fit, this option is incorrect.

Therefore, the preposition that correctly and naturally completes the sentence is '**on**'. The completed sentence reads: "Water is the single most important resource on the planet that we live **on**". This emphasizes the dependence of life on the planet itself.

11. Answer: d

Explanation:

Water Importance: Blank 2 Context

The task is to find the correct word for the second blank (blank 2) in a passage discussing the critical role of water as a **resource**. The passage highlights that water is essential for **living beings** and needs careful management. Identifying the correct word involves understanding grammar and context.

Analyzing Sentence Structure for Blank 2

We need to focus on the sentence containing the second blank: "Water is the basic necessity for all living beings, and it is incredibly important to _____ (2) _____ it."

Grammatically, the structure "it is incredibly important to _____" requires the infinitive form of a verb. The infinitive is typically formed using the base form of the verb. In this case, the base verb relates to taking care of water, which is 'conserve'. The pronoun 'it' at the end refers back to 'water'.

Evaluating Verb Forms for Blank 2

Let's examine each option to see which fits the grammatical requirement and the context of conserving water:

- **Option 1: Conserving** – This is the present participle form. The sentence "important to conserving it" is grammatically incorrect. The structure "to + verb-ing" is not standard for expressing importance or necessity here.
- **Option 2: Conserved** – This is the past participle. The sentence "important to conserved it" is incorrect. This form is used differently, for example, "Water should be conserved."
- **Option 3: has conserve** – This option is grammatically incorrect and does not fit the "to _____" structure required by the sentence.
- **Option 4: conserve** – This is the base form of the verb. The phrase "important to **conserve** it" correctly uses the infinitive form. This makes sense contextually, stressing the need to take care of water.

Selecting the Correct Word for Blank 2

The analysis shows that the base form of the verb, 'conserve', is the only option that correctly fits the grammatical structure required after "to" in the sentence. This choice accurately conveys the message about the necessity of taking care of water resources.

12. Answer: c

Explanation:

The correct answer is 'but also.'

★ Key Points

- Not only ... but also is used to connect and emphasize two phrases or two words at the same position.
- Different Structures:
 - Subject + Verb + not only + Adjective + but also + Adjective
 - Subject + Verb + not only + Adverb + but also + Adverb
 - Subject + Verb + not only + Noun + but also + Noun
 - Subject + not only + Verb + but also + Verb
 - Example: *I like not only cheesecake but also cake.*
- Hence, 'but also her' should be used to make the sentence grammatically correct.
- Hence, the correct answer is 'but also.'
- The Correct Sentence: *It is not only important for living and breathing things, **but also** for many inanimate objects that humans create.*

★ Additional Information

- A conjunction is a joiner, a word that connects (conjoins) parts of a sentence.
- Coordinating conjunctions join equals to one another.
 - Example : *Most children like sweets and cookies.*
- Coordinating conjunctions go in between items joined, not at the beginning or end.
 - Example : *I like coffee, but I don't like tea.*

★ Hinglish

- Not only ... but also एक ही स्थिति में दो वाक्यांशों या दो शब्दों को जोड़ने और उन पर जोर देने के लिए भी उपयोग किया जाता है।
- विभिन्न संरचनाएं:
 - Subject + Verb + not only + Adjective + but also + Adjective
 - Subject + Verb + not only + Adverb + but also + Adverb
 - Subject + Verb + not only + Noun + but also + Noun
 - Subject + not only + Verb + but also + Verb
 - Example: *I like not only cheesecake but also cake.*
- अतः वाक्य को व्याकरणिक रूप से शुद्ध करने के लिए 'but also' का प्रयोग करना चाहिए।

13. Answer: b

Explanation:

Understanding Water Conservation Importance

The question asks us to identify the correct preposition to fill in the fourth blank (blank 4) in the provided passage. The passage discusses the critical role of **water** as a resource and the necessity of its conservation. Blank 4 appears in the sentence: "It is essential to conserve and save water _____ (4) _____ ourselves and the entire planet Earth." We need to find the word that best fits this context, indicating the reason or beneficiary for saving water.

Analyzing the Context for Blank 4

The sentence structure suggests that saving water is done with a specific purpose or for the benefit of certain entities. The entities mentioned are "ourselves" (humans) and "the entire planet Earth". Therefore, the preposition required should link the action (conserve and save water) to its beneficiaries or purpose.

Evaluating Preposition Options for Blank 4

Let's examine each option provided to fill blank 4:

- **Option 1: to** – Using 'to' would imply direction, like "save water *to* ourselves," which doesn't grammatically or logically fit the intended meaning of benefiting ourselves.
- **Option 2: for** – Using 'for' fits perfectly: "save water *for* ourselves and the entire planet Earth." This indicates that the conservation is done with the purpose of benefiting humans and the planet.
- **Option 3: at** – Using 'at' refers to a location or a specific point, such as "save water *at* home." It does not fit the context of beneficiaries or purpose in this sentence.
- **Option 4: by** – Using 'by' typically indicates the means or method by which an action is performed, like "save water *by* reducing usage." While related to conservation, "save water *by* ourselves" would mean that we ourselves are the ones performing the act of saving, which isn't the primary meaning required here; the sentence focuses on *why* we save water.

Conclusion on the Correct Preposition

Based on the analysis, the preposition 'for' is the most suitable word for blank 4. It correctly expresses the purpose and beneficiaries of conserving water, linking the action to "ourselves and the entire planet Earth." This aligns with the overall message of the passage about the vital importance of water conservation for survival and well-being.

14. Answer: b

Explanation:

Identifying Increased Emotional Resilience Percentage

The question asks to identify the percentage of young people who experienced an increase in emotional resilience for dealing with adversity, based on the provided text about the iheart mental wellbeing program.

Analyzing Program Effectiveness on Resilience

The passage highlights the results of the iheart programme. It specifically mentions the impact on the participants' ability to handle challenges.

The text states: "Our role is to educate young people that they do NOT have a resilience deficit. Rather, we empower them with the confidence that they CAN uncover their built-in mental health, wellbeing and resilience so that they can overcome their challenges and realise their extraordinary potential."

Following this, the passage provides specific statistics on the program's success. Regarding emotional resilience, it explicitly says:

90% saw increased emotional resilience for dealing with adversity.

Determining the Correct Option

Based on the direct information provided in the passage, 90% of children reported an increase in emotional resilience for dealing with adversity after completing the iheart programme.

Therefore, the correct option is the one that matches this percentage.

Option 2 states "90%", which aligns perfectly with the information presented in the text.

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15. Answer: b

Explanation:

Analyzing the Impact of the iheart Programme on Youth

The question asks to identify the specific percentage of children who reported noticing a positive change in themselves after completing the **iheart programme**, based on the provided text passage.

Key Findings from the Passage Regarding iheart Programme Results

The passage details the focus on the youth mental health crisis and introduces the **iheart programme** as an innovative educational approach. It emphasizes that the programme challenges existing practices by educating young people about their innate resilience and mental wellbeing. To support its effectiveness, the passage provides several statistics:

- 98% of children noticed a positive change in themselves.
- 95% would recommend the programme to a friend.
- 90% saw increased emotional resilience for dealing with adversity.

Identifying the Percentage of Positive Change Noticed by Children

The passage explicitly states the results of the programme. Specifically, when discussing the outcomes, it mentions:

"98% of children noticed a positive change in themselves at the end of the iheart programme."

This statement directly answers the question posed.

Evaluating the Provided Options

Let's compare the information from the passage to the options given:

- Option 1: 85% – This percentage is not mentioned in the passage in relation to positive change.
- Option 2: 98% – This matches the statistic provided in the passage for children noticing a positive change.
- Option 3: 90% – The passage states that 90% saw increased emotional resilience, not overall positive change.
- Option 4: 75% – This percentage is not mentioned in the passage.

Conclusion on iheart Programme Effectiveness

Based on the direct information presented in the text, the correct percentage of children who noticed a positive change in themselves after completing the **iheart programme** is 98%. This corresponds to the second option provided.

16. Answer: b

Explanation:

Understanding Resilience in the Youth Mental Health Context

The question asks for a word that can replace **resilience** as used in the provided passage about the youth mental health crisis. To find the best replacement, we need to understand how **resilience** is used in the text.

Passage Analysis: The Meaning of Resilience

- The passage discusses the **youth mental health crisis** and critiques existing solutions that focus on a supposed "resilience deficit" in young people.
- The organization 'iheart' aims to educate young people that they do not have a deficit, but rather possess **built-in mental health, wellbeing and resilience**.
- The goal is to empower them to **overcome their challenges** and realize their potential.
- The program focuses on educating children about their **innate resilience**.
- Key outcomes include increased **emotional resilience** for dealing with adversity.

Based on this context, **resilience** refers to the ability to cope with and recover from difficulties, adapt to challenges, and bounce back from adversity.

Evaluating the Options for Replacing Resilience

Let's examine each option:

- **1. Rigidity:** This term means being stiff, unbending, or unable to change. It is the opposite of adapting to challenges, making it unsuitable as a replacement for

resilience.

- **2. Flexibility:** This means the ability to adapt to new conditions or change easily. In the context of facing challenges and adversity, **flexibility** aligns closely with the capacity to bounce back and adjust, which is a core component of **resilience**.
- **3. Fragility:** This term describes being weak, delicate, and easily broken. It represents the opposite of **resilience**, suggesting a lack of ability to withstand or recover from difficulties.
- **4. Weakness:** This denotes a lack of strength or power. Similar to fragility, **weakness** is contrary to the concept of **resilience**, which implies strength in overcoming adversity.

Conclusion: The Best Synonym for Resilience

Considering the passage's emphasis on overcoming challenges and dealing with adversity, **flexibility** is the most appropriate word to replace **resilience**. It captures the adaptive capacity needed to navigate difficult situations effectively.

17. Answer: b

Explanation:

Understanding the Sentence Sequence Task

This question asks us to find the correct order for a set of sentences (P, Q, R, S) that logically follows an initial sentence fragment. The goal is to arrange these sentences to form a coherent paragraph, focusing on the narrative about the papa telling a story and the children's reactions.

Analyzing the Sentences for Logical Flow

Let's break down the provided pieces:

- **Initial Fragment:** "The papa had told the story" – This sets the scene.

- **P:** "They all knew it as well as he knew it himself," – This highlights the children's deep familiarity with the story.
- **Q:** "and they could keep" – This phrase suggests a consequence or ability, starting a new clause that needs completion.
- **R:** "so often that the children knew just exactly what to expect the moment he began." – This sentence directly explains the effect of telling the story frequently, connecting well with the initial fragment.
- **S:** "from making mistakes," – This phrase seems to complete the clause started by Q, forming "they could keep from making mistakes".

Step-by-Step Solution Derivations

To find the correct sequence, we'll connect the sentences logically:

1. **Starting Point:** We begin with the fragment "The papa had told the story".
2. **Connecting R:** Sentence R fits perfectly after the initial fragment. It explains the frequency ("so often") and the result ("that the children knew just exactly what to expect the moment he began"). This establishes the context clearly. The sentence becomes: "The papa had told the story **so often that the children knew just exactly what to expect the moment he began.**"
3. **Adding P:** Sentence P elaborates on the children's knowledge mentioned in R. It naturally follows, emphasizing their thorough understanding: "The papa had told the story so often that the children knew just exactly what to expect the moment he began. **They all knew it as well as he knew it himself,**".
4. **Combining Q and S:** Sentences Q and S form a complete thought when combined. Q starts with "and they could keep", and S provides the necessary ending "from making mistakes". This creates the clause: "**and they could keep from making mistakes,**". This clause logically follows the statements about the children's deep knowledge of the story.
5. **Determining the Order:** By placing R first, followed by P, and then the combination of Q and S, we create a coherent narrative flow. Therefore, the correct sequence is R, P, Q, S.

The complete paragraph reads: "The papa had told the story so often that the children knew just exactly what to expect the moment he began. They all knew it as well as he knew it himself, and they could keep from making mistakes."

Final Correct Sequence: RPQS

The logical arrangement of the sentences is RPQS. This sequence ensures that the story flows smoothly, explaining the frequency of the story, the children's familiarity with it, and a resulting capability derived from that familiarity.

This order corresponds to Option 2.

18. Answer: b

Explanation:

Finding the Correct Sequence for Narrative Completion

This question requires us to arrange the given sentences (P, Q, R, S) in the correct order to complete a short narrative logically and coherently. The narrative starts with Gimme the Ax having a thought, and the sequence we choose should fit naturally after his initial statement and lead smoothly towards the description involving a wheelbarrow.

Analyzing the Sentences

Let's break down each sentence to understand its potential role in the story:

- **Q:** "Today I go to the post office and around, looking around." – This sounds like a plan or intention Gimme the Ax is considering.
- **R:** "Maybe I will hear about something happening last night when I was sleeping." – This sentence logically follows Q, explaining Gimme the Ax's motivation for going out and looking around – he hopes to gather information.
- **P:** "Maybe a policeman began laughing." – This seems like an observation Gimme the Ax might make while he is out. It's a separate event or thought.
- **S:** "fell in a cistern and came out with" – This is a sentence fragment describing an action or event. Crucially, it ends with "came out with", which sets up a continuation.

Building the Narrative Sequence

We need to find the order that makes the most sense. Let's evaluate the proposed correct sequence, QRPS:

1. **Q:** The narrative begins with Gimme the Ax's plan: "Today I go to the post office and around, looking around." This sets the scene for his actions.
2. **R:** This sentence follows Q naturally, providing a reason for his actions: "Maybe I will hear about something happening last night when I was sleeping." This shows his purpose for observing his surroundings.
3. **P:** "Maybe a policeman began laughing." This is likely an observation Gimme the Ax makes during his outing. While slightly disconnected from R, it fits as something he might witness.
4. **S:** "fell in a cistern and came out with". This sentence fragment describes a surprising event. Placed last in the sequence, it leads directly into the final part of the sentence provided in the question setup.

Putting it all together, the sequence QRPS creates a narrative flow:

Gimme the Ax is thinking about his plans (Q), his reasons for those plans (R), makes an observation (P), and then experiences an unusual event (S) that results in the wheelbarrow described.

The full sentence structure would be: "One day Gimme the Ax said to himself, Today I go to the post office and around, looking around. Maybe I will hear about something happening last night when I was sleeping. Maybe a policeman began laughing. fell in a cistern and came out with a wheelbarrow full of goldfish wearing new jewelry."

The sentence S, "fell in a cistern and came out with", fits perfectly with the concluding phrase "a wheelbarrow full of goldfish wearing new jewelry". This structure indicates that the event described in S is the outcome or the main point of the narrative segment.

Evaluating Other Options

Other sequences like PRQS, RQSP, or SPRQ disrupt the logical flow. For instance, starting with P or R before establishing Gimme the Ax's plan (Q) doesn't build the

narrative effectively. Ending with P after S (as in RQSP) would also be less logical, as S describes the core event connected to the wheelbarrow.

Conclusion

The sequence QRPS provides the most logical progression of thoughts, observations, and events, culminating in the description of the wheelbarrow. It follows a common narrative structure: intention → reason → observation → culminating event.

The correct sequence is **QRPS**.

Sequence	Sentence Q	Sentence R	Sentence P	Sentence S
QRPS	Today I go to the post office and around, looking around.	Maybe I will hear about something happening last night when I was sleeping.	Maybe a policeman began laughing.	fell in a cistern and came out with

19. Answer: b

Explanation:

Sequencing the Shoemaker's Story: Filling the Blanks Correctly

This question asks us to find the correct order for the fragments P, Q, R, and S to complete the sentence about a **poor shoemaker** and how his situation improved thanks to **talented elves**. We need to arrange these parts to create a meaningful and grammatically correct sentence.

Analyzing the Sentence Fragments

Let's look at each fragment:

- **P:** "to their last piece of leather" – This describes the extent of the shoemaker's poverty, indicating he had very little left to work with.
- **Q:** "and his wife are down" – This phrase introduces the shoemaker's wife and describes their poor condition, logically following the mention of the shoemaker.
- **R:** "when their fortunes" – This fragment acts as a conjunction, starting a clause that introduces a change in their circumstances.
- **S:** "change thanks to help from" – This explains the cause of the change mentioned in fragment R, specifically attributing it to assistance received.

Constructing the Sentence with the QPRS Sequence

Let's assemble the sentence using the sequence QPRS, which is indicated as the correct option:

1. Start with the given beginning: "A poor shoemaker"
2. Add fragment **Q**: "A poor shoemaker **and his wife are down...**" This logically establishes the subjects (shoemaker and his wife) and their state (down on their luck/poor).
3. Add fragment **P**: "**...to their last piece of leather...**" This phrase effectively modifies the state described in Q, elaborating on their poverty. The sentence now reads: "A poor shoemaker and his wife are down to their last piece of leather..."
4. Add fragment **R**: "**...when their fortunes...**" This fragment introduces the turning point. It connects their dire situation to a subsequent change. The sentence becomes: "A poor shoemaker and his wife are down to their last piece of leather when their fortunes..."
5. Add fragment **S**: "**...change thanks to help from...**" This part explains how the fortunes changed, linking it to the help received. The sentence now reads: "A poor shoemaker and his wife are down to their last piece of leather when their fortunes change thanks to help from..."
6. Finally, add the concluding part: "...talented elves."

The Complete Correct Sentence

Putting it all together, the sequence QPRS creates the following complete and coherent sentence:

"A poor shoemaker **and his wife are down to their last piece of leather** when their **fortunes change thanks to help from talented elves**."

Conclusion on the Sequence

The sequence QPRS provides the most logical flow, detailing the shoemaker's initial poverty ("**and his wife are down**", "**to their last piece of leather**") and then explaining the positive turn of events ("**when their fortunes change thanks to help from**") involving the **talented elves**. This order makes the sentence grammatically sound and tells a clear story.

20. Answer: b

Explanation:

Finding the Correct Sequence for the Fill-Up

This question requires us to determine the correct order of the given sentence fragments (Q, P, R, S) to complete the initial statement: "In the reign of good Queen Bess, _____ called Tommy and Margery." We need to arrange the fragments Q, P, R, and S logically and grammatically.

Analyzing the Sentence Fragments

Let's look at each fragment and its potential role in the sentence:

- **Q.** "there was an honest, industrious countryman named Meanwell," – This fragment introduces the main character of the sentence.
- **P.** "who, living under a hard landlord," – This fragment provides additional information about Meanwell, describing his living situation. The word "who" makes it a relative clause, likely following the name Meanwell.
- **R.** "was cruelly turned out of his little farm," – This fragment describes an action or event that happened, likely to Meanwell. It seems to follow the description in P.

- **S.** "which had enabled him to support a wife and two children," – This fragment describes the farm mentioned in R. The word "which" indicates it's a relative clause modifying "farm".

The sentence concludes with ", called Tommy and Margery," which likely names the children mentioned in fragment S.

Step-by-Step Sentence Construction

Let's assemble the sentence using the sequence QPRS:

1. Start with the introductory phrase: "In the reign of good Queen Bess,"
2. Add fragment **Q** to introduce the character: "In the reign of good Queen Bess, there was an honest, industrious countryman named Meanwell,"
3. Add fragment **P** to describe Meanwell: "In the reign of good Queen Bess, there was an honest, industrious countryman named Meanwell, who, living under a hard landlord,"
4. Add fragment **R** to describe the event: "In the reign of good Queen Bess, there was an honest, industrious countryman named Meanwell, who, living under a hard landlord, was cruelly turned out of his little farm,"
5. Add fragment **S** to describe the farm and its purpose: "In the reign of good Queen Bess, there was an honest, industrious countryman named Meanwell, who, living under a hard landlord, was cruelly turned out of his little farm, which had enabled him to support a wife and two children,"
6. Complete the sentence with the final phrase, naming the children: "In the reign of good Queen Bess, there was an honest, industrious countryman named Meanwell, who, living under a hard landlord, was cruelly turned out of his little farm, which had enabled him to support a wife and two children, called Tommy and Margery."

Confirming the Correct Sequence

The sequence QPRS creates a coherent and grammatically correct sentence that logically connects all the parts. It introduces the character, describes his circumstances and misfortunes, explains the significance of the lost farm, and finally names his children.

Therefore, the correct sequence to fill in the blanks is QPRS.

21. Answer: b

Explanation:

Understanding Word Choice for Decency and Fair Play

The question asks for the most suitable word to complete the sentence: "His _____ of decency and fair play made him refuse the offer." This sentence implies that the person acted based on their understanding or appreciation of ethical standards like decency and fair play.

Analyzing the Options

Let's examine each option to see how well it fits the context:

- **Option 1: watch** – The word "watch" typically refers to observing or looking at something. Using "watch of decency" does not form a meaningful or common English phrase in this context. It doesn't explain why someone would refuse an offer based on ethical principles.
- **Option 2: sense** – "Sense" refers to an awareness, understanding, or feeling. The phrase "sense of decency" and "sense of fair play" are very common idioms. They mean having an understanding and appreciation of what is decent and fair. Possessing this **sense** would naturally lead someone to refuse an offer that violates these principles. This fits the sentence perfectly.
- **Option 3: ignorance** – "Ignorance" means a lack of knowledge or information. If the sentence were "His ignorance of decency...", it would imply he didn't know what decency was. While ignorance might lead to unethical behavior, the sentence structure suggests the *presence* of a quality related to decency caused the refusal. Having a **sense** of decency explains the refusal better than lacking knowledge about it.
- **Option 4: lack** – "Lack" means the absence or deficiency of something. If we use "lack", the sentence would read "His **lack** of decency...". This implies the person did not have decency, which would contradict the idea that his principles

caused him to refuse the offer. Alternatively, "His **lack** of fair play..." implies he himself didn't play fair, which doesn't fit the context of refusing an offer *because* of fair play. While "lack of sense" is possible, "sense of decency" is the standard idiom that fits the situation where someone upholds principles.

Identifying the Best Fit

The key is the common English idiom "sense of decency" or "sense of fair play". This idiom refers to a person's moral compass and their understanding of social norms and ethical conduct. When someone has a strong **sense** of these qualities, they are likely to reject actions or offers that compromise them.

Therefore, the sentence highlights that the individual's inherent understanding and appreciation (their **sense**) of **decency** and **fair play** motivated their decision to **refuse** the offer.

Conclusion

The word **sense** correctly completes the sentence by referring to the person's understanding and adherence to the principles of decency and fair play, which directly led to their refusal of the offer.

22. Answer: d

Explanation:

- **Understanding the Sentence Context**
 - The core task is to find the most suitable word to complete the sentence: "Maybe he was trying to protect her, therefore he was trying to _____ the problem."
 - The sentence structure uses "therefore," indicating a cause-and-effect relationship. The reason for the action is to "protect her."
 - The action is directed towards "the problem." We need a verb that describes how one might interact with a problem when the motive is protection.

