

RRB NTPC CBT I Memory Based Paper 23 March 2026 S1

Q.1 In an election between two candidates, 80% of the registered voters cast their vote and 19% of the votes polled were found invalid. The winning candidate got 70% of the valid votes and won the election by a margin of 1458 votes. How many voters were registered?

- A. 5625
- B. 5622
- C. 5627
- D. 5623

Answer: A

Sol: Given

Registered voters who cast their vote = 80%
 Invalid votes = 19% of polled votes
 Valid votes secured by the winner = 70%
 Winning margin = 1458 votes

Solution

Let the total number of registered voters be x.
 Votes cast = 0.80x
 Valid votes = (100% - 19%) of 0.80x = 81% of 0.80x = 0.81 × 0.80x = 0.648x
 The winner got 70% of valid votes, so the loser got 30% of valid votes.
 Winning margin = (70% - 30%) of valid votes = 40% of valid votes
 40% of 0.648x = 1458
 $0.40 \times 0.648x = 1458$
 $0.2592x = 1458$
 $x = \frac{1458}{0.2592}$
 x = 5625

Final Answer

So the correct answer is (a)

Q.2 A man sold two bicycles at a total profit of 20%. If he had bought them for ₹3,500 each and sold the first one at a 2 profit of 5%, then for how much profit (%) he must make on the other one?

- A. 35%
- B. 25%
- C. 30%
- D. 20%

Answer: A

Sol: Given:

Cost price of each bicycle = ₹3,500

Therefore total cost price = ₹3,500 + ₹3,500 = ₹7,000

Total profit = 20% on ₹7,000

First bicycle sold at 5% profit

Formula Used:

$$\text{Profit} = \frac{\text{Profit \%} \times CP}{100}$$

Total Profit = Profit₁ + Profit₂

Solution:

Adda247

Test Prime

ALL EXAMS, ONE SUBSCRIPTION



1,00,000+
Mock Tests



Personalised
Report Card



Unlimited
Re-Attempt



600+
Exam Covered



25,000+ Previous
Year Papers



500%
Refund



ATTEMPT FREE MOCK NOW

Total profit on both bicycles = 20% of 7000
 $= \frac{20}{100} \times 7000 = 1400$

Profit on first bicycle = 5% of 3500
 $= \frac{5}{100} \times 3500 = 175$

Profit required on second bicycle = 1400 - 175
 $= 1225$

Profit % on second bicycle:
 $\frac{1225}{3500} \times 100 = 35$

Required profit on second bicycle = 35%

Alternate Solution:

Since both bicycles have equal cost price, use average profit trick

Average profit = 20%

If one bicycle profit = 5%, let other = x

$$\frac{5 + x}{2} = 20$$

$$5 + x = 40$$

$$x = 35\%$$

Q.3 Find the value of $14^{-10} \div 14^{13} \times 14^{-7}$

- A. 14^{-37}
- B. 14^{-30}
- C. 14^{-26}
- D. 14^{-25}

Answer: B

Sol: Given:

$$14^{-10} \div 14^{13} \times 14^{-7}$$

Formula Used:

$$a^m \div a^n = a^{m-n}$$

$$a^m \times a^n = a^{m+n}$$

Solution:

$$14^{-10} \div 14^{13} = 14^{-10-13} = 14^{-23}$$

$$14^{-23} \times 14^{-7} = 14^{-23-7} = 14^{-30}$$

Final Answer:

$$14^{-30} = \frac{1}{14^{30}}$$

Q.4 Which of the following terms is included in the Preamble of the Indian Constitution to describe the nature of the Indian State?

- A. Democratic
- B. Federal
- C. Parliamentary
- D. Unitary

Answer: A

Sol: The correct answer is **(A) Democratic**

Explanation:

- The Preamble of the Indian Constitution declares India to be a "Sovereign Socialist Secular Democratic Republic."
- The term 'Democratic' implies that the Constitution established a form of government which gets its authority from the will of the people.
- It encompasses not only political democracy but also social and economic democracy.
- India follows a representative parliamentary democracy where the executive is responsible to the legislature.
- The preamble serves as an introductory statement that sets out the guiding purpose and principles of the document.

Information Booster:

- The Preamble was amended only once by the 42nd Constitutional Amendment Act (1976), which added the words 'Socialist', 'Secular', and 'Integrity'.
- The ideals of Liberty, Equality, and Fraternity in the Preamble were borrowed from the French Revolution.
- The objective resolution proposed by Jawaharlal Nehru became the basis for the Preamble.

Additional Knowledge:**Federal (Option B):**

- Although India has a federal structure, the word 'Federal' is not mentioned anywhere in the Preamble or the entire Constitution. Article 1 describes India as a 'Union of States'.

Parliamentary (Option C):

- This describes the system of government where the executive is part of the legislature, but it is not a term used in the Preamble to define the state.

Unitary (Option D):

- India is often described as 'Quasi-federal' because it has strong unitary features, but 'Unitary' is not used in the Preamble.

Q.5 Each of the digits in the number 13645928 is arranged in descending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

- A. Three
- B. None
- C. One
- D. Two

Answer: D

Sol: Given: 13645928

Arrange the digits in descending order (largest to smallest):

Given Number 13645928

Descending Order 98654321

New number: 9 8 6 5 4 3 2 1

2 digits remain unchanged. (6 and 2)

So, **two** digits will remain unchanged as compared to that in the original number.

Thus, correct option is (d).

Q.6 Which of the following statements correctly describes the unique features of **Annelida and Aves**?

- A. Both groups possess feathers and hollow bones
- B. Annelids have jointed appendages and aves respire through gills
- C. Annelids are radially symmetrical and aves lack wings
- D. Annelids show true segmentation, while aves possess feathers and forelimbs modified into wings

Answer: D

Sol: The correct answer is (d).

Explanation Annelids are characterized by metameric (true) segmentation of the body. Aves are uniquely adapted for flight with feathers and forelimbs modified into wings.

Additional Information Option {a} is incorrect because annelids do not have feathers. Option {b} is incorrect because annelids do not have jointed appendages and birds do not respire through gills. Option {c} is incorrect because annelids are bilaterally symmetrical and birds have wings. Option {d} is correct as it highlights the distinguishing features of both groups.

Q.7 Which of the following statements about motion is/are correct?

- I. Net force acting on an object can change its state of motion
- II. Balanced forces always change the speed of an object

- A. Only I

- B. Only II
- C. Both I and II
- D. Neither I nor II

Answer: A

Sol: The correct answer is **(A) Only I**

Explanation:

- Newton's First Law of Motion states that an object will remain at rest or in uniform motion in a straight line unless acted upon by an external, unbalanced force (Net Force). Therefore, a net force is necessary to change the state of motion (speed or direction) of an object. Statement I is correct.
- Balanced forces are forces that are equal in magnitude and opposite in direction, resulting in a net force of zero. When the