- **Keywords:** Protect, Problem, Sentence Completion, Vocabulary
- **Evaluating Word Choices for the Problem**
 - Let's examine each option to see how well it fits the context of protecting someone from a problem:
 - **Option 1: endorse**
 - *Definition:* To declare one's public approval or support.
 - *Analysis:* Supporting or approving a problem doesn't make sense, especially when trying to protect someone. This word does not fit the context.
 - **Option 2: raise**
 - *Definition:* To lift up or move to a higher position; to bring attention to something.
 - *Analysis:* While you can "raise an issue" or "raise a concern," bringing attention to a problem is the opposite of protecting someone from it, unless the intention was to solve it collaboratively, which isn't implied here. It doesn't fit the protective motive as well as other options might.
 - **Option 3: issue**
 - *Definition:* To supply or distribute; to flow out.
 - *Analysis:* The phrase "issue the problem" is not standard English usage in this context. You might "issue a warning about a problem" but not the problem itself. This word is grammatically awkward and contextually inappropriate.
 - **Option 4: conceal**
 - *Definition:* To keep something secret; to hide it from sight.
 - *Analysis:* This word fits the context perfectly. If someone wants to protect another person from a problem, a common strategy is to hide or **conceal** the problem to prevent them from worrying, facing harm, or dealing with it directly.
- **Selecting the Most Appropriate Word**
 - Comparing the options, **conceal** is the only word that logically connects the action (dealing with the problem) with the motive (protecting her). Hiding or concealing a problem is a direct way to attempt protection.
 - The other words (endorse, raise, issue) do not align with the implied protective action towards a problem.

- **Keywords:** Appropriate Word, Vocabulary Fit, Contextual Meaning

Therefore, the most appropriate word to fill in the blank is **conceal**.

23. Answer: a

Explanation:

Understanding Word Choice: Extracting Medicines

The question asks for the most suitable verb to complete the sentence: "They can _____ precious medicines from ordinary substances." We need a word that describes the process of obtaining or deriving valuable medicines from common materials.

Analyzing the Options for the Sentence Context

Let's examine each option to see how it fits the meaning:

- **abstract:** This verb means to extract or obtain something (like information or a substance) from a larger source. In this context, it perfectly describes the process of getting precious medicines *from* ordinary substances.
- **add:** This verb means to join or combine something with something else. It doesn't fit here because the sentence is about obtaining something *from* a source, not combining things.
- **insert:** This verb means to put something into something else. This is incorrect as it doesn't describe obtaining medicines from substances.
- **dilute:** This verb means to make something weaker, usually by adding liquid. This is the opposite of extracting something valuable and does not fit the sentence's meaning.

Selecting the Most Appropriate Verb

Based on the analysis, the word **abstract** is the best fit. It accurately conveys the meaning of extracting or obtaining precious medicines from ordinary substances.

The sentence highlights the skill or ability to derive something valuable from simple beginnings.

Therefore, the completed sentence is: "They can **abstract** precious medicines from ordinary substances."

24. Answer: d

Explanation:

Understanding the Principle of Conservation of Energy

The question asks us to identify the correct word to complete a sentence defining the **principle of physics** known as the **conservation of energy**. This fundamental principle relates to how energy behaves within a **closed system**.

Explaining Energy Conservation

The **conservation of energy** is a key concept in physics. It states that energy cannot be created or destroyed, only converted from one form to another. In simpler terms, the total amount of energy in an isolated or **closed system** remains the same over time. Think of it like shuffling money between different pockets – the total amount of money you have doesn't change, it just moves around.

Analyzing the Blank in the Sentence

The sentence provided is: "Conservation of energy is the principle of physics according to which the energy of interacting bodies or particles in a closed system remains ____." We need a word that describes the state of energy in a **closed system** according to this principle. Since energy is conserved, it means the total energy does not increase or decrease; it stays the same.

Evaluating the Given Options

Let's look at each option to see which one fits the definition:

- **chronicle:** This word refers to a record of events, often in chronological order. It has no relation to the physical concept of energy remaining unchanged.
- **cardinal:** This word means of basic importance or principal. While the conservation of energy is important, 'cardinal' does not describe the state of energy itself within the system.
- **correction:** This word means the action or way of correcting something that is wrong. It doesn't fit the context of energy remaining in a specific state.
- **constant:** This word means unchanging over time or across different instances. This perfectly describes the total energy within a **closed system** as stated by the **principle of conservation of energy**. The energy level remains the same, or **constant**.

Conclusion on Filling the Blank

Based on the definition and meaning of the **conservation of energy**, the energy within a **closed system** is unchanging. Therefore, the word 'constant' is the most appropriate choice to fill in the blank, completing the sentence accurately.

25. Answer: d

Explanation:

Grammatical Error Analysis in Sentence Construction

This question requires identifying the grammatical error in the sentence: "I am sure that neither Juhi nor Jaya are responsible for breaking the vase." We need to examine each part of the sentence to find the mistake, focusing on rules of grammar.

Understanding Subject-Verb Agreement with 'Neither...Nor'

A crucial grammar rule involves subject-verb agreement, especially when using correlative conjunctions like '**neither...nor**'. This rule dictates that the verb must match the number (singular or plural) of the subject that is nearest to it.

Sentence Component Breakdown

Let's look at the structure of the sentence:

- The introductory clause is "I am sure that".
- The subject pair is connected by "neither...nor": Juhi and Jaya.
- The verb phrase is "are responsible".
- The prepositional phrase is "for breaking the vase".

In the construction "neither Juhi nor Jaya", the subject closest to the verb is 'Jaya'.

Pinpointing the Grammatical Fault

The subject 'Jaya' is a **singular** noun. According to the subject-verb agreement rule for 'neither...nor', the verb should also be singular. However, the sentence uses the plural verb '**are**'. This mismatch between the singular subject ('Jaya') and the plural verb ('are') constitutes the grammatical error.

The segment identified with the error is '**are responsible**'.

Correction of the Subject-Verb Agreement

To correct this grammatical mistake, the plural verb 'are' should be replaced with its singular form, 'is', to agree with the nearest subject 'Jaya'.

The corrected sentence would read: "I am sure that neither Juhi nor Jaya **is** responsible for breaking the vase."

Thus, the segment '**are responsible**' contains the grammatical inaccuracy.

26. Answer: b

Explanation:

Sentence Segment Grammatical Error Analysis

This explanation focuses on identifying the grammatical error within the provided sentence and its segments. We will examine each part of the sentence to pinpoint the mistake.

Understanding Uncountable Nouns: The Case of 'Furniture'

A key concept in English grammar is the difference between countable and uncountable nouns. Uncountable nouns refer to substances, concepts, or things that cannot typically be counted as separate items. Examples include 'water', 'information', 'advice', and importantly, 'furniture'.

Key Points about Uncountable Nouns:

- They do not usually have a plural form (e.g., we say 'furniture', not 'furnitures').
- They are treated as singular in sentences, requiring singular verbs (e.g., 'The furniture **is** here').
- The demonstrative adjectives 'this' and 'that' are used with them (e.g., 'this furniture').

Incorrectly pluralizing uncountable nouns, like forming 'furnitures', is a common grammatical error.

Step-by-Step Analysis of Sentence Segments

Let's break down the sentence: "This furnitures has been taken on hire for the function in the college." and evaluate the segments provided in the options:

Segment 1: 'on hire for the function'

This segment deals with the terms of acquiring the items. The phrase 'on hire' is a standard idiomatic expression meaning 'rented' or 'leased'. The preposition 'for' correctly indicates the purpose. Therefore, this segment is grammatically sound.

Segment 2: 'This furnitures has'

This segment contains the core grammatical error. As established earlier, 'furniture' is an uncountable noun. The sentence incorrectly uses the non-standard plural form 'furnitures'. It should use the singular form 'furniture'. The sentence also correctly uses the singular demonstrative 'This' and the singular verb 'has', which agree with the *intended* singular nature of the noun, but the pluralization error in 'furnitures' makes this segment incorrect.

The correct phrasing should be: 'This **furniture** has'.

Segment 3: 'been taken'

This part of the sentence forms the passive voice of the verb 'take'. The structure 'has been taken' (present perfect passive) is grammatically correct and fits the context, indicating that the furniture was subjected to the action of being taken on hire.

Segment 4: 'in the college'

This is a prepositional phrase indicating the location where the function is taking place. The preposition 'in' is appropriate for signifying location within a place like a college. This segment is grammatically correct.

Correcting the Grammatical Error

To correct the sentence, the word 'furnitures' needs to be changed to its proper uncountable form, 'furniture'.

The corrected sentence reads: "This **furniture** has been taken on hire for the function in the college."

27. Answer: d

Explanation:

- The question asks to identify the **grammatical error** within a given **sentence segment**.

- The sentence is: "Not only they won / the test match / but they also / broke many previous records."
- We need to examine each part of the sentence to find the specific segment containing the error.

Grammatical Error Identification in Sentence Segment

The sentence uses the correlative conjunction pair "**not only... but also**". This structure connects two related ideas. A key grammatical rule applies when "**not only**" begins a sentence: it typically requires subject-verb inversion in the clause that follows it.

Let's break down the sentence:

- **Segment 1:** "Not only they won"
- **Segment 2:** "the test match"
- **Segment 3:** "but they also"
- **Segment 4:** "broke many previous records."

Understanding the "Not Only... But Also" Rule

When "**not only**" starts a sentence to connect two clauses, the standard grammatical structure requires an inversion, meaning the auxiliary verb (or modal verb) comes before the subject. If there is no auxiliary verb present, the verb "**do**" (in its appropriate form: *do*, *does*, *did*) is used.

Consider the structure:

- Correct structure: "**Not only** + auxiliary verb + subject + main verb..."
- Example: "Not only **did** she sing beautifully, but she also danced gracefully."
- Example: "Not only **is** he intelligent, but he is also diligent."

Analyzing the Incorrect Segment

The first segment, "**Not only they won**", violates this inversion rule. Here:

- "**Not only**" starts the sentence.
- The subject is "they".
- The main verb is "won".

- There is no auxiliary verb or form of "**do**" placed between "**only**" and the subject "they".

The correct structure should be: "**Not only did** they win..."

Evaluating Other Segments

- "**the test match**": This is the object of the verb "**won**" and is grammatically correct in this position.
- "**but they also**": This part correctly introduces the second clause and follows the "not only... but also" pattern.
- "**broke many previous records**": This second clause is grammatically sound on its own.

Conclusion on the Grammatical Error

The primary **grammatical error** lies in the first segment, "**Not only they won**", due to the missing subject-verb inversion required when "**not only**" begins a sentence. The correct phrasing would be "**Not only did they win**". Therefore, this segment contains the error.

28. Answer: a

Explanation:

Choosing the Correct Phrasal Verb

The task is to select the most appropriate phrasal verb to complete the sentence: "The top and bottom _____ if you pull hard enough." The sentence describes a physical situation where applying force might lead to a specific result.

Understanding the Phrasal Verb Options

Phrasal verbs are essential parts of English grammar, combining a verb with a preposition or adverb to create a new meaning. We need to understand the

meaning of each option provided to determine the best fit for the sentence:

- **come apart:** This phrasal verb means to separate into pieces or sections. For example, if you pull on a poorly made seam, the fabric might *come apart*.
- **come down with:** This phrasal verb is used when someone gets sick or ill with a particular disease. For example, "He *came down with* a fever."
- **come forward:** This phrasal verb means to move ahead or present oneself, often to volunteer information or help. For example, "The police asked witnesses to *come forward*."
- **come from:** This phrasal verb indicates the origin or source of something or someone. For example, "The best coffee *comes from* Colombia."

Applying Phrasal Verbs to the Sentence Context

Let's analyze how each phrasal verb fits into the sentence: "The top and bottom _____ if you pull hard enough."

- **come apart:** "The top and bottom *come apart* if you pull hard enough." This meaning fits perfectly. It suggests that if enough force is applied, the top and bottom parts will separate from each other.
- **come down with:** "The top and bottom *come down with* if you pull hard enough." This makes no sense, as inanimate objects cannot become ill.
- **come forward:** "The top and bottom *come forward* if you pull hard enough." This implies the parts move towards the front, which is not the intended meaning of separating due to pulling.
- **come from:** "The top and bottom *come from* if you pull hard enough." This suggests an origin, which is unrelated to the physical action described.

Finalizing the Phrasal Verb Choice

The analysis clearly shows that "come apart" is the only phrasal verb that logically completes the sentence by describing the potential outcome of pulling the top and bottom parts with sufficient force – they separate.

The correct sentence is: "The top and bottom **come apart** if you pull hard enough."

29. Answer: b

Explanation:

Understanding the Task: Finding the Synonym of Doze

The main goal here is to identify the word that has a similar meaning to **Doze** from the given options. This involves understanding the meaning of the target word and comparing it with the meanings of the choices provided.

Meaning of Doze

The word **Doze** refers to the act of sleeping lightly or being in a drowsy state, almost asleep. It implies a state of semi-consciousness or light slumber, often unintentional.

Analysis of Options for Synonym

Let's look at each option to see how its meaning relates to **Doze**:

- **Option 1: Awakening** - This word means the act of waking up or becoming conscious after sleeping. It is the opposite of dozing or sleeping.
- **Option 2: Nap** - A **Nap** is defined as a short sleep, especially during the day. This meaning closely matches the definition of **Doze**, as both describe a light, often short, sleep.
- **Option 3: Be awake** - This phrase describes the state of not being asleep. It is contrary to the meaning of **Doze**.
- **Option 4: Wakefulness** - This refers to the state or period of being awake and alert. Similar to 'Be awake', this is the opposite of **Doze**.

Identifying the Correct Synonym

Comparing the meanings, we can see that:

- 'Awakening', 'Be awake', and 'Wakefulness' are related to being awake, which is the opposite of sleeping or dozing.
- 'Nap' describes a short, light sleep, which is the closest meaning to **Doze** among the options.

Therefore, **Nap** is the correct synonym for **Doze**.

30. Answer: b

Explanation:

Identifying the Grammatical Error in Preference Comparison

The question asks us to identify the segment containing a grammatical error in the sentence: "The invited guests preferred orange juice than hot coffee or chilled grapes." We need to carefully examine the structure and word choices related to preference and comparison.

Understanding the Verb 'Prefer'

The verb **preferred** is used to express a choice or liking for one thing over another. In English grammar, when **prefer** is used to compare two or more items directly, it is typically followed by the preposition **'to'**, not **'than'**.

- The standard structure is: Subject + prefer + [Thing 1] + **to** + [Thing 2].
- For example: "She prefers reading novels **to** watching movies."

The conjunction **'than'** is generally used with comparative adjectives (like 'bigger', 'better', 'more') or adverbs, not directly after the verb 'prefer'.

Analyzing the Sentence Segment

Let's break down the sentence and analyze the options:

- **Sentence:** "The invited guests preferred orange juice than hot coffee or chilled grapes."
- **Error Location:** The comparison is between "orange juice" and "hot coffee or chilled grapes". The word connecting these is "**than**".
- **Rule Violation:** The use of "**than**" after "preferred orange juice" is grammatically incorrect. The correct preposition should be "**to**".

Evaluating the Options

We need to find the option that accurately pinpoints the grammatical mistake:

- **Option 1:**

or chilled grapes

– This part of the list following the comparison seems grammatically correct.

- **Option 2:**

than hot coffee

– This segment contains the error. The conjunction "**than**" is incorrectly used with the verb "**preferred**". It should be "**to** hot coffee".

- **Option 3:**

preferred orange juice

– This part ("preferred orange juice") is grammatically sound on its own, forming the main clause. The error occurs *after* this segment.

- **Option 4:**

The invited guests

– This is the subject of the sentence and is grammatically correct.

Conclusion

The grammatical error lies in the incorrect use of the conjunction '**than**' following the verb '**preferred**'. The correct phrasing requires '**to**' for making comparisons with 'prefer'. Therefore, the segment highlighting this error is '**than hot coffee**'.

31. Answer: a

Explanation:

Author of “The Battle of Belonging” Explained

This solution focuses on identifying the writer behind the prominent book titled “The Battle of Belonging”. Understanding the authorship of significant literary works is crucial for literary analysis and general knowledge.

About the Book “The Battle of Belonging”

The book “The Battle of Belonging” delves into complex themes related to identity, nationalism, and the evolving political landscape. It offers critical perspectives on contemporary issues.

Key Figures Associated with the Book

Several notable individuals are known for their contributions to literature and public discourse. When considering the authorship of “The Battle of Belonging”, it's helpful to be aware of prominent authors and public figures:

- **Shashi Tharoor:** A well-known author, politician, and former diplomat, recognized for his extensive writing on various subjects, including Indian history, politics, and culture.
- **Jai Ratan:** Known for translations and literary works.
- **Kapil Sibal:** A prominent lawyer and politician, also known for his writings.
- **Jairam Ramesh:** An economist, politician, and author, often writing on environmental and political issues.

Determining the Author

The book “The Battle of Belonging” is authored by **Shashi Tharoor**. His works often explore themes of Indian identity and its place in the modern world, aligning with the subject matter of this particular book.

32. Answer: d

Explanation:

Identifying the Document termed 'Magna Carta of Indian Education'

The question asks us to identify the historical document that is famously known as the 'Magna Carta of Indian Education'. This nickname suggests a document of immense importance and foundational significance for the development of the education system in India during the British era.

Understanding Wood's Dispatch

Wood's Dispatch, published in 1854, is the document widely recognized by this title. It was a significant policy statement issued by the British East India Company that provided a detailed framework for the educational system in India. The dispatch is considered a 'Magna Carta' because it was the first comprehensive plan that laid down the guidelines for the entire field of education, influencing its structure and objectives for years to come.

Key Contributions of Wood's Dispatch

The dispatch, prepared by Sir Charles Wood, the President of the Board of Control for India, introduced several key principles and recommendations that revolutionized education in India:

- **Comprehensive Educational Blueprint:** It offered a holistic vision for education, covering primary, secondary, and higher education levels. It was the first official document to systematically address the educational needs of the Indian population.
- **Medium of Instruction:** Wood's Dispatch emphasized the use of vernacular languages in primary schools, aiming to make education more accessible to

the masses. However, it also supported the promotion of English as a medium for higher education and government employment.

- **Establishment of Departments of Public Instruction:** It recommended the creation of separate administrative bodies, known as the Departments of Public Instruction, in each province to manage and regulate education systematically.
- **University Education:** A major recommendation was the establishment of universities in major Indian cities. Following this, universities in Calcutta, Bombay, and Madras were established in 1857, modeled after the University of London.
- **Teacher Training Institutions:** The dispatch highlighted the need for trained teachers and advocated for the establishment of normal schools (teacher training colleges) to improve the quality of instruction.
- **Promoting Indian Languages and Literature:** While promoting Western education, it also stressed the importance of studying Indian languages, literature, and culture.
- **Vocational Training:** It recognized the need for practical and vocational education to prepare students for various professions.
- **Female Education:** The dispatch strongly supported the cause of female education, advocating for increased access and opportunities for women.

These extensive and foundational recommendations earned Wood's Dispatch the prestigious title of the 'Magna Carta of Indian Education'. It marked a crucial step towards structuring and expanding the education system in India under British rule.

Comparison with Other Options

Let's briefly look at why the other options are not considered the 'Magna Carta':

- **Macaulay's Minutes (1835):** Focused primarily on the controversial decision regarding the medium of instruction, advocating strongly for English. While influential, it was more specific and less comprehensive than Wood's Dispatch.
- **Hunter Commission (1882):** This commission was formed later to review the progress made since Wood's Dispatch, particularly focusing on primary education. It aimed to build upon and refine the policies established by the 1854 dispatch.

- **Charter Act of 1813:** This was an earlier legislative step that first acknowledged the British responsibility for education in India and allocated a sum of money (though often unused) for educational purposes. However, it lacked the detailed planning and broad scope characteristic of Wood's Dispatch.

In essence, Wood's Dispatch provided the most detailed, systematic, and influential policy framework, thus justifying its description as the 'Magna Carta of Indian Education'.

33. Answer: a

Explanation:

Deciphering India's Inaugural Newspaper

This section explores the historical context to identify the very first newspaper published in India. Understanding this helps us trace the evolution of print media in the country.

The Genesis of Indian Journalism

The journey of journalism in India began during the British colonial era. The establishment of the first newspaper was a significant event, paving the way for future publications and public discourse.

Spotlight on The Bengal Gazette

The Bengal Gazette holds the distinction of being recognized as India's first newspaper. Its publication marked the beginning of newspaper culture in the nation.

- **Founding Date:** It was first published on January 29, 1780.
- **Founder:** The newspaper was founded by James Augustus Hickey, an entrepreneur of Irish origin.
- **Publication Location:** It was published from Calcutta (present-day Kolkata).

- **Historical Significance:** Despite facing censorship and challenges from the East India Company due to its often critical reporting, *The Bengal Gazette* initiated the practice of regular news dissemination in India.

Evaluating Other Options

Let's briefly consider the other options mentioned:

- *The Calcutta Gazette:* This newspaper started its publication later, in 1784.
- *The Indian Journal:* Historical records do not identify this as the first newspaper in India.
- *The Bengal Newspaper:* Similar to "The Indian Journal," this name is not associated with the first newspaper publication in India.

Conclusion on India's First Newspaper

Based on historical accounts, **The Bengal Gazette** is confirmed as the pioneering newspaper of India, launched in 1780.

34. Answer: a

Explanation:

Understanding the Loor Dance of Haryana

The question asks about the traditional folk dance known as the 'Loor dance' and the specific Indian state where it is performed. It also highlights a key characteristic: the dance is performed exclusively by women.

Identifying the Loor Dance Location

The 'Loor dance' is a significant folk tradition primarily associated with the state of Haryana.

Key Features of the Loor Dance

- **Performance Style:** The dance is exclusively performed by women.
- **Cultural Significance:** It is a traditional folk dance form.
- **Region:** The dance originates from and is popular in Haryana.
- **Occasion:** Typically, the Loor dance is performed during festivals like Basoa or Baisakhi, often celebrating the spring season and harvest.
- **Name Origin:** The name 'Loor' itself signifies a girl in the local dialect, reinforcing the female participation aspect.

Explanation

The Loor dance is a vibrant expression of folk culture found in Haryana. Performed mainly during the spring season, especially around the festival of Baisakhi, this dance involves women singing and dancing together. They often perform in circles, moving rhythmically and clapping their hands. The dance celebrates themes of harvest, community, and the arrival of spring. The distinctive feature of the Loor dance is its all-female participation, making it a unique cultural practice in Haryana.

Therefore, considering the unique characteristics and origin of the 'Loor dance', Haryana is the correct state.

35. Answer: c

Explanation:

Defining Elasticity in Materials

Elasticity is a fundamental property of materials that describes their ability to deform under an applied stress and return to their original shape once the stress is removed. A material exhibiting high elasticity can withstand deformation without permanent damage and springs back to its original form.

Measuring Elasticity: Young's Modulus

In physics and engineering, the elasticity of a solid material under tension or compression is commonly quantified using **Young's Modulus**, often denoted by ' Y '. This modulus relates stress to strain in the elastic region of deformation. A higher Young's Modulus signifies a stiffer material, meaning it requires a larger stress to produce a given amount of elastic strain.

The formula for Young's Modulus is:

$$Y = \frac{\text{Stress}}{\text{Strain}}$$

Where Stress is the force applied per unit area ($\sigma = F/A$), and Strain is the relative deformation ($\epsilon = \Delta L/L_0$). A higher ' Y ' value indicates greater resistance to elastic deformation.

Comparing Young's Modulus for Key Materials

The elasticity of the materials listed depends significantly on their Young's Modulus values. Here's a comparison:

Material	Typical Young's Modulus (Approx. in GPa)
Rubber	~0.01 to 0.1
Aluminum	~70
Glass	~50 to 90
Steel	~200

Note: These are approximate values and can vary based on the specific composition and treatment of the material.

Determining the Most Elastic Material

Evaluating the elasticity based on Young's Modulus:

- **Rubber** exhibits very low elasticity compared to metals and glass. While it can stretch significantly, its resistance to deformation (stiffness) is low.

- **Aluminum** is more elastic than rubber but less so than steel.
- **Glass** has varying elasticity, but typically its Young's Modulus is lower than that of steel.
- **Steel** possesses the highest Young's Modulus among the options. This means **steel** is the most resistant to elastic deformation and will return to its original shape most forcefully when a load is removed.

Therefore, based on the measure of Young's Modulus, **steel** is considered the most **elastic** material among the choices provided.

36. Answer: b

Explanation:

Architect of the Central Vista Project Identified

The question asks to identify the specific individual who is the architect behind the major redevelopment initiative known as the **Central Vista Project** in New Delhi.

Understanding the Central Vista Project

The **Central Vista Project** is a significant undertaking focused on the redevelopment of the government's central administrative area in New Delhi. This project involves upgrading and constructing new buildings, including Parliament House, government offices, and the Central Secretariat. The design and planning for such a large-scale architectural project are critical.

The Role of an Architect

An **architect** is a professional responsible for the overall vision, design concept, planning, and often the supervision of construction for buildings and other physical structures. For a project like the **Central Vista Project**, the architect's role involves creating a cohesive and functional design that respects the area's historical context while incorporating modern requirements.

Evaluating Key Architects and the Central Vista Design

Several accomplished architects were mentioned in the options. Let's consider their contributions:

- **Chandrakant Sompura:** Known for his work on numerous temple constructions across India, including the Ram Mandir in Ayodhya.
- **Bimal Patel:** An acclaimed architect whose firm, HCP Design, Planning and Management, was awarded the contract to design the new Parliament building and is the lead architect for the **Central Vista Project** redevelopment. His work often focuses on institutional buildings and urban planning.
- **B. V. Doshi:** A renowned Indian architect, urban planner, and designer, who was the first Indian to receive the Pritzker Architecture Prize. His architectural style is distinct and influential.
- **Brinda Somaya:** An architect and urban conservationist known for her work in heritage conservation and sustainable urban development.

Identifying the Central Vista Architect

Through a competitive process, the design and planning contract for the **Central Vista Project**, including key structures like the new Parliament House, was awarded to the firm led by **Bimal Patel**. Therefore, he is recognized as the principal architect responsible for the project's design vision.

37. Answer: d

Explanation:

Identifying Individuals Not Associated with F1 Racing

This explanation focuses on identifying which individual from the provided list is not involved in the sport of Formula 1 (F1) racing. We will examine each person's known career and sport affiliation.

Analysis of Individuals in Relation to F1 Racing

- **Lewis Hamilton:** Lewis Hamilton is a highly acclaimed British racing driver. He has competed in Formula 1 for many years and is widely recognized as one of the most successful drivers in the history of the sport, holding multiple World Championship titles. His career is entirely centered around motorsport, specifically F1.
- **Charles Leclerc:** Charles Leclerc is a Monegasque racing driver currently competing in Formula 1. He drives for Scuderia Ferrari and has achieved significant success, including race wins and pole positions. His professional career is dedicated to F1 racing.
- **Romain Grosjean:** Romain Grosjean is a French–Swiss former professional racing driver. He spent many seasons competing in Formula 1, driving for teams like Lotus and Haas F1 Team. Although he has transitioned from F1, his professional identity is strongly linked to the sport.
- **Luis Suarez:** Luis Suarez is a renowned professional footballer (soccer player) from Uruguay. He has had a highly successful career playing for major clubs worldwide, including Liverpool, Barcelona, and Atletico Madrid. His expertise and career are in football, not motorsport or F1 racing.

Conclusion on F1 Racing Association

Based on the career profiles, Lewis Hamilton, Charles Leclerc, and Romain Grosjean are all established figures within the world of Formula 1 racing. In contrast, Luis Suarez is exclusively associated with professional football. Therefore, Luis Suarez is the individual among the options who is not associated with the sport of F1 racing.

38. Answer: b

Explanation:

Identifying the First Indian Air Chief to Command the Indian Air Force

This question asks to identify the very first Indian national who held the position of Chief of the **Indian Air Force** (IAF). The head of the IAF holds the title of Chief of Air

Staff (CAS).

Key Figure: Subroto Mukerjee

Subroto Mukerjee holds the historical distinction of being the first Indian to command the **Indian Air Force** as the Chief of Air Staff. He assumed this pivotal role in April 1954, succeeding Sir Ronald Ivelaw-Chapman.

Mukerjee's tenure marked a significant milestone as India took full command of its air force after independence. He served as the Chief of Air Staff until 1960. His leadership was crucial during the early years of the IAF's development as an independent service.

Analysis of Other Options:

- **Arjan Singh:** While a very distinguished leader and the 3rd Chief of Air Staff (1964–1969), he was not the first. He was later elevated to the rank of Marshal of the Indian Air Force.
- **Surinder Mehra:** Served as the 10th Chief of Air Staff from 1976 to 1978.
- **Swaroop Krishna Kaul:** Was a senior officer in the IAF but did not hold the position of Chief of Air Staff.

Conclusion on Air Force Command

Therefore, based on the historical records of the **Indian Air Force** leadership, **Subroto Mukerjee** is recognized as the first Indian Air Chief to command the force.

39. Answer: d

Explanation:

Understanding the Indian Air Force Aerobatics Teams

The Indian Air Force (IAF), often referred to as the 'Bharatiya Vayu Sena', is known for its highly skilled pilots and advanced aircraft. Beyond its operational duties, the IAF

also showcases its precision flying capabilities through various demonstration teams. This question asks to identify the specific team known for **aerobatics demonstrations** using aircraft.

What are Aerobatics Demonstration Teams?

Aerobatics demonstration teams are specialized units composed of highly trained pilots who perform complex aerial maneuvers, formations, and stunts in aircraft. These displays are meant to showcase the skill of the pilots, the capabilities of the aircraft, and to inspire public interest in aviation and the Air Force.

Analyzing the Options for IAF Aerobatics

Let's examine each option provided in the context of the Indian Air Force's demonstration teams:

- **Sarang:** The 'Sarang' team is the helicopter aerobatics team of the Indian Air Force. They fly advanced HAL Dhruv helicopters and are known for their synchronized flying. While they perform aerobatics, they specifically use helicopters, not fixed-wing aircraft typically associated with major aerobatics displays.
- **Golden Eagles:** The 'Golden Eagles' is the name of the Indian Air Force's skydiving demonstration team. They perform jumps from aircraft rather than flying maneuvers themselves.
- **Flying Bullets:** The 'Flying Bullets' is the Indian Air Force's formation aerobatic team that performs motorcycle stunts, not aircraft aerobatics.
- **Surya Kiran:** The 'Surya Kiran' ('Sun Rays' in Hindi) is the IAF's official aerobatics demonstration squadron. Flying the Hawk Mk. 132 advanced jet trainer aircraft, this team performs spectacular formation flying and maneuvers, making it the primary fixed-wing aerobatics team of the Indian Air Force.

Identifying the Correct Aerobatics Demonstration Aircraft Team

Based on the analysis, the team specifically known for **aerobatics demonstration** using aircraft, particularly fixed-wing jets which are commonly associated with such displays, is **Surya Kiran**.

Key points:

- **Surya Kiran:** Fixed-wing aerobatics team (Hawk Mk. 132 jets).
- Sarang: Helicopter aerobatics team (HAL Dhruv).
- Golden Eagles: Skydiving team.
- Flying Bullets: Motorcycle display team.

Therefore, the correct identification for the **Indian Air Force aerobatics demonstration aircraft team** among the given choices is Surya Kiran.

40. Answer: c

Explanation:

India's Role as a Major Mineral Producer

This explanation focuses on identifying which mineral India is the **largest producer** of on a global scale, comparing its output against other major producing nations for the minerals listed in the options.

Mineral Production Analysis: India vs. Global Output

To determine the correct answer, let's review India's standing in the production of each option:

- **Zinc Production Status:** India is a significant producer of zinc, contributing substantially to the global supply. However, countries like China and Australia typically produce larger volumes of zinc.
- **Lead Production Status:** India also mines and processes lead. While it is an important producer, it does not hold the position of the **largest producer** of lead worldwide. China and Australia are leading countries in lead production.

- **Mica Production Status:** India has historically been and continues to be the world's **largest producer** of mica. The country accounts for a major share of the global output, especially of high-quality sheet mica, which is valued for its electrical and thermal insulation properties. Mica from India is exported globally for use in various industries, including electronics, automotive, and construction.
- **Bauxite Production Status:** Bauxite is the primary ore used to produce aluminum. India is a major producer of bauxite and ranks among the top global producers. However, countries like Australia, Guinea, and China generally produce higher quantities of bauxite than India.

Identifying India's Top Mineral Production

Comparing the global production figures, it is evident that India holds the top position specifically for **Mica**.

Final Conclusion on India's Largest Production

Based on the comparative analysis of global mineral production, India is confirmed as the **largest producer** of Mica among the choices provided.

41. Answer: b

Explanation:

Azadi Ka Amrit Mahotsav Special Train Launch

The question asks to identify which metro service initiated a special train in January 2022 specifically to celebrate the 'Azadi Ka Amrit Mahotsav'. This occasion marks 75 years of India's independence.

Delhi Metro's Commemorative Initiative

In January 2022, the **Delhi Metro** Rail Corporation (DMRC) launched a special train adorned with themes and motifs related to India's journey towards its 75 years of

independence, known as 'Azadi Ka Amrit Mahotsav'. This initiative aimed to showcase the nation's progress and heritage during this significant milestone.

The special train featured artwork and displays highlighting various aspects of India's freedom struggle and post-independence achievements. It served as a moving tribute and a way to connect commuters with the spirit of national pride and remembrance.

Analysis of Metro Services

Let's look at the options provided:

- **Jaipur Metro:** While Jaipur Metro operates services in Rajasthan's capital, there is no widely reported information about it launching a specific 'Azadi Ka Amrit Mahotsav' train in January 2022.
- **Delhi Metro:** The Delhi Metro is known to have launched a special train in January 2022 decorated for the 'Azadi Ka Amrit Mahotsav' celebration.
- **Hyderabad Metro:** Information regarding a special train launched by Hyderabad Metro for this specific commemoration in January 2022 is not prominent.
- **Lucknow Metro:** Similarly, Lucknow Metro does not appear to have launched a dedicated train for this event in the specified timeframe.

Therefore, based on the known initiatives commemorating 'Azadi Ka Amrit Mahotsav' in January 2022, the Delhi Metro was the service that introduced a special train for this purpose.

42. Answer: d

Explanation:

Understanding the International Date Line

The **International Date Line** is an imaginary line that runs mostly through the Pacific Ocean. It is where the calendar date changes from one day to the next. When you

cross the line, the date changes forward by one day when travelling west, and backward by one day when travelling east.

Analyzing the Options for the International Date Line

Let's examine the options provided to determine which one correctly identifies the location of the **International Date Line**:

- **Equator**: The Equator is a line of latitude, specifically **0 degrees latitude** (0° latitude). It divides the Earth into the Northern and Southern Hemispheres. The **International Date Line** relates to longitude (east-west position) and the change of date, not latitude.
- **0° longitude**: This line is known as the Prime Meridian. It passes through Greenwich, London, and serves as the reference point (0°) for Coordinated Universal Time (UTC) and longitude measurements globally. While crucial for timekeeping, it is not the **International Date Line**.
- **90° east longitude**: This line of longitude is located 90 degrees east of the Prime Meridian. It runs through parts of Asia and the Arctic and Southern Oceans. It does not mark the change in calendar date.
- **180° longitude**: This is the line of longitude generally considered the location of the **International Date Line**. It is opposite the Prime Meridian (0° longitude) on the other side of the globe. Following this line helps manage the transition between calendar days.

Identifying the Correct Location

Based on the analysis, the **International Date Line** is located along the **180° longitude** meridian. This is where the calendar date officially changes.

43. Answer: b

Explanation:

- **Understanding Passport Services in India**

Passports are essential documents for international travel. In India, the process of obtaining or renewing a passport was historically cumbersome, with services concentrated in limited locations. This made accessing passport services difficult for many citizens across the country.

- **The Initiative for Widespread Passport Services**

To address the challenges and make passport services easily accessible nationwide, a significant initiative was launched. This program aimed to streamline the application process, reduce delays, and increase the number of access points for citizens.

- **Analyzing the Options**

Let's look at the provided options in the context of spreading passport services:

- **FMPSK:** This acronym is not commonly associated with the expansion of passport services in India.
- **POPSK:** This likely refers to the **Passport Seva Project (PSP)** and its associated **Passport Seva Kendras (PSKs)**. The PSP was a major e-governance initiative by the Indian Ministry of External Affairs. It aimed to completely overhaul the passport issuance system by establishing modern, well-equipped PSKs across the country. This project significantly increased the reach and efficiency of passport services, making them widespread.
- **Jan Dhan Yojana:** This is a government scheme focused on financial inclusion, providing access to banking, insurance, and pension services. It is not directly related to passport services.
- **PMPSK:** This acronym is not clearly defined in the context of passport service expansion in India.

- **Conclusion on Widespread Availability**

The **Passport Seva Project (PSP)**, often represented by initiatives like the establishment of **Passport Seva Kendras (PSKs)**, is the program directly responsible for the widespread availability of passport services across India. It

modernized the system, making it more efficient, transparent, and citizen-friendly, thereby reaching citizens in numerous locations.

44. Answer: c

Explanation:

Lucknow Franchise Name Identified

The question asks for the official name of the Indian Premier League (IPL) franchise based in Lucknow, which is owned by the RPSG Group. Identifying the correct team name is crucial for fans and followers of the tournament.

Understanding the Lucknow IPL Team

The Indian Premier League (IPL) expanded its teams, and a new franchise was established in Lucknow. The RPSG Group acquired this franchise. A key aspect of any sports team is its identity, which includes its name and logo.

Evaluating Franchise Name Options

Several names were proposed or considered for the Lucknow IPL team. Let's look at the options provided:

- The Nawabs of Lucknow
- Lucknow Legends
- Lucknow Super Giants
- Lucknow Tuskers

Determining the Correct Lucknow Team Name

After careful consideration and official announcements, the RPSG Group revealed the name for their Lucknow franchise in the Indian Premier League. The name chosen reflects a blend of regional identity and team spirit.

The official name for the Lucknow IPL franchise owned by the RPSG Group is **Lucknow Super Giants**.

This name was selected to represent the team in the competitive landscape of the IPL. The "Super Giants" part aims to evoke a sense of power and dominance.

45. Answer: b

Explanation:

Meta's AI Supercomputer Introduction in Jan 2022

In **Jan 2022**, **Meta**, the company behind Facebook, Instagram, and WhatsApp, announced a significant development in its **artificial intelligence** infrastructure. They unveiled what they described as one of the world's fastest AI supercomputers, built to support their AI research efforts.

Identifying Meta's AI Research SuperCluster (RSC)

The specific supercomputer introduced by Meta in January 2022 is known as the **AI Research SuperCluster (RSC)**. Here's a breakdown of its significance:

- **Name:** AI Research SuperCluster (RSC).
- **Introduction:** Announced by Meta in January 2022.
- **Purpose:** Designed to significantly accelerate Meta's artificial intelligence research and development. It aims to help build better AI models for understanding vast datasets and complex tasks like computer vision and natural language processing.
- **Performance:** Built using thousands of NVIDIA GPUs (Graphics Processing Units) and linked together, the RSC was designed for high-speed AI training. Meta highlighted its performance capabilities in handling large-scale AI workloads.
- **Key Terminology:** This system is central to Meta's strategy for advancing artificial intelligence.

Analysis of Other Supercomputer Options

Let's look at why the other options provided are not the correct answer concerning Meta's January 2022 announcement:

- **Sunway TaihuLight:** This supercomputer, developed in China, was once the fastest in the world on the TOP500 list. However, it's a general-purpose system and was not introduced by Meta in Jan 2022.
- **JUWELS Booster Module:** This is a powerful supercomputer located at the Jülich Supercomputing Centre in Germany, used for scientific research, but it is not associated with Meta.
- **HPC5:** This is a high-performance computing cluster owned by the Italian energy company Eni. It is used for complex simulations, particularly in the oil and gas industry, and is unrelated to Meta's AI initiative.

Final Explanation for Meta's Supercomputer

Meta's investment in the **AI Research SuperCluster (RSC)** reflects the growing importance of powerful computing infrastructure for cutting-edge **artificial intelligence** research. The RSC was specifically developed and introduced by **Meta** in **Jan 2022** to serve these advanced AI needs, distinguishing it from other major supercomputing projects worldwide.

46. Answer: b

Explanation:

Understanding the 'Global - 500' Award

The 'Global - 500' Award was an initiative established by the United Nations Environment Programme (UNEP). This prestigious award recognized outstanding achievements in the field of environmental protection and improvement.

'Global - 500' Award and Environment Conservation

The core purpose behind the 'Global - 500' Award was to celebrate and encourage exceptional contributions towards safeguarding our planet. The field most closely

associated with this objective is **environment conservation**. This involves a broad spectrum of activities dedicated to protecting Earth's natural resources for current and future generations.

Analysis of Award Fields

Let's look at the options provided in the context of the 'Global - 500' Award:

- **Environment conservation:** This aligns directly with the award's mission. It covers efforts to protect habitats, conserve biodiversity, manage natural resources like water and forests sustainably, and promote ecological balance.
- Gene preservation: While important for biodiversity, it represents a specific scientific area within the broader environmental field and was not the sole focus of the award.
- Population control: This concerns managing the size of populations, which can relate to environmental issues but is distinct from the overall goal of environmental conservation recognized by the award.
- Pollution control: This is a vital component of environmental protection, but **environment conservation** is a more comprehensive term that encompasses pollution control alongside other critical aspects like habitat protection and resource management.

Therefore, the 'Global - 500' Award recognized rare achievements primarily in the domain of **environment conservation**.

47. Answer: a

Explanation:

- The question asks to identify the Indian state that recently conducted experimental Internet-voting for the first time.
- Internet voting, also known as electronic voting or e-voting, allows voters to cast their ballots remotely using the internet.
- Conducting such experiments is a step towards modernizing the electoral process and increasing accessibility.

Telangana's Pioneering Internet-Voting Experiment

Recent reports indicate that **Telangana** was the state where experimental Internet-voting was first conducted. This initiative aimed to explore the feasibility and security of using internet platforms for voting purposes.

Context of Recent Internet-Voting Trials

The use of experimental Internet-voting is a significant development in India's electoral landscape. While the specific details and dates of the experiment in Telangana would require referring to recent election commission reports or news archives, it's recognized as a trial phase.

- **Objective:** The primary goal of such experiments is usually to test the technology, identify potential security vulnerabilities, and assess voter acceptance and convenience.
- **Scope:** These trials are typically conducted on a smaller scale, perhaps for specific local elections or a segment of voters, before considering wider implementation.
- **Comparison with Other States:** While other states like Uttar Pradesh, Kerala, and Andhra Pradesh are also advancing in various aspects of digital governance, Telangana has been noted for this specific recent trial in Internet-voting.

Understanding Internet-Voting

Internet-voting aims to provide a secure and convenient alternative to traditional polling methods. Key considerations include:

- Ensuring voter anonymity.
- Preventing fraud and ensuring the integrity of the vote count.
- Providing accessibility to all eligible voters, including those who are overseas or have mobility issues.
- Securing the network against cyberattacks.

The experimental phase in states like **Telangana** is crucial for addressing these challenges and building confidence in digital voting systems.

48. Answer: a

Explanation:

Ministry of Defence Departments Explained

This explanation breaks down the different government departments mentioned in the question to determine which one does not fall under the purview of the Ministry of Defence (MoD).

Identifying Key Departments under Ministry of Defence

The question asks us to identify the department that is NOT part of the **Ministry of Defence**. To answer this, we need to understand the structure of the Indian government and which ministry oversees each department.

Analysis of Government Departments

Let's look at each option provided:

- **Department Of Defence Production (DDP):** This department functions under the Ministry of Defence. Its main role is to promote indigenous defence production, foster self-reliance in the defence industry, and manage defence manufacturing entities.
- **Department Of Ex-servicemen Welfare (DESW):** Also functioning under the Ministry of Defence, this department is dedicated to the welfare and rehabilitation of retired defence personnel (ex-servicemen) and their families.
- **Defence Research and Development Organisation (DRDO):** DRDO is the primary research and development arm for the Ministry of Defence. It is responsible for designing, developing, and producing advanced defence technologies and systems.
- **Department Of Border Management:** This department is responsible for the security of India's land and sea borders, management of immigration, and related aspects. Crucially, it operates under the **Ministry of Home Affairs (MHA)**,

not the Ministry of Defence. Its focus is on internal security and border control, distinct from the defence and military matters handled by the MoD.

Conclusion on Ministry of Defence Affiliation

Based on the analysis, the Department Of Defence Production, the Department Of Ex-servicemen Welfare, and the DRDO are all integral parts of the Ministry of Defence. The Department Of Border Management, however, falls under the Ministry of Home Affairs.

Therefore, the **Department Of Border Management** is the correct answer as it does not come under the Ministry of Defence.

49. Answer: b

Explanation:

Understanding The Scientific Study of Cells

The question asks for the specific term used in science to denote the study of cells. Cells are the basic building blocks of all known living organisms. Identifying the correct branch of biology dedicated to their study is key.

Exploring Biological Disciplines Related to Cells

Let's examine the options provided to understand their meanings and determine which one accurately describes the scientific study of a cell:

- **Histology:** This field is concerned with the study of tissues, which are groups of cells working together. Histology focuses on the microscopic structure of tissues and their organization.
- **Cytology:** This discipline specifically focuses on the scientific study of cells. It covers cell structure, cell function, cell division, cell metabolism, and the life cycle of cells. The prefix 'cyto-' relates directly to cells.

- **Physiology:** This area of biology investigates the functions and mechanisms of living systems. It looks at how organisms, organs, tissues, and cells work and interact. While it involves cells, its scope is broader than just the study of cells themselves.
- **Taxonomy:** This branch deals with the classification, naming, and description of living organisms. It organizes life into groups based on shared characteristics. It does not specifically focus on the study of individual cells.

Determining The Correct Term For Cell Study

Comparing the definitions, it's clear that one term exclusively focuses on the scientific study of the cell itself. Based on its definition, **cytology** is the branch of biology dedicated to understanding cells.

50. Answer: c

Explanation:

Understanding the 'Quad' Group Membership

The question asks us to identify which country from the given options is not a member of the 'Quad' group. The 'Quad' is an informal strategic security dialogue between four nations: **Japan, India, Australia, and the United States (USA)**.

The primary goal of the 'Quad' is to promote a "free, open, and inclusive Indo-Pacific region." It involves regular consultations and joint military exercises among the member countries.

Analyzing the Member Countries

Let's look at the countries listed in the options and compare them with the known members of the 'Quad' group:

- **Japan:** This country is a founding and active member of the 'Quad'.
- **USA:** The United States is also a key member of the 'Quad'.

- **Australia:** Australia is another crucial member participating in the 'Quad' strategic dialogue.
- **Germany:** While Germany has shown interest in the Indo-Pacific region and engages in dialogue with 'Quad' members, it is not part of the formal 'Quad' group structure.

Identifying the Non-Member Country

Based on the established membership of the 'Quad' group, which includes **Japan**, **USA**, **India**, and **Australia**, we can determine which option does not belong.

Comparing the options with the member list:

- Japan is a member.
- USA is a member.
- Australia is a member.
- **Germany** is not a member.

Therefore, **Germany** is the country among the choices provided that is not a member of the 'Quad' group.

51. Answer: d

Explanation:

This question asks us to identify the specific team that **Kieron Pollard** hit six sixes in an over against during a T20 match. This memorable event showcased Pollard's exceptional power-hitting capabilities.

Kieron Pollard's Six Sixes Feat

The achievement of hitting six sixes in a single over is a rare milestone in cricket. **Kieron Pollard**, a renowned West Indies all-rounder, accomplished this feat in a T20 International (T20I) match, becoming the first player to do so in this specific format.

Match Details: Pollard vs Sri Lanka

The T20 International match where this spectacular batting display occurred was between the West Indies and **Sri Lanka**. This significant event took place on March 3, 2021, at the Coolidge Cricket Ground in Antigua.

- **Batsman:** Kieron Pollard (West Indies)
- **Opponent:** Sri Lanka
- **Bowler:** Akila Dananjaya
- **Format:** T20 International
- **Event Summary:** Pollard hit six consecutive sixes off the bowling of Akila Dananjaya in one over.

Interestingly, the bowler, Akila Dananjaya, had secured a hat-trick in his previous over, dismissing three West Indian batsmen. However, the momentum shifted dramatically when Pollard decided to attack, hitting Dananjaya for six towering sixes, making it a dramatic turnaround.

Significance of the Achievement

This performance cemented **Kieron Pollard's** place in cricket history as the first player to achieve the feat of six sixes in an over in a **T20 International** match. While other cricketers like Sir Garfield Sobers, Ravi Shastri, Herschelle Gibbs, and Yuvraj Singh have achieved similar feats in different formats of cricket, Pollard's achievement in the T20I arena was particularly noteworthy.

Therefore, the team against which **Kieron Pollard** achieved this remarkable feat of hitting six sixes in an over was **Sri Lanka**.

52. Answer: b

Explanation:

Understanding Organic Compounds in Perfumes

Perfumes rely heavily on the pleasant and volatile aroma of various organic compounds. Different functional groups within organic chemistry produce distinct

scents and have varying properties that make them suitable or unsuitable for fragrance applications. This explanation explores why certain groups are preferred over others in perfume creation.

Analyzing Functional Groups for Perfumery

Alcohols in Fragrance

Many alcohols, particularly larger ones like phenylethyl alcohol or geraniol, are frequently used in perfumes. They often contribute floral notes (like rose) and can act as solvents or fixatives, helping the overall fragrance last longer on the skin. Their volatility is generally suitable for perfumes.

Esters and Their Scent Profiles

Esters are perhaps the most crucial class of compounds in perfumery. They are known for their distinct, often sweet, fruity, or floral scents. For example:

- Isoamyl acetate smells like bananas.
- Ethyl butyrate smells like pineapple.
- Benzyl acetate has a jasmine-like aroma.

Their relatively low molecular weight and pleasant smells make them ideal fragrance ingredients.

Aldehydes in Perfume Formulations

Aldehydes are also important in creating specific scent characteristics in perfumes. While some can have sharp or pungent smells in their pure form, they are often used in small quantities to add lift, sparkle, or unique notes. Famous examples include aldehydes used in Chanel No. 5, which provide a distinct waxy or citrusy character.

Carboxylic Acids: Least Likely Candidates

Carboxylic acids are generally characterized by sour, unpleasant, or pungent odors, especially the shorter-chain ones like acetic acid (vinegar smell). While some

longer-chain or aromatic carboxylic acids might have less offensive smells, they are typically:

- Less volatile than typical perfume ingredients.
- Less likely to possess the pleasant, desirable aromas needed for perfumes.
- Often perceived as acidic or rancid.

Because of these properties, carboxylic acids themselves are rarely used directly as primary fragrance components in perfumes. They might be used as intermediates in synthesizing other fragrant molecules (like esters), but not typically for their own scent profile.

Conclusion on Perfume Ingredients

Comparing the functional groups, **Carboxylic Acids** stand out as the least likely to be directly incorporated into perfumes due to their generally unpleasant odors and lower volatility compared to alcohols, esters, and aldehydes, which are widely used for their desirable aromatic properties.

53. Answer: a

Explanation:

Padma Bhushan Award for Tech CEO in 2022

This question requires identifying the CEO of which company among the given options was honored with the **Padma Bhushan** award in the year **2022**. The focus is on recognizing the specific leader and their associated company based on this prestigious award.

About the Padma Bhushan Award

The **Padma Bhushan** is a significant civilian award granted by the Republic of India. It ranks third in the hierarchy of Padma awards, after the Bharat Ratna and the Padma Vibhushan. It is awarded for "service of a high order in any field".

Awardee CEO Identification

Let's examine the Chief Executive Officers (CEOs) of the companies listed in the options:

- **Google:** The CEO is Sundar Pichai.
- **Apple:** The CEO is Tim Cook.
- **Facebook:** The CEO of the parent company, Meta Platforms (formerly Facebook), is Mark Zuckerberg.
- **Instagram:** Adam Mosseri leads Instagram, often referred to similarly to a CEO role within the Meta ecosystem.

The task is to confirm which of these individuals received the **Padma Bhushan** in 2022.

Sundar Pichai's Padma Bhushan Recognition

In 2022, **Sundar Pichai**, the CEO of **Google** and its parent company, Alphabet Inc., was conferred with the **Padma Bhushan** award. This award was presented in recognition of his distinguished service in the field of Trade and Industry.

This finding directly connects the CEO of **Google** to the award mentioned in the question.

Other Company CEOs

A review of the 2022 Padma Award recipients confirms that:

- Tim Cook (Apple CEO) was not a recipient of the Padma Bhushan in 2022.
- Mark Zuckerberg (Meta/Facebook CEO) was not a recipient of the Padma Bhushan in 2022.
- Adam Mosseri (Head of Instagram) was also not among the 2022 recipients of this award.

Final Answer Explanation

Considering the information about the 2022 Padma Bhushan awardees, Sundar Pichai, the CEO of **Google**, is the individual who received this honor. Therefore, the company whose CEO received the award is **Google**.

54. Answer: a

Explanation:

Australian Open Women's Singles 2022 Champion

The Australian Open is one of the four major Grand Slam tennis tournaments. The January 2022 edition featured a highly anticipated Women's Singles competition.

Ashleigh Barty's Historic Victory

Ashleigh Barty, the top-ranked player from Australia at the time, emerged as the winner of the 2022 Australian Open Women's Singles title. This was a monumental achievement for Barty, marking her first-ever Australian Open singles title and a cherished victory on home ground.

The Final Match Details

In the final showdown, Ashleigh Barty faced **Danielle Collins**. Barty demonstrated exceptional skill and composure, defeating Collins in straight sets to claim the championship trophy. The final score reflected Barty's dominance throughout the match.

Runner-up Performance

Danielle Collins reached the final of a Grand Slam for the first time in her career during the 2022 Australian Open. Her performance in reaching the final match was a significant milestone in her professional tennis journey.

Other Notable Players

While players like **Naomi Osaka** and **Serena Williams** are renowned champions in women's tennis and have won multiple Grand Slam titles, including the Australian Open in previous years, they were not the champions in the January 2022 Women's Singles event.

Key Tournament Information Recap

- **Tournament:** Australian Open 2022
- **Category:** Women's Singles
- **Champion:** Ashleigh Barty
- **Runner-up:** Danielle Collins

55. Answer: b

Explanation:

First Earth Summit & Convention on Biological Diversity Location Explained

The question asks to identify the location of the first "Earth Summit" where the "Convention on Biological Diversity" was established. The Earth Summit is a widely recognized term for the United Nations Conference on Environment and Development (UNCED).

Significance of the Earth Summit and CBD

The United Nations Conference on Environment and Development (UNCED), often called the Earth Summit, was a major United Nations conference convened in response to concerns about global environmental degradation. It took place in 1992.

A primary outcome of this summit was the adoption of key international agreements to address environmental challenges. Among these was the **Convention on Biological Diversity (CBD)**, a landmark treaty aimed at conserving

biological diversity, ensuring the sustainable use of its components, and promoting the fair and equitable sharing of benefits arising from the use of genetic resources.

Identifying the Correct Earth Summit Location

The **first Earth Summit**, which led to the opening for signature of the **Convention on Biological Diversity**, was held in **Rio de Janeiro**, Brazil.

- **Event Name:** United Nations Conference on Environment and Development (UNCED)
- **Common Name:** Earth Summit
- **Year:** 1992
- **Location:** Rio de Janeiro, Brazil
- **Key Outcome related to question:** Convention on Biological Diversity (CBD) opened for signature.

Analysis of Provided Options

Let's examine the options provided in relation to the first Earth Summit and the Convention on Biological Diversity:

- **Johannesburg (2002), S. Africa:** This location hosted the World Summit on Sustainable Development in 2002, which was a follow-up conference, not the initial Earth Summit related to the CBD's establishment.
- **Rio de Janeiro (1992), Brazil:** This is the correct location and year for the first Earth Summit (UNCED), where the Convention on Biological Diversity was opened for signature.
- **Dehradun (1992), India:** While environmental conferences may have occurred in India around this time, Dehradun was not the venue for the global Earth Summit that established the CBD.
- **New York (2000), USA:** New York hosts many United Nations events, but the first Earth Summit connected with the CBD was not held there in 2000.

Therefore, the first Earth Summit for the Convention on Biological Diversity took place in Rio de Janeiro, Brazil, in 1992.

56. Answer: a

Explanation:

Triangle ABC Angle Calculation

This solution explains how to find the measure of angle C in a triangle ($\triangle ABC$) when the average of the other two angles ($\angle A$ and $\angle B$) is provided.

Understanding Triangle Angle Properties

A fundamental property of any triangle in Euclidean geometry is that the sum of the measures of its interior angles always equals 180 degrees. For $\triangle ABC$, this can be expressed mathematically as:

$$\angle A + \angle B + \angle C = 180^\circ$$

Using the Average Angle Information

The problem states that the average measure of $\angle A$ and $\angle B$ is 74° . The average of two values is calculated by summing them and dividing by 2. Therefore, we can write this relationship as:

$$\frac{\angle A + \angle B}{2} = 74^\circ$$

To find the sum of $\angle A$ and $\angle B$, we multiply the average by 2:

$$\angle A + \angle B = 2 \times 74^\circ$$

$$\angle A + \angle B = 148^\circ$$

Calculating Angle C

Now we can use the sum of $\angle A$ and $\angle B$ in the triangle angle sum equation:

$$(\angle A + \angle B) + \angle C = 180^\circ$$

Substitute the calculated sum (148°) into the equation:

$$148^\circ + \angle C = 180^\circ$$

To find the measure of $\angle C$, subtract 148° from 180° :

$$\angle C = 180^\circ - 148^\circ$$

$$\angle C = 32^\circ$$

Conclusion

The measure of angle C in the triangle is 32 degrees.

Answer Options Analysis

Let's review the options based on our calculation:

- Option 1: 32° - Matches our calculated value.
- Option 2: 36°
- Option 3: 40°
- Option 4: 42°

The calculation confirms that 32° is the correct measure for $\angle C$.

Your Personal Exams Guide

57. Answer: c

Explanation:

This question asks us to determine the percentage by which Ram needs to decrease his petrol consumption to maintain the same total spending, given a 25% increase in the price of petrol.

Understanding the Petrol Price Increase Scenario

The core issue is managing a budget when a key expense, petrol, becomes more expensive. Ram wants to keep his total spending on petrol constant despite the

price hike. This means if the price goes up, the quantity (consumption) must go down proportionally to balance it out.

Key Information:

- Price Increase: 25%
- Goal: Maintain the same total cost.

Calculating Consumption Reduction Algebraically

Let's use variables to represent the original price and consumption, and then the new price and consumption.

- Let the original price per unit of petrol be P .
- Let the original consumption of petrol be C units.
- The original total cost is the product of price and consumption: **Original Cost = $P \times C$.**

Now, consider the changes:

- The price of petrol increases by 25%. The new price, P' , is calculated as:

$$P' = P + (25\% \times P) = P + 0.25P = 1.25P$$

- Let the new consumption be C' units.
- Ram wants the total cost to remain the same, so:

$$\text{Original Cost} = \text{New Cost}$$

$$P \times C = P' \times C'$$

Substitute the expression for the new price (P'):

$$P \times C = (1.25P) \times C'$$

To find the relationship between the consumptions, we can simplify this equation. Divide both sides by P (assuming P is not zero):

$$C = 1.25C'$$

Now, solve for the new consumption, C' :

$$C' = \frac{C}{1.25}$$

Since 1.25 is equal to $\frac{5}{4}$, we have:

$$C' = \frac{C}{5/4} = C \times \frac{4}{5} = 0.8C$$

This means the new consumption (C') is 80% of the original consumption (C).

Determining the Percentage Reduction in Consumption

The reduction in consumption is the difference between the original and new consumption:

$$\text{Reduction} = C - C' = C - 0.8C = 0.2C$$

To find the percentage reduction, we compare this reduction to the original consumption:

$$\text{Percentage Reduction} = \left(\frac{\text{Reduction}}{\text{Original Consumption}} \right) \times 100\%$$

$$\text{Percentage Reduction} = \left(\frac{0.2C}{C} \right) \times 100\%$$

$$\text{Percentage Reduction} = 0.2 \times 100\% = 20\%$$

Alternative Calculation Using Numerical Values

We can also solve this by assuming simple values for the original price and consumption.

- Assume the original price of petrol was \$ 100 per unit.
- Assume the original consumption was \$ 100 units.
- Therefore, the Original Cost = $100 \times 100 = 10,000$.

Now, apply the price increase:

- The new price is 25% higher than 100 : New Price = $100 + (25\% \times 100) = 100 + 25 = 125\$$

- Let the new consumption be x units. The total cost must remain 10,000.

$$\text{New Cost} = \text{New Price} \times \text{New Consumption}$$

$$10,000 = 125 \times x$$

Solve for x :

$$x = \frac{10,000}{125}$$

$$x = 80 \text{ units}$$

The reduction in consumption is:

$$\text{Reduction} = \text{Original Consumption} - \text{New Consumption} = 100 - 80 = 20 \text{ units}$$

The percentage reduction is:

$$\text{Percentage Reduction} = \left(\frac{20}{100} \right) \times 100\% = 20\%$$

Final Reduction Percentage

Both methods show that Ram needs to reduce his consumption of petrol by **20%** to keep the total cost the same after a 25% price increase.

Your Personal Exams Guide

58. Answer: d

Explanation:

Determining the Lottery Money Difference Based on Age Ratio

This problem involves dividing a sum of money based on the ratio of the ages of two individuals, Ram and Shyam, and then finding the difference between their shares.

Calculating the Ratio of Ages

First, we identify the ages of Ram and Shyam:

- Ram's age: 25 years
- Shyam's age: 35 years

The ratio of their ages is calculated as:

Ratio = Ram's age : Shyam's age

Substituting the values:

Ratio = 25 : 35

To simplify the ratio, we find the greatest common divisor (GCD) of 25 and 35, which is 5. Dividing both parts of the ratio by 5:

Simplified Ratio = $\frac{25}{5} : \frac{35}{5} = 5 : 7$

So, the lottery money will be divided in the ratio 5:7.

Dividing the Lottery Money

The total amount of the lottery is Rs. 3,00,000.

To divide this amount according to the ratio 5:7, we first find the sum of the ratio parts:

Sum of ratio parts = $5 + 7 = 12$

Now, we calculate the share of the lottery money for each person:

Ram's share = $\left(\frac{\text{Ram's ratio part}}{\text{Sum of ratio parts}} \right) \times \text{Total Lottery Money}$

Ram's share = $\left(\frac{5}{12} \right) \times 3,00,000$

Ram's share = $5 \times \frac{3,00,000}{12}$

Ram's share = $5 \times 25,000 = 1,25,000$

So, Ram received Rs. 1,25,000.

$$\text{Shyam's share} = \left(\frac{\text{Shyam's ratio part}}{\text{Sum of ratio parts}} \right) \times \text{Total Lottery Money}$$

$$\text{Shyam's share} = \left(\frac{7}{12} \right) \times 3,00,000$$

$$\text{Shyam's share} = 7 \times \frac{3,00,000}{12}$$

$$\text{Shyam's share} = 7 \times 25,000 = 1,75,000$$

So, Shyam received Rs. 1,75,000.

Calculating the Difference in Shares

The final step is to find the difference between the amounts received by Shyam and Ram.

$$\text{Difference} = \text{Shyam's share} - \text{Ram's share}$$

$$\text{Difference} = \text{Rs. } 1,75,000 - \text{Rs. } 1,25,000$$

$$\text{Difference} = \text{Rs. } 50,000$$

The difference between the money Ram and Shyam got is Rs. 50,000.

Individual	Age (Years)	Ratio Part	Share (Rs.)
Ram	25	5	1,25,000
Shyam	35	7	1,75,000
Total	60	12	3,00,000

The difference in their shares is Rs. 50,000.

59. Answer: b

Explanation:

This problem involves calculating the time taken by an individual, C, to complete a piece of work, given the times taken by others and their combined time.

Calculating C's Work Time

We can solve this by determining the work rate of each person and their combinations.

Understanding Work Rates

The rate at which a person works is the amount of work they can complete in one unit of time (in this case, one day). If a person can complete a job in n days, their work rate is $1/n$ of the job per day.

Step-by-Step Solution

- **Step 1: Find the work rate of A**

A can complete the work in 8 days. So, A's work rate = $\frac{1}{8}$ of the work per day.

- **Step 2: Find the work rate of B**

B can complete the work in 6 days. So, B's work rate = $\frac{1}{6}$ of the work per day.

- **Step 3: Find the combined work rate of A and B**

The combined work rate of A and B is the sum of their individual rates:

$$\text{Rate (A + B)} = \text{Rate (A)} + \text{Rate (B)} = \frac{1}{8} + \frac{1}{6}$$

To add these fractions, we find a common denominator, which is 24.

$$\text{Rate (A + B)} = \frac{3}{24} + \frac{4}{24} = \frac{7}{24} \text{ of the work per day.}$$

- **Step 4: Find the combined work rate of A, B, and C**

A, B, and C together can complete the work in 3 days. So, their combined work rate is:

$$\text{Rate (A + B + C)} = \frac{1}{3} \text{ of the work per day.}$$

- **Step 5: Find the work rate of C**

The work rate of C alone can be found by subtracting the combined rate of A and B from the combined rate of A, B, and C:

$$\text{Rate (C)} = \text{Rate (A + B + C)} - \text{Rate (A + B)}$$

$$\text{Rate (C)} = \frac{1}{3} - \frac{7}{24}$$

Again, we find a common denominator, which is 24.

$$\text{Rate (C)} = \frac{8}{24} - \frac{7}{24} = \frac{1}{24} \text{ of the work per day.}$$

- **Step 6: Calculate the time taken by C alone**

If C's work rate is $\frac{1}{24}$ of the work per day, the time taken by C to complete the entire work alone is the reciprocal of the rate:

$$\text{Time (C)} = \frac{1}{\text{Rate (C)}} = \frac{1}{\frac{1}{24}} = 24 \text{ days.}$$

Summary of Work Rates

Person/Group	Time Taken (Days)	Work Rate (Work/Day)
A	8	$\frac{1}{8}$
B	6	$\frac{1}{6}$
A, B, C	3	$\frac{1}{3}$
A + B	-	$\frac{7}{24}$
C	24	$\frac{1}{24}$

Therefore, C alone can complete the same work in 24 days.

60. Answer: d

Explanation:

Understanding Tank Filling and Leakage Dynamics

This problem involves calculating the time it takes for a leakage to empty a tank, considering the rate at which another pipe fills it. We need to determine the individual rates of filling and leaking.

Analyzing Filling Rates

First, let's understand the rates at which the tank is being filled and emptied.

- The pipe 'A' fills the tank in 7 hours. So, the rate at which pipe 'A' fills the tank is:

$$\text{Rate}_A = \frac{1}{7} \text{ tank per hour}$$

- Due to a leakage, the time taken to fill the tank is 8 hours. This means that both the filling action of pipe 'A' and the emptying action of the leakage are happening simultaneously. The combined rate of filling the tank (considering both A filling and leakage emptying) is:

$$\text{Rate}_{\text{Combined}} = \frac{1}{8} \text{ tank per hour}$$

Calculating the Leakage Rate

The leakage reduces the effective filling rate. To find the rate at which the leakage empties the tank, we subtract the combined rate from the filling rate of pipe 'A'.

- Let the rate at which the leakage empties the tank be $\text{Rate}_{\text{Leakage}}$.
- The relationship is:

$$\text{Rate}_A - \text{Rate}_{\text{Leakage}} = \text{Rate}_{\text{Combined}}$$

- Rearranging the formula to find the leakage rate:

$$\text{Rate}_{\text{Leakage}} = \text{Rate}_A - \text{Rate}_{\text{Combined}}$$

- Substituting the values:

$$\text{Rate}_{\text{Leakage}} = \frac{1}{7} - \frac{1}{8}$$

- To subtract these fractions, we find a common denominator, which is $7 \times 8 = 56$.

$$\text{Rate}_{\text{Leakage}} = \frac{8}{56} - \frac{7}{56}$$

$$\text{Rate}_{\text{Leakage}} = \frac{8 - 7}{56}$$

$$\text{Rate}_{\text{Leakage}} = \frac{1}{56} \text{ tank per hour}$$

This means the leakage empties $1/56$ of the tank every hour.

Determining Time to Empty the Tank

Now, we can find the time it would take for the leakage alone to empty the entire tank.

- If the leakage empties $1/56$ of the tank in 1 hour, then the time taken to empty the full tank (1 tank) is the reciprocal of the leakage rate.

$$\text{Time}_{\text{Empty}} = \frac{1}{\text{Rate}_{\text{Leakage}}}$$

- $$\text{Time}_{\text{Empty}} = \frac{1}{1/56}$$

$$\text{Time}_{\text{Empty}} = 56 \text{ hours}$$

Therefore, the leakage can empty the full tank in 56 hours.

61. Answer: a

Explanation:

Paneer Consumption Analysis: Monday to Thursday

This problem involves calculating the total amount of paneer consumed over four days, following a specific pattern. A woman buys a certain amount of paneer and uses half of what's available each day from Monday through Thursday.

- **Initial State:** Let the total initial quantity of paneer be represented by ' Q '.
- **Consumption Pattern:** Each day, the woman consumes exactly half ($\frac{1}{2}$) of the paneer remaining from the previous day.
- **Objective:** We need to find the total percentage of the initial paneer quantity (Q) that was consumed from Monday to Thursday.

Step-by-Step Paneer Quantity Calculation

Let's track the amount of paneer consumed and remaining each day:

- **Monday:**

- Consumed: $\frac{1}{2} \times Q = \frac{Q}{2}$
- Remaining: $Q - \frac{Q}{2} = \frac{Q}{2}$

- **Tuesday:**

- Consumed: $\frac{1}{2} \times (\text{Remaining from Monday}) = \frac{1}{2} \times \frac{Q}{2} = \frac{Q}{4}$
- Remaining: $\frac{Q}{2} - \frac{Q}{4} = \frac{Q}{4}$

- **Wednesday:**

- Consumed: $\frac{1}{2} \times (\text{Remaining from Tuesday}) = \frac{1}{2} \times \frac{Q}{4} = \frac{Q}{8}$
- Remaining: $\frac{Q}{4} - \frac{Q}{8} = \frac{Q}{8}$

- **Thursday:**

- Consumed: $\frac{1}{2} \times (\text{Remaining from Wednesday}) = \frac{1}{2} \times \frac{Q}{8} = \frac{Q}{16}$
- Remaining: $\frac{Q}{8} - \frac{Q}{16} = \frac{Q}{16}$

Total Paneer Consumed Calculation

To find the total amount consumed, we sum the quantities used each day:

Total Consumed = (Monday Consumed) + (Tuesday Consumed) + (Wednesday Consumed) + (Thursday Consumed)

$$\text{Total Consumed} = \frac{Q}{2} + \frac{Q}{4} + \frac{Q}{8} + \frac{Q}{16}$$

To add these fractions, we find a common denominator, which is 16:

$$\text{Total Consumed} = \frac{8Q}{16} + \frac{4Q}{16} + \frac{2Q}{16} + \frac{Q}{16}$$

$$\text{Total Consumed} = \frac{8Q+4Q+2Q+Q}{16} = \frac{15Q}{16}$$

So, the total quantity of paneer consumed is $\frac{15}{16}$ of the initial quantity.

Final Percentage Calculation

Now, we convert the total consumed fraction into a percentage of the initial quantity (Q):

$$\text{Percentage Consumed} = \frac{\text{Total Consumed}}{\text{Initial Quantity}} \times 100\%$$

$$\text{Percentage Consumed} = \frac{\frac{15Q}{16}}{Q} \times 100\%$$

$$\text{Percentage Consumed} = \frac{15}{16} \times 100\%$$

Calculating the value:

$$\text{Percentage Consumed} = 15 \times \frac{100}{16} \% = 15 \times \frac{25}{4} \% = \frac{375}{4} \%$$

$$\text{Percentage Consumed} = 93.75\%$$

Conclusion

The total quantity of paneer consumed from Monday to Thursday is **93.75%** of the initial amount. This matches the first option provided.

62. Answer: b

Explanation:

This question asks us to calculate the overall change in a shopkeeper's profit when both the profit per unit and the total number of sales change by different percentages.

Calculating the Shopkeeper's Net Profit Change

To find the net profit, we need to understand how the individual percentage changes in profit and sales combine to affect the total profit amount. We can approach this by considering the profit per item and the number of sales.

Initial Assumptions and Variables

Let's assume:

- The initial profit per item sold is p .
- The initial number of sales (items sold) is n .

The initial total profit, let's call it P , can be calculated as:

$$P = p \times n$$

Changes in Profit and Sales

The problem states two key changes:

1. **Profit Increase:** The profit per item increases by 15%.
2. **Sales Decrease:** The number of sales decreases by 5%.

We can calculate the new values:

- New profit per item (p_{new}): An increase of 15% means the new profit is 100% + 15% = 115% of the original.

$$p_{new} = p + 0.15p = 1.15p$$

- New number of sales (n_{new}): A decrease of 5% means the new number of sales is 100% - 5% = 95% of the original.

$$n_{new} = n - 0.05n = 0.95n$$

Calculating the New Total Profit

The new total profit (P_{new}) is the product of the new profit per item and the new number of sales:

$$P_{new} = p_{new} \times n_{new}$$

Substitute the expressions for p_{new} and n_{new} :

$$P_{new} = (1.15p) \times (0.95n)$$

Rearrange the terms:

$$P_{new} = (1.15 \times 0.95) \times (p \times n)$$

Calculate the product of the multipliers:

$$1.15 \times 0.95 = 1.0925$$

So, the new total profit is:

$$P_{new} = 1.0925 \times (p \times n)$$

Since the initial total profit $P = p \times n$, we have:

$$P_{new} = 1.0925P$$

Determining the Net Profit Percentage

The net change in profit is $P_{new} - P$. The net profit percentage is the change relative to the original profit (P):

$$\text{Net Profit \% Change} = \frac{P_{new} - P}{P} \times 100\%$$

Substitute $P_{new} = 1.0925P$:

$$\text{Net Profit \% Change} = \frac{1.0925P - P}{P} \times 100\%$$

$$\text{Net Profit \% Change} = \frac{(1.0925 - 1)P}{P} \times 100\%$$

$$\text{Net Profit \% Change} = \frac{0.0925P}{P} \times 100\%$$

$$\text{Net Profit \% Change} = 0.0925 \times 100\%$$

$$\text{Net Profit \% Change} = 9.25\%$$

Conclusion

The shopkeeper experiences a net increase in profit. The calculation shows that the new total profit is 1.0925 times the original profit, which represents a net increase of 9.25%.

Comparing this result with the given options:

- 10%
- 9.25%
- 8.75%
- 11.25%

The calculated net profit percentage matches the second option.

63. Answer: c

Explanation:

The problem asks us to find the principal **sum of money** (let's call it P) that Aman lent. We are given the total **simple interest** earned over 6 years, but the **interest rate** changes during this period.

Understanding the Simple Interest Calculation

The formula for simple interest (SI) is:

$$SI = \frac{P \times R \times T}{100}$$

Where:

- P = Principal sum of money
- R = Rate of interest per annum (%)
- T = Time period (in years)

In this problem, the interest rate changes, so we need to calculate the interest for each phase separately and add them up.

Calculating Interest Over Different Periods

We can break down the total interest calculation into three parts based on the given rates and time periods:

- **Period 1:**
 - Time (T_1) = 2 years
 - Rate (R_1) = 3%
 - Interest for Period 1 (SI_1) = $\frac{P \times 3 \times 2}{100} = \frac{6P}{100}$
- **Period 2:**
 - Time (T_2) = 3 years

- Rate (R_2) = 5%
- Interest for Period 2 (SI_2) = $\frac{P \times 5 \times 3}{100} = \frac{15P}{100}$
- **Period 3:**
 - Time (T_3) = 1 year
 - Rate (R_3) = 7%
 - Interest for Period 3 (SI_3) = $\frac{P \times 7 \times 1}{100} = \frac{7P}{100}$

The total time period is $T = T_1 + T_2 + T_3 = 2 + 3 + 1 = 6$ years.

Determining the Total Simple Interest

The total simple interest (SI) is given as Rs. 840. This total interest is the sum of the interests from the three periods:

$$SI_{total} = SI_1 + SI_2 + SI_3$$

$$840 = \frac{6P}{100} + \frac{15P}{100} + \frac{7P}{100}$$

Solving for the Sum of Money (P)

Now, we need to solve the equation for P .

1. Combine the terms on the right side since they have a common denominator (100):

$$840 = \frac{6P + 15P + 7P}{100}$$

2. Add the terms in the numerator:

$$840 = \frac{(6 + 15 + 7)P}{100}$$

$$840 = \frac{28P}{100}$$

3. To find P , rearrange the equation:

$$P = \frac{840 \times 100}{28}$$

4. Perform the calculation: First, divide 840 by 28: $\frac{840}{28} = 30$ Then, multiply by 100:
 $P = 30 \times 100$

$$P = 3000$$

Therefore, the principal **sum of money** Aman lent is Rs. 3000.

Conclusion

By calculating the simple interest for each period with its respective rate and summing them up, we set the total interest equal to the given Rs. 840. Solving the resulting equation allowed us to find the principal sum of money.

The sum of money is Rs. 3000.

64. Answer: a

Explanation:

Understanding the Principal Sum Calculation

This problem asks us to find the initial amount (the **principal sum**) invested when we know the **compound interest** earned over a specific period (3 years) at a given **annual interest rate** (5%), and the total interest amount (Rs. 1261).

Compound Interest Formula Explained

To solve this, we use the formula relating the **compound interest** (CI), the **principal sum** (P), the annual interest **rate** (R), and the number of years (n).

The formula for the total amount (A) after n years is:

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

Since Compound Interest (CI) is the difference between the final Amount (A) and the Principal (P), we can write:

$$CI = A - P$$

Substituting the formula for A:

$$CI = P \left(1 + \frac{R}{100} \right)^n - P$$

We can factor out P:

$$CI = P \left[\left(1 + \frac{R}{100} \right)^n - 1 \right]$$

We need to find P, so we can rearrange the formula:

$$P = \frac{CI}{\left[\left(1 + \frac{R}{100} \right)^n - 1 \right]}$$

Step-by-Step Calculation

Let's plug in the values we know:

- Compound Interest (CI) = Rs. 1261
- Rate (R) = 5%
- Time Period (n) = 3 years

Now, let's calculate the term $\left(1 + \frac{R}{100} \right)^n$:

1. Calculate the interest rate factor:

$$1 + \frac{R}{100} = 1 + \frac{5}{100} = 1 + 0.05 = 1.05$$

2. Calculate the value raised to the power of the time period (3 years):

$$(1.05)^3 = 1.05 \times 1.05 \times 1.05 = 1.1025 \times 1.05 = 1.157625$$

3. Now, calculate the value inside the brackets:

$$[(1.05)^3 - 1] = 1.157625 - 1 = 0.157625$$

4. Finally, use the rearranged formula to find the Principal (P):

$$P = \frac{CI}{0.157625}$$

$$P = \frac{1261}{0.157625}$$

5. Performing the division:

$$P = 8000$$

Conclusion: The Sum

The calculation shows that the principal sum required to earn Rs. 1261 as compound interest over 3 years at an annual rate of 5% is Rs. 8000.

65. Answer: d

Explanation:

Solving the Ram and Shyam Travelling Distance Problem

This problem requires us to determine the meeting point (P) of Ram and Shyam, who are travelling towards each other from points A and B respectively. We need to find the distance of this meeting point P from Ram's starting point A.

Understanding Ram and Shyam's Journey

Let's break down the key information given:

- The total distance separating point A and point B is **710 km**.
- Ram starts from point A and travels towards point B.
- Ram's speed is **50 km/hr**.
- Shyam starts from point B and travels towards point A.
- Shyam's speed is **30 km/hr**.

- A crucial detail is that Shyam begins his journey **3 hours after** Ram starts.

Calculating Ram's Initial Distance Travelled

Ram had a head start of 3 hours before Shyam began travelling. We first calculate the distance Ram covered during this time.

- Ram's speed = 50 km/hr
- Ram's head start time = 3 hours
- Distance covered by Ram in the first 3 hours = Speed $\times$ Time
- Distance = 50 km/hr $\times$ 3 hr = 150 km

When Shyam starts travelling from point B, Ram is already **150 km** away from point A.

Determining the Remaining Distance Between Them

After Ram has travelled 150 km, the distance between Ram and Shyam is less than the initial 710 km.

- Initial distance = 710 km
- Distance covered by Ram = 150 km
- Remaining distance = Initial Distance - Distance covered by Ram
- Remaining distance = 710 km - 150 km = 560 km

So, when both Ram and Shyam are moving towards each other, the distance separating them is **560 km**.

Calculating Their Relative Speed

Since Ram and Shyam are travelling towards each other, their speeds combine to reduce the distance between them. This is known as their relative speed.

- Ram's speed = 50 km/hr
- Shyam's speed = 30 km/hr
- Relative Speed = Ram's Speed + Shyam's Speed
- Relative Speed = 50 km/hr + 30 km/hr = 80 km/hr

The rate at which the distance between them closes is **80 km/hr**.

Calculating the Time Taken to Meet

We can now find out how long it takes for them to cover the remaining 560 km distance at their relative speed of 80 km/hr.

- Time = Distance / Speed
- Time to meet (after Shyam starts) = Remaining Distance / Relative Speed
- Time = $\frac{560 \text{ km}}{80 \text{ km/hr}} = 7 \text{ hours}$

This means they will meet 7 hours after Shyam started his journey.

Finding the Distance from Point A to Point P

The question asks for the distance from point P to point A. This is the total distance covered by Ram from the moment he started until they met.

- Ram's total travel time = Ram's head start time + Time taken to meet after Shyam started
- Ram's total travel time = 3 hours + 7 hours = 10 hours
- Ram's speed = 50 km/hr
- Distance from A to P = Ram's Speed $\times$ Ram's Total Travel Time
- Distance = 50 km/hr $\times$ 10 hours = 500 km

Thus, the meeting point P is located **500 km** from point A.

Final Calculation Summary

Ram travelled for 10 hours in total. His speed was 50 km/hr. The total distance he covered from point A is calculated as 50 km/hr $\times$ 10 hours, which equals 500 km. This distance represents the location of point P relative to point A.

66. Answer: c

Explanation:

Detailed Explanation for Apple Sales Profit Calculation

This solution breaks down the steps to calculate the required selling price per kilogram for the remaining apples to achieve a specific overall profit margin.

Calculating the Total Cost Price (CP) of Apples

The first step is to determine the total amount spent on purchasing all the apples.

- Quantity of apples bought: 50 kgs
- Cost price per kg: Rs. 55
- **Total Cost Price (Total CP)** is calculated as:

$$\text{Total CP} = \text{Quantity} \times \text{Cost Price per kg}$$

$$\text{Total CP} = 50 \text{ kgs} \times \text{Rs. } 55/\text{kg} = \text{Rs. } 2750$$

Determining the Target Total Selling Price (SP) for 25% Profit

The objective is to make a **profit of 25%** on the total investment. We need to calculate the total revenue required to meet this profit goal.

- Desired Profit Percentage: 25%
- The profit amount is 25% of the Total CP:

$$\text{Profit Amount} = 0.25 \times \text{Total CP}$$

$$\text{Profit Amount} = 0.25 \times \text{Rs. } 2750 = \text{Rs. } 687.50$$

- The **Target Total Selling Price (Target Total SP)** is the sum of the Total CP and the desired Profit Amount:

$$\text{Target Total SP} = \text{Total CP} + \text{Profit Amount}$$

$$\text{Target Total SP} = \text{Rs. } 2750 + \text{Rs. } 687.50 = \text{Rs. } 3437.50$$

Alternatively, this can be calculated as:

$$\text{Target Total SP} = \text{Total CP} \times (1 + \text{Profit Percentage})$$

$$\text{Target Total SP} = \text{Rs. } 2750 \times (1 + 0.25) = \text{Rs. } 2750 \times 1.25 = \text{Rs. } 3437.50$$

Calculating Revenue from the First Batch of Apples Sold

We calculate the earnings from the portion of apples sold at the initial higher price.

- Quantity sold in the first batch: 25% of 50 kgs.

$$\text{Quantity Sold} = 0.25 \times 50 \text{ kgs} = 12.5 \text{ kgs}$$

- Selling price per kg for this batch: Rs. 59
- Revenue generated from the first batch:

$$\text{Revenue (First Batch)} = \text{Quantity Sold} \times \text{Selling Price per kg}$$

$$\text{Revenue (First Batch)} = 12.5 \text{ kgs} \times \text{Rs. } 59/\text{kg} = \text{Rs. } 737.50$$

Calculating Requirements for the Remaining Apples

We determine the quantity of apples left and the revenue needed from them to reach the overall profit target.

- **Remaining Quantity** of apples:

$$\text{Remaining Quantity} = \text{Total Quantity} - \text{Quantity Sold}$$

$$\text{Remaining Quantity} = 50 \text{ kgs} - 12.5 \text{ kgs} = 37.5 \text{ kgs}$$

- **Required revenue** from the remaining apples:

$$\text{Required Revenue (Remaining)} = \text{Target Total SP} - \text{Revenue (First Batch)}$$

$$\text{Required Revenue (Remaining)} = \text{Rs. } 3437.50 - \text{Rs. } 737.50 = \text{Rs. } 2700$$

Final Calculation: Selling Price per kg for Remaining Apples

The final step is to calculate the selling price per kilogram needed for the remaining 37.5 kgs of apples.

- **Selling Price per kg for Remaining Apples** is calculated by dividing the required revenue by the remaining quantity:

$$\text{SP per kg (Remaining)} = \frac{\text{Required Revenue (Remaining)}}{\text{Remaining Quantity}}$$

$$\text{SP per kg (Remaining)} = \frac{\text{Rs. 2700}}{37.5 \text{ kgs}}$$

$$\text{SP per kg (Remaining)} = \text{Rs. 72/kg}$$

Summary of Calculations

Item	Quantity (kg)	Price (Rs./kg)	Amount (Rs.)
Total Purchase	50	55	2750
Target Total Selling Price (for 25% profit)	-	-	3437.50
First Part Sold (25% of quantity)	12.5	59	737.50
Remaining Apples	37.5	72	2700
Total Sales Verification	50	-	3437.50 (737.50 + 2700)

To achieve an overall profit of 25%, the person needs to sell the **remaining apples** at **Rs. 72 per kg**.

67. Answer: b

Explanation:

Understanding the Travel Scenario

This problem involves calculating the speed of an **onward journey**. We are given the **total distance** covered in a to-and-fro trip, the **total time** taken for the entire journey

including a halt, and a relationship between the **speed** of the onward journey and the return journey. We need to find the speed of the onward journey.

- **Total Distance** (P to Q and back): 2000 km.
- **Distance one way** (P to Q): $\frac{2000 \text{ km}}{2} = 1000 \text{ km}$.
- **Total Time** (including halt): 42 hours.
- **Halt Time**: 2 hours.
- **Speed Relationship**: Onward speed is 20% less than return speed.

Calculating Total Travel Time

The total time mentioned (42 hours) includes the time spent traveling and the time spent halted. To find the actual time spent traveling, we need to subtract the halt time from the total time.

Actual Travel Time = Total Time - Halt Time

Actual Travel Time = 42 hours - 2 hours = 40 hours.

This 40 hours is the sum of the time taken for the onward journey and the time taken for the return journey.

Relating Onward and Return Speeds

Let's define the speeds:

- Let v_{on} represent the **speed of the onward journey** (P to Q) in km/hr.
- Let v_{ret} represent the **speed of the return journey** (Q to P) in km/hr.

The problem states that the onward journey speed was 20% less than the return journey speed. This can be written as:

$$v_{on} = v_{ret} - 0.20 \times v_{ret}$$

$$v_{on} = (1 - 0.20) \times v_{ret}$$

$$v_{on} = 0.80 \times v_{ret}$$

We can express the return speed in terms of the onward speed:

$$v_{ret} = \frac{v_{on}}{0.80} = \frac{v_{on}}{4/5} = \frac{5}{4}v_{on}$$

Setting up the Speed Equation

We know that Time = Distance / Speed.

- Time for the onward journey (t_{on}): $t_{on} = \frac{1000 \text{ km}}{v_{on}}$
- Time for the return journey (t_{ret}): $t_{ret} = \frac{1000 \text{ km}}{v_{ret}}$

Substitute the expression for v_{ret} into the equation for t_{ret} :

$$t_{ret} = \frac{1000}{\frac{5}{4}v_{on}} = \frac{1000 \times 4}{5v_{on}} = \frac{4000}{5v_{on}} = \frac{800}{v_{on}}$$

The total actual travel time is the sum of the onward and return journey times:

$$t_{on} + t_{ret} = 40 \text{ hours}$$

Substituting the expressions for t_{on} and t_{ret} :

$$\frac{1000}{v_{on}} + \frac{800}{v_{on}} = 40$$

Solving for Onward Journey Speed

Now, we solve the equation for v_{on} :

Combine the terms on the left side:

$$\frac{1000+800}{v_{on}} = 40$$

$$\frac{1800}{v_{on}} = 40$$

Rearrange the equation to solve for v_{on} :

$$v_{on} = \frac{1800}{40}$$

$$v_{on} = \frac{180}{4}$$

$$v_{on} = 45 \text{ km/hr}$$

Final Answer Verification

Let's verify if this speed fits the conditions:

- Onward speed (v_{on}) = 45 km/hr.
- Return speed (v_{ret}) = $\frac{5}{4} \times 45 = \frac{225}{4} = 56.25$ km/hr.
- Check speed condition: $56.25 \times 0.80 = 45$ km/hr. (Correct)
- Time for onward journey (t_{on}) = $\frac{1000}{45} = \frac{200}{9}$ hours.
- Time for return journey (t_{ret}) = $\frac{1000}{56.25} = \frac{1000}{225/4} = \frac{4000}{225} = \frac{160}{9}$ hours.
- Total travel time = $t_{on} + t_{ret} = \frac{200}{9} + \frac{160}{9} = \frac{360}{9} = 40$ hours. (Correct)
- Total journey time = Total travel time + Halt time = $40 + 2 = 42$ hours. (Correct)

All conditions are met. The speed of the onward journey is 45 km/hr.

68. Answer: d

Explanation:

Given

The cost price of 10 shirts and 5 trousers together = Rs. 10,000

A shopkeeper sells shirts at a profit of 15% and trousers at a loss of 10% and his overall gain = Rs. 275

Formula Used

$$\text{Profit\%} = (\text{Profit/CP}) \times 100$$

$$\text{Loss\%} = (\text{Loss/CP}) \times 100$$

Calculation

Let the cost price of shirt and trouser be x and y

According to the question

$$10x + 5y = 10000 \text{ ----(1)}$$

And also according to the question

$$10x (15/100) - 5y (10/100) = 275$$

$$\Rightarrow 15x - 5y = 2750 \text{ ---(2)}$$

On adding (1) and (2), we get

$$25x = 12750$$

$$\Rightarrow x = 510$$

$\therefore$ The cost price of a shirt is Rs. 510.

69. Answer: b

Explanation:

Summer Camp Consumption Calculation: Finding Initial Student Cost

This problem involves calculating the initial daily consumption cost per student at a summer camp, given changes in the number of students and the total and average costs.

Understanding the Problem Variables

We need to find the initial average cost per student. Let's define the variables based on the information provided:

- Initial number of students: $N_1 = 120$
- Number of students joining later: 20
- Final number of students: $N_2 = 120 + 20 = 140$
- Increase in total daily consumption cost: Rs. 80
- Decrease in average cost per student: Rs. 5
- Let A_1 be the initial average daily consumption cost per student (in Rs.).
- Let A_2 be the final average daily consumption cost per student (in Rs.).
- Let C_1 be the initial total daily consumption cost (in Rs.).

- Let C_2 be the final total daily consumption cost (in Rs.).

Setting Up the Equations

We can establish relationships between these variables:

- The initial total cost is the product of the initial number of students and the initial average cost: $C_1 = N_1 \times A_1$ $C_1 = 120 \times A_1$
- The final total cost is the product of the final number of students and the final average cost: $C_2 = N_2 \times A_2$ $C_2 = 140 \times A_2$
- The problem states the average cost decreased by Rs. 5, so: $A_2 = A_1 - 5$
- The problem also states the total cost increased by Rs. 80, meaning the final total cost is Rs. 80 more than the initial total cost: $C_2 = C_1 + 80$

Calculating the Initial Consumption Per Student

Now, we can solve for A_1 using the equations derived above. We will substitute the expressions step-by-step:

1. Substitute the expression for A_2 into the equation for C_2 : $C_2 = 140 \times (A_1 - 5)$
 $C_2 = 140A_1 - (140 \times 5)$ $C_2 = 140A_1 - 700$
2. Now, use the relationship $C_2 = C_1 + 80$: $C_1 + 80 = 140A_1 - 700$
3. Substitute the expression for C_1 (which is $120A_1$) into this equation: $(120A_1) + 80 = 140A_1 - 700$
4. Rearrange the equation to solve for A_1 : Subtract $120A_1$ from both sides: $80 = (140A_1 - 120A_1) - 700$ $80 = 20A_1 - 700$
5. Add 700 to both sides: $80 + 700 = 20A_1$ $780 = 20A_1$
6. Divide by 20 to find A_1 : $A_1 = \frac{780}{20}$ $A_1 = 39$

Verification

Let's check if this value of $A_1 = 39$ satisfies all conditions:

- Initial average cost (A_1): Rs. 39
- Initial total cost (C_1): $120 \times 39 = \text{Rs. } 4680$
- Final average cost ($A_2 = A_1 - 5$): $39 - 5 = \text{Rs. } 34$
- Final total cost (C_2): $140 \times 34 = \text{Rs. } 4760$

- Increase in total cost ($C_2 - C_1$): $4760 - 4680 = \text{Rs. } 80$

The calculated increase in total cost (Rs. 80) matches the information given in the problem, confirming our result.

Conclusion

The initial consumption of each student was Rs. 39.

70. Answer: c

Explanation:

Meeting Floor Calculation for Vikash and Khushbu

This problem involves two people, Vikash and Khushbu, moving in lifts at different floors and speeds. We need to find the specific floor where they meet. Vikash starts on the 10th floor and moves upwards, while Khushbu starts on the 35th floor and moves downwards. They begin their journey at the same time.

Understanding Lift Movement and Speeds

- **Vikash's Position:** 10th floor
- **Vikash's Lift Direction:** Upward
- **Vikash's Lift Speed:** $v_V = 24$ floors per minute
- **Khushbu's Position:** 35th floor
- **Khushbu's Lift Direction:** Downward
- **Khushbu's Lift Speed:** $v_K = 26$ floors per minute
- **Start Time:** Both start simultaneously.

Since they are moving towards each other (one up, one down), we can use the concept of relative speed to determine when they will meet.

Calculating the Meeting Point

Step 1: Determine the Relative Speed

When two objects move towards each other, their relative speed is the sum of their individual speeds. This tells us how quickly the distance between them is closing.

Relative Speed $v_{rel} = v_V + v_K$

Substituting the given speeds:

$$v_{rel} = 24 \text{ floors/min} + 26 \text{ floors/min} = 50 \text{ floors/min}$$

The distance between their starting floors is decreasing at a rate of 50 floors every minute.

Step 2: Calculate the Initial Distance

The initial distance between Vikash and Khushbu is the difference between their starting floors.

Distance $D = \text{Khushbu's Floor} - \text{Vikash's Floor}$

$$D = 35 - 10 = 25 \text{ floors}$$

Step 3: Calculate the Time to Meet

The time it takes for them to meet can be calculated using the formula: $\text{Time} = \frac{\text{Distance}}{\text{Relative Speed}}$.

$$\text{Time } t = \frac{D}{v_{rel}}$$

$$t = \frac{25 \text{ floors}}{50 \text{ floors/min}} = 0.5 \text{ minutes}$$

So, Vikash and Khushbu will meet after 0.5 minutes.

Step 4: Calculate the Meeting Floor

To find the floor where they meet, we can calculate how far either Vikash or Khushbu has traveled in 0.5 minutes and add/subtract it from their starting floor.

Method 1: Using Vikash's Travel

Distance covered by Vikash = Vikash's Speed $\times$ Time

$$\text{Distance_Vikash} = v_V \times t = 24 \text{ floors/min} \times 0.5 \text{ min} = 12 \text{ floors}$$

Meeting Floor = Vikash's Starting Floor + Distance covered by Vikash

$$\text{Meeting Floor} = 10 + 12 = 22\text{nd floor}$$

Method 2: Using Khushbu's Travel

Distance covered by Khushbu = Khushbu's Speed $\times$ Time

$$\text{Distance_Khushbu} = v_K \times t = 26 \text{ floors/min} \times 0.5 \text{ min} = 13 \text{ floors}$$

Meeting Floor = Khushbu's Starting Floor - Distance covered by Khushbu

$$\text{Meeting Floor} = 35 - 13 = 22\text{nd floor}$$

Both methods confirm that they will meet on the 22nd floor.

Final Conclusion

Vikash and Khushbu will meet each other on the **22nd floor** after 0.5 minutes of starting their lifts simultaneously.

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71. Answer: d

Explanation:

Finding the Value of N1 Using Ratios and Sum of Squares

This problem requires us to find the value of a number, **N1**, based on the sum of the squares of three numbers (**N1**, **N2**, **N3**) and their given ratios.

Understanding the Given Information

- The sum of the squares of the three numbers is 3325. This can be written as:

$$N_1^2 + N_2^2 + N_3^2 = 3325$$

- The ratio between **N1** and **N2** is 3:2 ($N_1 : N_2 = 3 : 2$).
- The ratio between **N2** and **N3** is 3:2 ($N_2 : N_3 = 3 : 2$).

Step 1: Combining the Ratios

To work with all three numbers together, we need a single combined ratio $N_1 : N_2 : N_3$. The given ratios are:

- $N_1 : N_2 = 3 : 2$
- $N_2 : N_3 = 3 : 2$

Notice that the value representing **N2** is different in both ratios (2 in the first and 3 in the second). To combine them, we need to make the **N2** term the same. We can do this by finding the least common multiple (LCM) of the **N2** terms (which are 2 and 3). The LCM of 2 and 3 is 6.

Multiply the terms of the first ratio ($N_1 : N_2$) by 3:

$$N_1 : N_2 = (3 \times 3) : (2 \times 3) = 9 : 6$$

Multiply the terms of the second ratio ($N_2 : N_3$) by 2:

$$N_2 : N_3 = (3 \times 2) : (2 \times 2) = 6 : 4$$

Now, we can combine these into a single ratio because the **N2** term is 6 in both:

$$N_1 : N_2 : N_3 = 9 : 6 : 4$$

Step 2: Representing the Numbers

We can now represent the numbers **N1**, **N2**, and **N3** using a common multiplier, let's call it x , based on their combined ratio:

- $N_1 = 9x$
- $N_2 = 6x$
- $N_3 = 4x$

Step 3: Using the Sum of Squares

We know that the sum of the squares of these numbers is 3325. Let's substitute our expressions for **N1**, **N2**, and **N3** into the equation:

$$N_1^2 + N_2^2 + N_3^2 = 3325$$

$$(9x)^2 + (6x)^2 + (4x)^2 = 3325$$

Step 4: Solving for the Multiplier x

Calculate the squares:

$$81x^2 + 36x^2 + 16x^2 = 3325$$

Combine the terms with x^2 :

$$(81 + 36 + 16)x^2 = 3325$$

$$133x^2 = 3325$$

Now, solve for x^2 by dividing both sides by 133:

$$x^2 = \frac{3325}{133}$$

Performing the division:

$$x^2 = 25$$

Take the square root of both sides to find x:

$$x = \sqrt{25}$$

$$x = 5$$

(We consider the positive value for x as numbers in ratio problems are typically positive unless stated otherwise).

Step 5: Calculating the Value of N1

The question asks for the value of **N1**. We know that $N_1 = 9x$. Substitute the value of x we found:

$$N_1 = 9 \times 5$$

$$N_1 = 45$$

Conclusion

Therefore, the value of **N1** is 45.

72. Answer: b

Explanation:

Compound Interest Sum Growth Explained

This explanation addresses a common compound interest problem: determining the time required for an initial sum to grow to 8 times its original value, given that it doubles in 4 years.

Understanding the Principle of Compound Interest

Compound interest is calculated on the initial principal and also on the accumulated interest from previous periods. Essentially, your money grows faster because the interest earned also starts earning interest. The key characteristic is that the sum grows exponentially, meaning it multiplies by the same factor over equal time intervals.

The standard formula for compound interest is:

$$A = P(1 + r)^t$$

Where:

- **A** is the amount of money accumulated after n years, including interest.
- **P** is the principal amount (the initial amount of money).

- r is the annual interest rate (expressed as a decimal).
- t is the number of years the money is invested or borrowed for.

Analyzing the Given Information: Doubling Time

We are told that the sum becomes double in 4 years. Let the initial principal be P . After 4 years, the amount A becomes $2P$.

Using the formula:

$$2P = P(1 + r)^4$$

To find the growth factor, we can divide both sides by P :

$$2 = (1 + r)^4$$

This equation shows that the factor by which the sum grows in 4 years is 2.

Calculating the Time for 8 Times Growth

The goal is to find out how many years (let's call this T) it will take for the sum to become 8 times its original value, meaning $A = 8P$.

Using the formula again:

$$8P = P(1 + r)^T$$

Divide both sides by P :

$$8 = (1 + r)^T$$

Now, we connect this to the information we found earlier. We know that 8 can be expressed as a power of 2. Specifically, $8 = 2^3$.

We can substitute the expression for 2 from our doubling time calculation ($2 = (1 + r)^4$) into the equation for 8 times growth:

$$8 = (2)^3$$

$$8 = \left[(1 + r)^4\right]^3$$

Using the exponent rule $(a^m)^n = a^{mn}$, we get:

$$8 = (1 + r)^{4 \times 3}$$

$$8 = (1 + r)^{12}$$

By comparing this result, $8 = (1 + r)^{12}$, with our target equation, $8 = (1 + r)^T$, we can directly conclude:

$$T = 12$$

So, it will take 12 years for the sum to become 8 times itself.

Step-by-Step Conceptual Calculation

Here's a simpler way to think about it, focusing on the doubling periods:

- **Start:** Initial sum = P
- **After 4 years:** The sum doubles, becoming $2P$.
- **After another 4 years (Total 8 years):** The sum of $2P$ doubles again, becoming $2 \times (2P) = 4P$.
- **After another 4 years (Total 12 years):** The sum of $4P$ doubles again, becoming $2 \times (4P) = 8P$.

Therefore, the sum becomes 8 times the original principal in 12 years.

Summary of Growth

The problem illustrates that if a sum grows by a factor of X in time t , it grows by a factor of X^n in time $n \times t$.

- Growth factor in 4 years = 2
- Target growth factor = 8 ($= 2^3$)
- Number of doubling periods needed = 3
- Total time = Number of periods $\times$ Time per period
- Total time = 3×4 years = 12 years.

73. Answer: d

Explanation:

Understanding the Expression Evaluation

We need to find the value of the given mathematical expression: $18 \div [26 - \{25 - (15 - 5) \div 2\}]$ of $12 + 2 - 2 \div 4 \times 16$. To solve this, we follow the order of operations (PEMDAS/BODMAS): Parentheses/Brackets, Orders (or 'of'), Division and Multiplication (from left to right), Addition and Subtraction (from left to right).

Step-by-Step Calculation Breakdown

Let's evaluate the expression step by step:

1. **Innermost Parentheses:** First, calculate the value inside the innermost parentheses $(15 - 5)$.

$$(15 - 5) = 10$$

The expression becomes: $18 \div [26 - \{25 - 10 \div 2\}]$ of $12 + 2 - 2 \div 4 \times 16$

2. **Division within Brackets:** Next, perform the division inside the curly braces $10 \div 2$.

$$10 \div 2 = 5$$

The expression simplifies to: $18 \div [26 - \{25 - 5\}]$ of $12 + 2 - 2 \div 4 \times 16$

3. **Subtraction within Brackets:** Now, calculate the subtraction within the curly braces $\{25 - 5\}$.

$$25 - 5 = 20$$

The expression is now: $18 \div [26 - 20]$ of $12 + 2 - 2 \div 4 \times 16$

4. **Subtraction within Square Brackets:** Calculate the subtraction within the square brackets $[26 - 20]$.

$$26 - 20 = 6$$

The expression becomes: $18 \div 6$ of $12 + 2 - 2 \div 4 \times 16$

5. **Multiplication ('of'):** The term 'of' indicates multiplication and is typically performed before division. Calculate 6 of 12.

$$6 \text{ of } 12 = 6 \times 12 = 72$$

The expression is now: $18 \div 72 + 2 - 2 \div 4 \times 16$

6. **Division and Multiplication (Left to Right):** Perform the remaining divisions and multiplications from left to right. First, calculate $18 \div 72$:

$$\frac{18}{72} = \frac{1}{4}$$

Next, calculate $2 \div 4$:

$$\frac{2}{4} = \frac{1}{2}$$

Then, multiply the result by 16:

$$\frac{1}{2} \times 16 = 8$$

The expression is now: $\frac{1}{4} + 2 - 8$

7. **Addition and Subtraction (Left to Right):** Finally, perform addition and subtraction from left to right. First, add $\frac{1}{4} + 2$:

$$\frac{1}{4} + 2 = \frac{1}{4} + \frac{8}{4} = \frac{1+8}{4} = \frac{9}{4}$$

The expression becomes: $\frac{9}{4} - 8$ Now, perform the subtraction:

$$\frac{9}{4} - 8 = \frac{9}{4} - \frac{32}{4} = \frac{9-32}{4} = -\frac{23}{4}$$

Final Result Verification

The calculation shows that the value of the expression is $-\frac{23}{4}$. This matches one of the provided options.

Comparing with Options

The calculated value is $-\frac{23}{4}$.

- Option 1: $\frac{9}{4}$
- Option 2: $\frac{3}{2}$
- Option 3: $-\frac{25}{2}$

- Option 4: $-\frac{23}{4}$
- Option 5: (Not specified)

The calculated value $-\frac{23}{4}$ corresponds to Option 4.

74. Answer: a

Explanation:

Understanding the Mixing Ratio Problem

This problem involves finding the correct proportion to mix liquids from two different sources (vessels) to achieve a specific composition in the final mixture. We are given the **ratio** of **spirit** and **water** in each vessel and the desired **ratio** in the final mixture. The core concept used here is the rule of allegation, which helps determine the mixing **ratio** based on the quantities and concentrations (in this case, the proportion of spirit). We need to find the ratio in which to mix the contents of the two vessels to get a new mixture that is half **spirit** and half **water**.

Analyzing the Ratios in Each Vessel

First, let's determine the proportion (or concentration) of spirit in each vessel based on the given ratios:

- **Vessel 1:** The ratio of spirit to water is 5 : 1.
 - Total parts in the ratio = 5 (spirit) + 1 (water) = 6 parts.
 - The proportion of spirit in Vessel 1 is calculated as: $\text{Spirit}_{\text{Vessel 1}} = \frac{\text{Parts of Spirit}}{\text{Total Parts}} = \frac{5}{6}$
- **Vessel 2:** The ratio of spirit to water is 3 : 7.
 - Total parts in the ratio = 3 (spirit) + 7 (water) = 10 parts.
 - The proportion of spirit in Vessel 2 is calculated as: $\text{Spirit}_{\text{Vessel 2}} = \frac{\text{Parts of Spirit}}{\text{Total Parts}} = \frac{3}{10}$

Determining the Target Mixture Ratio

The goal is to obtain a new mixture that contains half **spirit** and half **water**. This means the final mixture should have a spirit proportion of 1 : 1.

- Target Mixture Ratio: Spirit : Water = 1 : 1.
- Total parts in the target mixture = 1 (spirit) + 1 (water) = 2 parts.
- The desired proportion of spirit in the final mixture is: $\text{Spirit}_{\text{Target}} = \frac{\text{Parts of Spirit}}{\text{Total Parts}} = \frac{1}{2}$

Applying the Allegation Method

The rule of allegation helps us find the ratio of mixing two ingredients with different concentrations to obtain a mixture with a desired average concentration. We compare the concentration of spirit in each vessel with the target concentration.

Let the quantities to be mixed from Vessel 1 and Vessel 2 be Q_1 and Q_2 , respectively. According to the allegation rule:

$$(\text{Quantity of Vessel 1}) : (\text{Quantity of Vessel 2}) = (\text{Target Concentration} - \text{Concentration in Vessel 2}) : (\text{Concentration in Vessel 1} - \text{Target Concentration})$$

Using the spirit proportions calculated earlier:

$$\text{Concentration in Vessel 1 } (C_1) = \frac{5}{6}$$

$$\text{Concentration in Vessel 2 } (C_2) = \frac{3}{10}$$

$$\text{Target Concentration } (C_T) = \frac{1}{2}$$

We calculate the differences:

- Difference 1 (Vessel 1 vs Target): $|C_1 - C_T| = \left| \frac{5}{6} - \frac{1}{2} \right|$
 - To subtract, find a common denominator (6): $\left| \frac{5}{6} - \frac{3}{6} \right| = \left| \frac{5-3}{6} \right| = \frac{2}{6} = \frac{1}{3}$
- Difference 2 (Target vs Vessel 2): $|C_T - C_2| = \left| \frac{1}{2} - \frac{3}{10} \right|$
 - To subtract, find a common denominator (10): $\left| \frac{5}{10} - \frac{3}{10} \right| = \left| \frac{5-3}{10} \right| = \frac{2}{10} = \frac{1}{5}$

The rule of allegation states that the ratio of the quantities to be mixed is the inverse of the ratio of these differences.

$$\text{Ratio (Quantity from Vessel 1) : (Quantity from Vessel 2)} = \text{Difference 2 : Difference 1}$$

$$\text{Ratio} = \frac{1}{5} : \frac{1}{3}$$

Calculating the Final Mixing Ratio

To express the ratio $\frac{1}{5} : \frac{1}{3}$ in its simplest whole number form, we can multiply both sides by the least common multiple (LCM) of the denominators (5 and 3), which is 15.

- Ratio = $(\frac{1}{5} \times 15) : (\frac{1}{3} \times 15)$
- Ratio = 3 : 5

Therefore, the liquid from the two vessels should be mixed in the ratio 3 : 5 to obtain a new mixture containing half spirit and half water.

75. Answer: a

Explanation:

Determining the Number of Boys from Average Weights

This solution explains how to calculate the **number of boys** in a college given the **total students**, the **average weight of boys**, the **average weight of girls**, and the **overall average weight**.

Understanding the Problem Parameters

We are provided with the following information:

- Total number of students in the college: $N_{Total} = 250$
- Average weight of boys: $W_B = 50$
- Average weight of girls: $W_G = 45$
- Overall average weight of all students: $W_{Overall} = 48$

Our goal is to find the specific **number of boys**.

Formulating the Equations

Let's denote the **number of boys** as B and the **number of girls** as G .

We can establish two key equations based on the given data:

1. **Total Students Equation:** The sum of the number of boys and girls equals the total number of students.

$$B + G = 250 \quad (1)$$

2. **Total Weight Equation:** The sum of the total weight of all boys and the total weight of all girls equals the total weight of all students. The total weight is calculated by multiplying the number of students in a group by their average weight.

$$(B \times W_B) + (G \times W_G) = N_{Total} \times W_{Overall}$$

Substituting the known values:

$$(B \times 50) + (G \times 45) = 250 \times 48$$

$$50B + 45G = 12000 \quad (2)$$

Step-by-Step Calculation

Now, we solve these two equations to find the value of B .

1. **Express G in terms of B:** From equation (1), we can rearrange it to find G :

$$G = 250 - B$$

2. **Substitute G into Equation (2):** Replace G in the second equation with the expression $250 - B$:

$$50B + 45(250 - B) = 12000$$

3. **Simplify the equation:** Distribute the 45:

$$50B + (45 \times 250) - 45B = 12000$$

$$50B + 11250 - 45B = 12000$$

4. **Combine terms with B:** Group the terms containing B :

$$(50B - 45B) + 11250 = 12000$$

$$5B + 11250 = 12000$$

5. **Isolate the term with B:** Subtract 11250 from both sides of the equation:

$$5B = 12000 - 11250$$

$$5B = 750$$

6. **Solve for B:** Divide both sides by 5 to find the number of boys:

$$B = \frac{750}{5}$$

$$B = 150$$

Verification of the Result

Let's check if this result is consistent with the given information.

- If the **number of boys** (B) is 150, then the **number of girls** (G) is $250 - 150 = 100$.
- The total weight contributed by boys is $150 \times 50 = 7500$.
- The total weight contributed by girls is $100 \times 45 = 4500$.
- The total combined weight is $7500 + 4500 = 12000$.
- The overall average weight is $\frac{\text{Total Weight}}{\text{Total Students}} = \frac{12000}{250} = 48$.

This calculated overall average matches the given overall average weight, confirming our calculation.

Conclusion on the Number of Boys

Based on the calculations, the **number of boys** in the college is 150.

76. **Answer: c**

Explanation:

Analysing the Elements for the Odd One Out Pattern

The goal here is to identify the element that doesn't fit the pattern shared by the other three. We need to examine the relationship between the letter and the numbers in each given item.

Detailed Breakdown of Elements

Let's look closely at each item:

- **K1122**: Consists of the letter 'K' and the numbers '11' and '22'.
- **P1632**: Consists of the letter 'P' and the numbers '16' and '32'.
- **N148**: Consists of the letter 'N' and the numbers '14' and '8'.
- **D48**: Consists of the letter 'D' and the numbers '4' and '8'.

Discovering the Underlying Pattern

A pattern can be observed by considering the alphabetical position of the letter and its relation to the numbers:

- Find the position of the letter in the alphabet (A=1, B=2, ...).
- Check if the first number matches this position.
- Check if the second number is double the first number.

Let's apply this to each element:

Element	Letter	Alphabetical Position (P)	Numbers Given	Pattern Verification (Is Second Number = P <i>times</i> 2?)
K1122	K	11	11, 22	Yes, because $22 = 11 \times 2$.
P1632	P	16	16, 32	Yes, because $32 = 16 \times 2$.
N148	N	14	14, 8	No, because 8 is not equal to 14×2 (which is 28).
D48	D	4	4, 8	Yes, because $8 = 4 \times 2$.

The table clearly shows that the first number always matches the letter's position. The crucial part of the pattern is that the second number is double the first number.

Identifying the Odd Element Out

Three elements (K1122, P1632, D48) consistently follow the rule: Letter (position P) followed by numbers P and $2 \times P$. The element N148 breaks this rule because while the first number (14) matches the letter N's position, the second number (8) is not double the first number.

Therefore, based on this analysis, N148 is the element that does not conform to the established pattern.

77. Answer: d

Explanation:

Understanding the 'Odd One Out' Question Type

This question requires identifying the term that does not belong to the group based on a shared characteristic. We need to examine the nature of Gidda, Garba, Kathak, and Pongal to find the commonality among three and the outlier.

Analyzing the Given Words

Let's look at each word provided:

- **Gidda:** This is a popular folk dance performed primarily by women in the Indian state of Punjab. It is characterized by its vibrant energy and traditional folk style.
- **Garba:** This is a traditional Gujarati folk dance that is widely performed during the Hindu festival of Navratri. It involves rhythmic clapping and circular movements.
- **Kathak:** This is one of the major forms of Indian classical dance, known for its intricate footwork, storytelling, and graceful movements. It originated in North India.
- **Pongal:** This is a significant harvest festival celebrated primarily in the South Indian state of Tamil Nadu. It is a multi-day celebration thanking nature and the harvest, involving rituals, special foods, and decorations, but it is not a dance form.

Identifying the Common Characteristic

Upon reviewing the definitions, we can see a pattern:

- Gidda is a type of dance (folk).
- Garba is a type of dance (folk).
- Kathak is a type of dance (classical).

These three terms (Gidda, Garba, Kathak) are all related to various forms of Indian dance.

Determining the Odd Word Out

The term **Pongal** stands out because it refers to a festival, not a dance form. While festivals often include dance performances, Pongal itself is the celebration, whereas

Gidda, Garba, and Kathak are specific dance styles.

Therefore, **Pongal** is the word that does not fit the category of 'dance forms' shared by the other three options.

78. Answer: b

Explanation:

Understanding the Analogy: Train : Yard :: _____ : Hanger

This question tests our ability to identify the specific **relationship** between words in an analogy. We need to find a word that has the same relationship with **Hanger** as **Train** has with **Yard**.

Analyzing the Primary Relationship: Train and Yard

The first pair is **Train : Yard**. A **Yard** is a place specifically designated for housing, storing, and maintaining **Trains** when they are not in active service. It's the typical location associated with trains for resting or operational purposes.

Identifying the Required Relationship: _____ and Hanger

The second part of the analogy is _____ : **Hanger**. We are looking for a type of vehicle or object that is typically housed, stored, or maintained in a **Hanger**. A **Hanger** is a specialized structure designed for this purpose.

Evaluating the Options

Let's examine each option to see which one fits the required relationship with **Hanger**:

- **Car : Hanger** – Cars are usually kept in garages, parking lots, or on streets. They are not typically housed in hangers.

- **Aeroplane : Hanger** – Aeroplanes (also spelled Airplanes) are commonly stored, parked, and maintained inside structures called hangers. This matches the relationship identified (Vehicle : Specific Housing Structure).
- **Ship : Hanger** – Ships are maritime vessels and are housed in ports, docks, or dry docks. Hangers are not used for ships.
- **Boat : Hanger** – Boats are smaller watercraft, typically kept in marinas, boathouses, or sometimes on trailers. They are generally not stored in hangers.

Conclusion on the Analogy

Based on the analysis, the **Aeroplane** is the vehicle that is specifically associated with being housed in a **Hanger**, similar to how a **Train** is associated with a **Yard**. Therefore, the correct analogy is **Train : Yard :: Aeroplane : Hanger**.

79. Answer: b

Explanation:

Secunderabad Hyderabad Relationship Analysis

Analogy questions test your ability to identify the relationship between a given pair of words and find another pair with the same relationship. We are given the pair **Secunderabad : Hyderabad**.

Let's examine the connection between Secunderabad and Hyderabad.

Secunderabad is a prominent city known for its historical significance and commercial activity. It is geographically adjacent to **Hyderabad**, which is the capital city of Telangana. Secunderabad and Hyderabad are often referred to as "twin cities" because they are closely integrated and form a single large metropolitan area. The core relationship is between a major urban center (Secunderabad) and its associated capital city (Hyderabad).

Analogy Options Comparison

We need to find the option that mirrors this relationship: a major city closely linked to a capital city.

Option 1: Delhi : Gurgaon

- **Delhi** is the capital territory of India.
- **Gurgaon** (Gurugram) is a major city in the neighboring state of Haryana, and it is part of the National Capital Region (NCR) surrounding Delhi.
- Here, the relationship is Capital City (Delhi) to a Major Satellite City (Gurgaon). This is different from the Major City : Capital City pattern presented in the original pair.

Option 2: Ahmedabad : Gandhinagar

- **Ahmedabad** is the largest and a very important city in the state of Gujarat.
- **Gandhinagar** is the capital city of Gujarat, planned and located near Ahmedabad.
- This pair shows a Major City (Ahmedabad) and its corresponding Capital City (Gandhinagar). This relationship is very similar to the one between Secunderabad and Hyderabad.

Option 3: Kolkata : Hoogly

- **Kolkata** is the capital city of West Bengal.
- **Hoogly** is a river significant to the region but is not a city.
- This option pairs a capital city with a geographical feature (river), not a related city, so the relationship type does not match.

Option 4: Chandigarh : Kolkata

- **Chandigarh** is itself a capital city (for both Punjab and Haryana) and a union territory.
- **Kolkata** is the capital city of West Bengal.
- These are two separate capital cities. There is no geographical or functional link (like twin cities) between them that matches the original pair's relationship.

Identifying the Correct Analogy Match

Comparing the options, the pair **Ahmedabad : Gandhinagar** demonstrates the most analogous relationship to **Secunderabad : Hyderabad**. Both pairs consist of a major city closely associated with a capital city, reflecting a pattern of urban connection and administrative hierarchy.

80. Answer: a

Explanation:

Understanding the Brood : Hen Analogy

This question tests your ability to identify the relationship between the first pair of words and apply that same relationship to find the correct word for the second pair.

The given pair is **Brood : Hen**.

- A **hen** is a female adult chicken.
- A **brood** refers to the group of young chicks that hatch from the eggs laid by a single hen and are raised by her.

Therefore, the relationship is: A specific term for a group of young animals is associated with the parent animal (female bird) that produces or cares for them.

Exploring the Litter : ? Relationship

Now, we need to find a word that relates to **Litter** in the same way that **Hen** relates to **Brood**.

A **litter** is a term used for a group of young animals born to the same mother at the same time, typically from mammals.

We need to find which of the options represents an animal that commonly has a litter.

Analyzing the Options

Let's examine each option based on the relationship established (young animals : parent animal type):

- **Option 1: Cat**

A female cat gives birth to a group of kittens at one time. This group is called a litter.

Relationship: Litter (young cats) : Cat (parent animal). This matches the pattern.

- **Option 2: Pen**

A pen is an enclosure used to keep animals, like pigs or chickens. It is not an animal itself.

Relationship: Does not fit the pattern.

- **Option 3: Buildings**

Buildings are structures where people live or work. They are not animals.

Relationship: Does not fit the pattern.

- **Option 4: Vehicle**

A vehicle is a machine used for transportation. It is not an animal.

Relationship: Does not fit the pattern.

Conclusion: Identifying the Correct Term

Comparing the options with the relationship derived from "Brood : Hen", we see that a cat produces a litter.

The relationship is **Group of Young : Type of Parent Animal**.

Brood is the group of young, and **Hen** is the parent animal.

Litter is the group of young, and **Cat** is the parent animal.

Therefore, the word that shares the same relationship is **Cat**.

81. Answer: d

Explanation:

Understanding the Odd One Out Task

This type of question asks us to find the word that doesn't fit with the others based on a shared characteristic. We need to look at the words given – Cheese, Yogurt, Curd, and Tofu – and figure out what makes three of them similar and one different.

Analyzing the Given Options

Let's examine each word to understand its nature:

- **Cheese:** This is a food product typically made from milk. Milk is curdled using rennet or an acid, and then the curds are pressed into a mold. It's a common **dairy product**.
- **Yogurt:** This is also made from milk fermented by specific bacteria cultures, usually starting with milk heated and then cooled before adding the cultures. Yogurt is another well-known **dairy product**.
- **Curd:** Often used interchangeably with cottage cheese or paneer in some regions, curd is generally made by adding a food-grade acid (like lemon juice or vinegar) or starter culture to milk to make it coagulate or "curdle". It is fundamentally a **dairy product** derived from milk.
- **Tofu:** This food is made by soaking dried soybeans, grinding them with water, then boiling the mixture and straining it to produce soy milk. The soy milk is then curdled using a coagulant, and the resulting curds are pressed into blocks. Tofu is made from **soybeans**, not milk.

Identifying the Common Link

When we look closely at Cheese, Yogurt, and Curd, we see a clear connection: they are all derived from **milk**. They are classified as **dairy products**, which come from the milk of mammals like cows, goats, or sheep.

Determining the Odd Word Out

Now let's consider Tofu. While the process of making tofu involves curdling, similar to how cheese or curd is made, the source ingredient is entirely different. Tofu originates from **soybeans**, which are legumes, not from animal milk. Therefore, Tofu does not belong to the **dairy product** category.

Conclusion: The Odd One is Tofu

The common characteristic shared by Cheese, Yogurt, and Curd is that they are all **dairy products** made from **milk**. Tofu is the odd one out because it is made from **soybeans**.

82. Answer: c

Explanation:

Identifying the Number Pattern Logic

The question presents a sequence of numbers arranged in a pattern. To solve this, we first need to arrange the numbers into a grid to identify the relationship between them. The sequence 10510520?4203015915 contains 15 numbers, which suggests a 5x3 grid structure. Let's set up the grid:

10	5	10
5	2	0
?	4	20
3	0	15
15	9	15

We need to find the missing number represented by '?'. Let's analyze the relationship between the numbers in each row, considering the first column number as 'A', the second column number as 'B', and the third column number as 'C'.

Analyzing Row Relationships

We look for a consistent mathematical operation that connects A, B, and C in each row. A possible relationship is $C = A \times k$, where k is a factor that might depend on the value of B.

- **Row 1:** $A=10, B=5, C=10$. If $C = A \times k$, then $10 = 10 \times k$. Solving for k gives $k=1$.
- **Row 2:** $A=5, B=2, C=0$. If $C = A \times k$, then $0 = 5 \times k$. Solving for k gives $k=0$.
- **Row 3:** $A=?, B=4, C=20$. Let the missing number be 'X'. If $C = A \times k$, then $20 = X \times k$. We need to find k based on $B=4$.
- **Row 4:** $A=3, B=0, C=15$. If $C = A \times k$, then $15 = 3 \times k$. Solving for k gives $k=5$.
- **Row 5:** $A=15, B=9, C=15$. If $C = A \times k$, then $15 = 15 \times k$. Solving for k gives $k=1$.

Discovering the Rule for Factor k

From the row analysis, we've found the value of k for different values of B:

- When $B=0$, $k=5$.

- When $B=2$, $k=0$.
- When $B=5$, $k=1$.
- When $B=9$, $k=1$.

We need to determine the value of k when $B=4$ (for Row 3).

Let's examine the relationship between B and k . Consider a rule based on the value of B :

- If $B > 3$, then $k=1$. This rule works for $B=5$ ($k=1$) and $B=9$ ($k=1$).
- If $B = 2$, then $k=0$. This rule works.
- If $B = 0$, then $k=5$. This rule works.

Now, let's apply this rule to find k for Row 3, where $B=4$.

Since $B=4$ is greater than 3, according to our rule, $k=1$.

Calculating the Missing Number

We can now use the relationship $C = A \times k$ for Row 3, with $B=4$, $C=20$, and the determined value $k=1$.

$$C = A \times k$$

$$20 = A \times 1$$

Solving for A (the missing number):

$$A = 20 / 1$$

$$A = 20$$

So, the missing number is 20.

Verifying the Pattern Across All Rows

Let's check if the pattern holds true for all the rows using the rule for k :

- Row 1 ($B=5$): $k=1$ (since $B > 3$). Calculation: $10 \times 1 = 10$. Matches $C=10$.
- Row 2 ($B=2$): $k=0$. Calculation: $5 \times 0 = 0$. Matches $C=0$.

- Row 3 ($B=4$): $k=1$ (since $B > 3$). Calculation: $20 \times 1 = 20$. Matches $C=20$.
- Row 4 ($B=0$): $k=5$. Calculation: $3 \times 5 = 15$. Matches $C=15$.
- Row 5 ($B=9$): $k=1$ (since $B > 3$). Calculation: $15 \times 1 = 15$. Matches $C=15$.

The pattern $C = A \times k$, with the defined rules for k based on B , consistently explains the numbers in the grid.

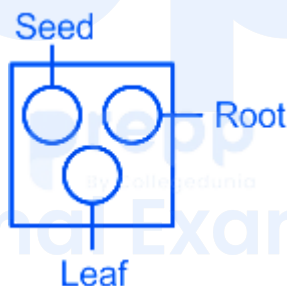
Final Answer

The number that correctly replaces the question mark (?) in the pattern is 20.

83. Answer: b

Explanation:

The Venn diagrams best represent the relationship between - Seed, Root, Leaf figures are shown below:



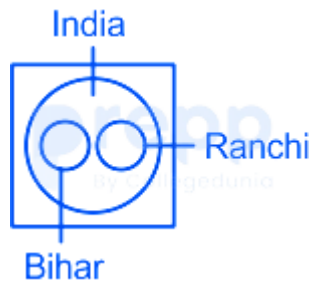
Here all the three things are different Root and leaf are the different parts of the Tree or plant, seed from which a new plant grows.

Hence, 'Option 2' is the correct answer.

84. Answer: d

Explanation:

The Venn diagrams best represent the relationship between – Seed, Root, Leaf figures are shown below:



India the country, Bihar is a state in India, Ranchi is a city in India. So Bihar and Ranchi will be separate in India.

Hence, Correct answer 'option 4'.

85. Answer: c

Explanation:

Understanding the Coding Pattern: MIRACLE to NKUEHRL

This question involves a coding pattern where a word is transformed into a coded form. We need to figure out the rule used to change **MIRACLE** into **NKUEHRL** and then apply that same rule to code the word **GAMBLE**.

Let's analyze the transformation by comparing the letters of **MIRACLE** with **NKUEHRL** based on their positions in the English alphabet (where A=1, B=2, C=3, ..., Z=26).

- **M** (13th letter) becomes **N** (14th letter). The shift is +1 ($14 - 13 = 1$).
- **I** (9th letter) becomes **K** (11th letter). The shift is +2 ($11 - 9 = 2$).
- **R** (18th letter) becomes **U** (21st letter). The shift is +3 ($21 - 18 = 3$).
- **A** (1st letter) becomes **E** (5th letter). The shift is +4 ($5 - 1 = 4$).
- **C** (3rd letter) becomes **H** (8th letter). The shift is +5 ($8 - 3 = 5$).
- **L** (12th letter) becomes **R** (18th letter). The shift is +6 ($18 - 12 = 6$).
- **E** (5th letter) becomes **L** (12th letter). The shift is +7 ($12 - 5 = 7$).

From this analysis, we can see a clear pattern: each letter in the original word is shifted forward in the alphabet by an amount corresponding to its position in the word. The first letter is shifted by 1, the second by 2, the third by 3, and so on.

Applying the Coding Rule to GAMBLE

Now, let's apply this discovered pattern (shift = position number) to the word **GAMBLE**.

We will process each letter of **GAMBLE** one by one:

- **G**: This is the 1st letter. Its alphabet position is 7. Apply a shift of +1. The new position is $7 + 1 = 8$. The 8th letter is **H**.
- **A**: This is the 2nd letter. Its alphabet position is 1. Apply a shift of +2. The new position is $1 + 2 = 3$. The 3rd letter is **C**.
- **M**: This is the 3rd letter. Its alphabet position is 13. Apply a shift of +3. The new position is $13 + 3 = 16$. The 16th letter is **P**.
- **B**: This is the 4th letter. Its alphabet position is 2. Apply a shift of +4. The new position is $2 + 4 = 6$. The 6th letter is **F**.
- **L**: This is the 5th letter. Its alphabet position is 12. Apply a shift of +5. The new position is $12 + 5 = 17$. The 17th letter is **Q**.
- **E**: This is the 6th letter. Its alphabet position is 5. Apply a shift of +6. The new position is $5 + 6 = 11$. The 11th letter is **K**.

Final Coded Word for GAMBLE

By combining the resulting letters, we find that the coded word for **GAMBLE** is **HCPFGK**.

Comparing this result with the given options:

- 1. JDOCMF
- 2. CLEMNK
- 3. HCPFQK
- 4. AELGMN

Our calculated code, **HCPFGK**, matches option 3, **HCPFQK**. Therefore, based on the identified pattern, **HCPFQK** is the correct code for **GAMBLE** in this specific language.

86. Answer: b

Explanation:

Six Persons Puzzle: Finding the Mother

We need to identify the mother among six individuals (A, B, C, D, E, F) using clues about their family relationships and the specific composition of the group (two fathers, three brothers, one mother).

Persons and Relationships Overview

First, let's list and understand the given relationship facts:

- **Sister Relation:** C is the sister of F. This establishes C as female (F) and indicates C and F share parents.
- **Brotherhood and Marriage:** B is the brother of E's husband. Let H represent E's husband. This means B is male (M), H is male (M), and B and H are brothers. E is female (F) and married to H.
- **Fatherhood and Grandfatherhood:** D is the father of A ($D=M$). D is also the grandfather of F. Since D is the grandfather of F, and D is the father of A, it means A must be the parent of F.

From these facts, we can infer:

- A is the parent of F and C (since C is F's sister).
- D is A's parent, making D the grandparent of F.
- B and H are brothers.
- H is married to E.

Group Composition Analysis

The problem states the group contains exactly:

- 2 Fathers
- 3 Brothers
- 1 Mother

We know the genders of some individuals:

- Males (M): D, B, H
- Females (F): C, E
- A and F: Gender to be determined.

We have 3 males and 2 females identified so far. Person A and F need to be placed.

Gender and Family Links Deduction

Let's try to determine the genders of A and F and link the family members to meet the group composition requirements.

Requirement: 3 Brothers

- We already have two brothers: B and H.
- A is the child of D. H is also a child of D (since D is the grandfather of F, and H is the father of F). Thus, A and H are siblings.
- For the group to have 3 brothers, A must be male (M). This makes A a brother to H.
- With A as male (M), our known males are D, B, H, A (4 males).
- The three brothers are B, H, and A.

Requirement: 2 Fathers

- D is the father of A.
- If A is male (M) and the parent of F and C, A is also a father.
- So, the two fathers are D and A.

Revisiting the Structure

If D and A are fathers, they are male. B and H are brothers (male). C and E are female. F's gender is still undetermined but is a child.

Let's test a potential structure fitting the counts:

- D (M) is the father of H (M) and A (M). (D = Father 1)
- B (M) is the brother of H (M). (B = Brother 1, H = Brother 2)
- H (M) is married to E (F).
- H (M) is the father of F and C. (H = Father 2)
- E (F) is the mother of F and C. (E = Mother 1)
- C (F) is the sister of F.
- A (M) is the child of D. To satisfy the 3 brothers condition, A must be male and counted as a brother.

Let's check the counts in this structure:

- **Fathers:** D (father of H) and H (father of F, C). Total = 2. OK.
- **Brothers:** B (brother of H), H (brother of B), A (brother of H, assumed male). Total = 3. OK.
- **Mother:** E (mother of F, C). Total = 1. OK.

This structure works perfectly. It places all individuals and satisfies all relationship clues and group composition counts.

Mother Identification Process

In the derived structure that satisfies all conditions:

- D and H are the two fathers.
- B, H, and A are the three brothers.
- E is the mother (of F and C).

Final Result Confirmation

All conditions are met with E being the mother. The relationships and group counts align consistently with E in the role of the mother.

87. Answer: c

Explanation:

This question is a classic reasoning puzzle that tests our ability to understand family relationships described through a statement. We need to carefully break down the sentence structure to determine the connection between Rohit and the girl in the photograph.

Analyzing Rohit's Statement Step-by-Step

Rohit points to a photograph and says, "She is the daughter of the only son of my father." Let's dissect this statement:

- **"My father"**: This refers to Rohit's own father.
- **"The only son of my father"**: This is the crucial part of the puzzle. Since Rohit is the speaker, and assuming Rohit is male, the 'only son' of his father can only be Rohit himself. If he had brothers, he wouldn't be the *only* son.
- **"She is the daughter of [the only son of my father]"**: By substituting "Rohit" for "the only son of my father", the statement simplifies to "She is the daughter of Rohit."

Determining the Relationship to the Girl

Based on the breakdown of the statement:

- The girl in the photograph is identified as Rohit's daughter.
- If the girl is Rohit's daughter, then Rohit is, by definition, her **Father**.

Therefore, Rohit is the father of the girl shown in the photograph.

88. Answer: a

Explanation:

Understanding Puja's Journey and Final Direction

This question asks us to find the final direction of the Mathura railway station relative to Puja's starting point (her house) after a series of movements.

Analyzing Puja's Movements

Let's track Puja's path step by step. We can think of her house as the starting point (origin).

- **Initial Movement:** Puja first travels **15 km North**.
- **Second Movement:** She turns West and travels **10 km**.
- **Third Movement:** She then turns South and travels **5 km**.
- **Final Movement:** Finally, she turns East and travels **10 km** to reach the Mathura railway station.

Calculating Net Displacement

To find the final direction from her house, we need to calculate her net displacement in the North-South and East-West directions.

- **North-South Displacement:**
 - Puja moved **15 km North** (positive direction).
 - Later, she moved **5 km South** (negative direction).
 - Net North-South displacement = (Distance North) - (Distance South)
 - Net North-South displacement = $15 \text{ km} - 5 \text{ km} = 10 \text{ km}$.
 - This means she is **10 km North** of her house's latitude.
- **East-West Displacement:**
 - Puja moved **10 km West** (negative direction).
 - Then, she moved **10 km East** (positive direction).
 - Net East-West displacement = (Distance East) - (Distance West)
 - Net East-West displacement = $10 \text{ km} - 10 \text{ km} = 0 \text{ km}$.
 - This means she is neither East nor West of her house's longitude; she is on the same North-South line as her house.

Determining the Final Direction from the House

Based on the net displacement calculations:

- The net movement East or West is 0 km.
- The net movement is 10 km towards the North.

Therefore, the Mathura railway station is located **10 km North** of Puja's house. The direction is simply **North**.

89. Answer: d

Explanation:

This question involves determining the distance and direction between points based on given relative positions. We can solve this by setting up a coordinate system and calculating the coordinates of each point.

Coordinate System Setup

Let's establish a coordinate system where Point T is at the origin (0, 0). We'll consider North as the positive y-direction and East as the positive x-direction.

Point Coordinates Calculation

- **Point T:** Positioned at the origin, so $T = (0, 0)$.
- **Point R:** 10 km South of T. Coordinates are $(0, -10)$.
- **Point W:** R is 13 km West of W, meaning W is 13 km East of R. Coordinates are $(0 + 13, -10) = (13, -10)$.
- **Point S:** W is 16 km North of S, meaning S is 16 km South of W. Coordinates are $(13, -10 - 16) = (13, -26)$.
- **Point G:** G is 25 km West of S. Coordinates are $(13 - 25, -26) = (-12, -26)$.
- **Point M:** M is 21 km South of R. Coordinates are $(0, -10 - 21) = (0, -31)$.

Distance Calculation: Point G from Point M

We need to find the distance between Point G $(-12, -26)$ and Point M $(0, -31)$. We use the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Let G be (x_1, y_1) and M be (x_2, y_2) .

- $x_1 = -12, y_1 = -26$
- $x_2 = 0, y_2 = -31$

Substituting the values:

$$d_{GM} = \sqrt{(0 - (-12))^2 + (-31 - (-26))^2}$$

$$d_{GM} = \sqrt{(12)^2 + (-31 + 26)^2}$$

$$d_{GM} = \sqrt{144 + (-5)^2}$$

$$d_{GM} = \sqrt{144 + 25}$$

$$d_{GM} = \sqrt{169}$$

$$d_{GM} = 13 \text{ km}$$

So, the distance between point G and point M is **13 km**.

Direction Calculation: Point W from Point M

We need to determine the direction of Point W $(13, -10)$ from Point M $(0, -31)$.

To find the direction, we calculate the difference in coordinates relative to Point M:

- Difference in x-coordinate: $W_x - M_x = 13 - 0 = 13$
- Difference in y-coordinate: $W_y - M_y = -10 - (-31) = -10 + 31 = 21$

The relative position vector from M to W is $(13, 21)$.

- Since the x-difference (13) is positive, W is East of M.
- Since the y-difference (21) is positive, W is North of M.

Combining these, Point W is in the **North east** direction from Point M.

Conclusion

Based on the calculations:

- The distance between point G and point M is 13 km.
- Point W is in the North east direction from point M.

Therefore, the correct option is **13 km, North east**.

90. Answer: b

Explanation:

The logic followed is:

The same figure is embedded inside the main figure.

Option 1 →



The same figure is embedded inside the main figure.

Option 2 →



The same figure is not embedded inside the main figure.

Option 3 →



The same figure is embedded inside the main figure.

Option 4 →



The same figure is embedded inside the main figure.

Hence, the correct answer is "Option 2".

91. Answer: b

Explanation:

The option that can replace the question mark (?) in the given figure and complete the pattern when rotation is NOT allowed is shown below:



Hence, 'option 2' is the correct answer.

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92. Answer: d

Explanation:

On observing the given figure carefully, we get:

In the question figure (x),

1. One dot is in the common area of hexagon, circle and parallelogram
2. One dot is in the common area of parallelogram, circle and another hexagon.
3. One dot is in the common area of the circle and parallelogram.

Figure (A) → Common area of the hexagon, circle and parallelogram isn't present.

Figure (B) → Common area of the hexagon, circle and parallelogram isn't present.

Figure (C) → Common area of the hexagon, circle and parallelogram and common area of circle and parallelogram isn't present.

Figure (D) → Common area of the hexagon, circle and parallelogram and common area of circle and parallelogram isn't present.

Figure (E) → All the required conditions are fulfilled as shown below:



Hence, the correct answer is "Figure (E)".

★ Important Points

We should not think of the exact shape and size of the figures in these questions.

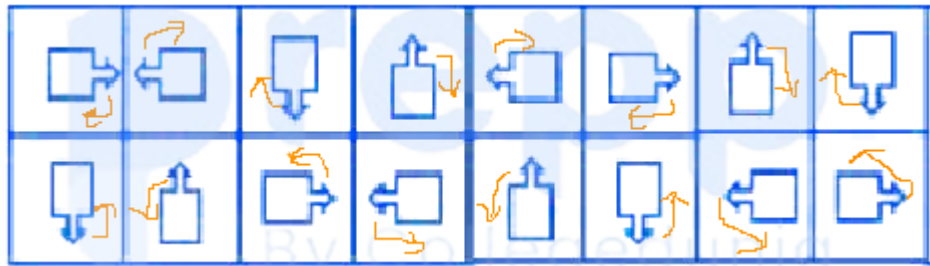
Just resemblance will work like if an Equilateral triangle is given in the question figure, any shape of the triangle in the answer figure will work, be it right triangle or scalene triangle.

93. Answer: a

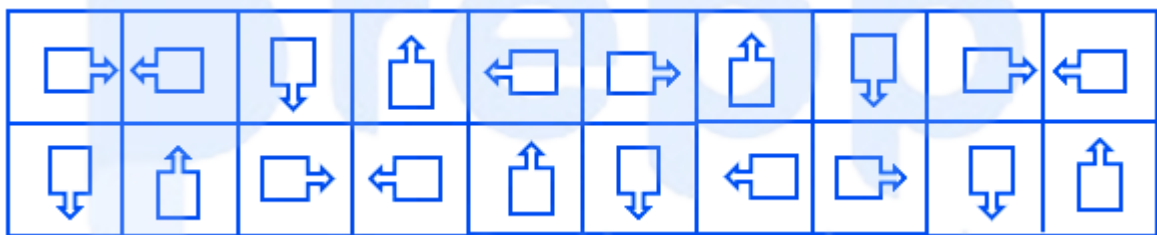
Explanation:

The pattern followed here is as follows:

- 1) The two figures at the top are rotating in the clockwise direction by 90° .
- 2) The two figures at the bottom are rotating in the anti-clockwise direction by 90° .



The image which will come next in the series is:



Hence, the correct answer is "Option 1".

94. Answer: b

Explanation:

Unscrambling Jumbled Letters to Find the Different Word

The task requires us to unscramble sets of jumbled letters to form meaningful English words. After forming the words, we need to identify the one word that differs in category from the rest.

Step 1: Rearranging the Jumbled Letter Sets

Let's rearrange each given set of jumbled letters into a meaningful word:

- NIDEKY: Rearranges to form the word KIDNEY.
- HIGHT: Rearranges to form the word HEIGHT.
- TEHAR: Rearranges to form the word HEART.

- **NGUSL**: Rearranges to form the word **LUNGS**.

Step 2: Categorizing the Unscrambled Words

To find the word that is different, we need to understand the meaning and category of each unscrambled word:

- **KIDNEY**: This is a biological organ found in the body.
- **HEIGHT**: This is a measurement, indicating the distance from bottom to top. It's an abstract concept or dimension.
- **HEART**: This is a vital biological organ responsible for pumping blood.
- **LUNGS**: These are biological organs essential for respiration.

Step 3: Identifying the Odd One Out

Comparing the categories, we find:

- **KIDNEY** is a body part.
- **HEART** is a body part.
- **LUNGS** are body parts.
- **HEIGHT** is a measurement or characteristic, not a physical body part.

Therefore, **HEIGHT** is the word that does not fit with the others, as the others (**KIDNEY**, **HEART**, **LUNGS**) are all parts of the body.

Final Answer

The jumbled letters **HIGHT** unscramble to form the word **HEIGHT**. This word is different from **KIDNEY**, **HEART**, and **LUNGS** because it represents a measurement rather than a body organ.

95. Answer: a

Explanation:

This problem involves determining the student with the highest score based on several comparison statements about their performance in an examination. Let's break down the information step by step to establish the ranking.

Determining the Highest Score Among Students

We are given information about five students (A, B, C, D, E) and their examination scores. We need to find out who scored the highest.

Analyzing the Given Conditions:

- **Condition 1: Ranking of C**

We are told that C secured the second position. This means one student scored higher than C, and the rest scored lower. The partial ranking is: $_ > C > _ > _ > _$.

- **Condition 2: E's Score**

It's stated that no one scored less than E. This implies E has the lowest score, meaning E is in the fifth position. The ranking now looks like: $_ > C > _ > _ > E$.

- **Condition 3: C's Comparisons**

C scored more marks than E ($C > E$) and C scored more marks than B ($C > B$). This aligns with our current ranking structure, placing B somewhere below C and above E.

- **Condition 4: A's Comparisons**

A scored more marks than D ($A > D$) and A also scored more marks than B ($A > B$).

- **Condition 5: D's Comparison**

D scored more marks than B ($D > B$).

Combining the Conditions to Establish the Full Ranking:

- From Conditions 4 and 5, we can establish a sequence for A, D, and B: Since $A > D$ and $D > B$, the combined order is $A > D > B$.
- Now, let's integrate this with the ranking involving C and E: $_ > C > _ > _ > E$.
- We know C is in the second position. The only student who could possibly score higher than C, based on the relationships derived ($A > D > B$ and $C > B$, $C > E$),

is A. Therefore, A must be in the first position. The ranking becomes: $A > C > _ > _ > E$.

- The remaining students to be placed are D and B, filling the third and fourth positions.
- We know from the combined sequence ($A > D > B$) that D scored more than B.
- Therefore, D must be in the third position, and B must be in the fourth position to satisfy $D > B$.
- The complete ranking order is: $A > C > D > B > E$.

Conclusion on Highest Score:

Based on the derived ranking $A > C > D > B > E$, which satisfies all the given conditions:

- A scored the highest (1st position).
- C scored the second highest (2nd position).
- D scored the third highest (3rd position).
- B scored the fourth highest (4th position).
- E scored the lowest (5th position).

Thus, the student who scored the highest mark is A.

96. Answer: c

Explanation:

Identifying the Odd Letter Cluster

This question requires us to find the letter cluster that does not follow the same pattern as the others among the given options. We need to analyze the relationship between consecutive letters in each cluster based on their position in the alphabet.

Letter Cluster Analysis

Let's examine each option by determining the positional difference between consecutive letters:

- **Option 1: DFGI**

- D is the 4th letter, F is the 6th. The difference is $6 - 4 = 2$. (Letter E is between them)
- F is the 6th letter, G is the 7th. The difference is $7 - 6 = 1$. (No letters are between them)
- G is the 7th letter, I is the 9th. The difference is $9 - 7 = 2$. (Letter H is between them)
- The pattern is +2, +1, +2.

- **Option 2: SUVX**

- S is the 19th letter, U is the 21st. The difference is $21 - 19 = 2$. (Letter T is between them)
- U is the 21st letter, V is the 22nd. The difference is $22 - 21 = 1$. (No letters are between them)
- V is the 22nd letter, X is the 24th. The difference is $24 - 22 = 2$. (Letter W is between them)
- The pattern is +2, +1, +2.

- **Option 3: DFHJ**

- D is the 4th letter, F is the 6th. The difference is $6 - 4 = 2$. (Letter E is between them)
- F is the 6th letter, H is the 8th. The difference is $8 - 6 = 2$. (Letter G is between them)
- H is the 8th letter, J is the 10th. The difference is $10 - 8 = 2$. (Letter I is between them)
- The pattern is +2, +2, +2.

- **Option 4: LNOQ**

- L is the 12th letter, N is the 14th. The difference is $14 - 12 = 2$. (Letter M is between them)
- N is the 14th letter, O is the 15th. The difference is $15 - 14 = 1$. (No letters are between them)
- O is the 15th letter, Q is the 17th. The difference is $17 - 15 = 2$. (Letter P is between them)
- The pattern is +2, +1, +2.

Comparison of Patterns

We can summarize the identified patterns in a table:

Letter Cluster	Pattern of Differences
DFGI	+2, +1, +2
SUVX	+2, +1, +2
DFHJ	+2, +2, +2
LNOQ	+2, +1, +2

Determining the Odd One Out

Three of the letter clusters (DFGI, SUVX, LNOQ) follow the pattern where the differences between consecutive letters are +2, +1, and +2. The letter cluster DFHJ follows a different pattern of +2, +2, +2.

Therefore, DFHJ is the odd one out because its internal letter progression differs from the common pattern observed in the other three options.

Final Answer

The odd one out is the letter cluster that does not fit the established pattern. Based on the analysis of positional differences:

- DFGI follows +2, +1, +2.
- SUVX follows +2, +1, +2.
- DFHJ follows +2, +2, +2.
- LNOQ follows +2, +1, +2.

The cluster **DFHJ** is different from the others.

97. Answer: c

Explanation:

Solving the Mathematical Expression with Operator Substitution

This solution explains how to find the value of the given mathematical expression after substituting the operators based on the provided rules. We will perform operator substitution and then follow the order of operations (BODMAS/PEMDAS) to reach the correct value.

Operator Substitution Rules

The question provides a specific set of rules for substituting the operators:

- '+' is replaced with '÷'
- '-' is replaced with '×'
- '×' is replaced with '+'
- '÷' is replaced with '-'

Applying Operator Substitution

The original expression is: $11 \times 15 - 81 + 27 \div 18$

Let's substitute each operator according to the rules:

- The multiplication symbol '×' between 11 and 15 becomes '÷'.
- The subtraction symbol '-' between 15 and 81 becomes '×'.
- The addition symbol '+' between 81 and 27 becomes '÷'.
- The division symbol '÷' between 27 and 18 becomes '-'.

After substitution, the new expression becomes:

$$11 + 15 \times 81 \div 27 - 18$$

Calculation Steps using BODMAS/PEMDAS

Now, we evaluate the new expression $11 + 15 \times 81 \div 27 - 18$ using the order of operations (BODMAS/PEMDAS: Brackets, Orders, Division/Multiplication, Addition/Subtraction).

1. **Division:** First, perform the division operation:

$$81 \div 27 = 3$$

The expression now is: $11 + 15 \times 3 - 18$

2. **Multiplication:** Next, perform the multiplication:

$$15 \times 3 = 45$$

The expression now is: $11 + 45 - 18$

3. **Addition:** Perform the addition:

$$11 + 45 = 56$$

The expression now is: $56 - 18$

4. **Subtraction:** Finally, perform the subtraction:

$$56 - 18 = 38$$

Final Value

Therefore, the value of the expression after performing the operator substitution and following the order of operations is **38**.

98. **Answer: a**

Explanation:

Evaluating the Expression with Symbol Substitution

This solution explains how to solve the given coding-relation problem by substituting symbols with mathematical operations and applying the order of operations (BODMAS/PEMDAS).

Understanding the Symbol Mapping

First, let's establish the meaning of each symbol based on the problem statement:

- 'A' represents the addition operator: +
- 'B' represents the multiplication operator: ×
- 'C' represents the division operator: ÷
- 'D' represents the subtraction operator: −

Substituting Symbols into the Expression

The given expression is: 16 C 7 B 49 C 28 A 63 D 21 A 11.

Now, we substitute the symbols according to the mapping:

- Replace 'C' with '÷'
- Replace 'B' with '×'
- Replace 'A' with '+'
- Replace 'D' with '−'

The expression becomes:

$$16 \div 7 \times 49 \div 28 + 63 - 21 + 11$$

Using LaTeX notation, this is:

$$16 \div 7 \times 49 \div 28 + 63 - 21 + 11$$

Step-by-Step Calculation using BODMAS

We will solve the expression using the BODMAS rule (Brackets, Orders, Division/Multiplication, Addition/Subtraction) from left to right.

1. Division and Multiplication (from left to right):

- First division:

$$16 \div 7 = \frac{16}{7}$$

- The expression now is:

$$\frac{16}{7} \times 49 \div 28 + 63 - 21 + 11$$

- Next multiplication:

$$\frac{16}{7} \times 49 = \frac{16 \times 49}{7} = 16 \times 7 = 112$$

- The expression now is:

$$112 \div 28 + 63 - 21 + 11$$

- Next division:

$$112 \div 28 = 4$$

- The expression becomes:

$$4 + 63 - 21 + 11$$

2. Addition and Subtraction (from left to right):

- First addition:

$$4 + 63 = 67$$

- The expression becomes:

$$67 - 21 + 11$$

- Next subtraction:

$$67 - 21 = 46$$

- The expression becomes:

$$46 + 11$$

- Final addition:

$$46 + 11 = 57$$

Final Answer Derivation

Following the substitution of symbols and the correct order of operations (BODMAS/PEMDAS), the calculation yields the result 57.

Therefore, the value of the expression

$$16 \div 7 \times 49 \div 28 + 63 - 21 + 11$$

is 57.

Multiple Choice Options Analysis

The calculated result is 57. Let's compare this with the given options:

- Option 1: 57
- Option 2: 49
- Option 3: 63
- Option 4: 47
- Option 5: (No value provided)

Our calculated result matches Option 1.

99. Answer: c

Explanation:

This question asks us to identify a logical relationship between the first pair of letter clusters, 'ALONE' and 'ZOLMV', and then apply that same relationship to the second letter cluster, 'GROUP', to find the missing part. This is a common type of verbal reasoning or coding-decoding question often found in competitive exams.

Decoding the ALONE to ZOLMV Relationship

Let's analyze the transformation from 'ALONE' to 'ZOLMV'. We can do this by looking at the position of each letter in the English alphabet (A=1, B=2, ..., Z=26).

- A is the 1st letter. In 'ZOLMV', the corresponding letter is Z, which is the 26th letter.

- **L** is the 12th letter. In 'ZOLMV', the corresponding letter is **O**, which is the 15th letter.
- **O** is the 15th letter. In 'ZOLMV', the corresponding letter is **L**, which is the 12th letter.
- **N** is the 14th letter. In 'ZOLMV', the corresponding letter is **M**, which is the 13th letter.
- **E** is the 5th letter. In 'ZOLMV', the corresponding letter is **V**, which is the 22nd letter.

Now, let's examine the numerical relationship between the positions:

- For A (1) and Z (26): $1 + 26 = 27$.
- For L (12) and O (15): $12 + 15 = 27$.
- For O (15) and L (12): $15 + 12 = 27$.
- For N (14) and M (13): $14 + 13 = 27$.
- For E (5) and V (22): $5 + 22 = 27$.

The pattern is consistent: each letter in the first cluster is replaced by a letter whose position number adds up to 27 with the original letter's position number. This is known as finding the "reverse" or "complementary" letter. Mathematically, if a letter is at position n , its corresponding letter is at position $27 - n$.

Applying the Pattern to GROUP

We will now apply the same reverse alphabet rule to the letter cluster 'GROUP':

- **G**: Its position is $P(G) = 7$. The position of the corresponding letter is $27 - 7 = 20$. The 20th letter of the alphabet is **T**.
- **R**: Its position is $P(R) = 18$. The position of the corresponding letter is $27 - 18 = 9$. The 9th letter of the alphabet is **I**.
- **O**: Its position is $P(O) = 15$. The position of the corresponding letter is $27 - 15 = 12$. The 12th letter of the alphabet is **L**.
- **U**: Its position is $P(U) = 21$. The position of the corresponding letter is $27 - 21 = 6$. The 6th letter of the alphabet is **F**.
- **P**: Its position is $P(P) = 16$. The position of the corresponding letter is $27 - 16 = 11$. The 11th letter of the alphabet is **K**.

Combining these letters, we find that 'GROUP' transforms into 'TILFK'.

Matching the Result with Options

The calculated transformation for 'GROUP' is 'TILFK'. Let's compare this with the given options:

1. TIFLK
2. TIKFL
3. TILFK
4. TILKF

Our result 'TILFK' perfectly matches the third option.

100. Answer: d

Explanation:

Identifying the Odd Word from Alternatives

The task is to find the 'odd word' among the given 'alternatives'. This involves understanding the meaning of each word and identifying the one that does not fit the pattern established by the others.

Defining the Words

Let's clarify the meaning of each alternative provided:

- **Revoke:** This means to officially cancel a decision, law, rule, or promise. It signifies taking something back or making it invalid. For example, authorities might *revoke* a license.
- **Cancel:** This means to decide that something arranged will not happen, or to stop something from happening. It's a general term for calling something off. For example, one might *cancel* an appointment.
- **Abrogate:** This means to repeal or abolish a law, right, treaty, or formal agreement. It's a formal way of ending something, often used in legal or

governmental contexts. For example, a government might *abrogate* an old law.

- **Establish:** This means to set up, create, institute, or found something (like an organization, system, law, or belief) on a firm or permanent basis. For example, they decided to *establish* a new school.

Analyzing the Meanings for a Common Theme

By examining the definitions, we can group the words based on their shared meaning:

- The words **Revoke**, **Cancel**, and **Abrogate** share a common core meaning. They all refer to the act of ending, annulling, voiding, or taking away something that was previously in effect, decided, or arranged.
- These words indicate a process of cessation or invalidation.

Selecting the Odd Word

The word **Establish** has a meaning that is fundamentally different from the other three. While **Revoke**, **Cancel**, and **Abrogate** all signify ending or removing something, **Establish** signifies the creation or institution of something.

Therefore, **Establish** is the odd word out because it represents creation, whereas the others represent cancellation or abolition.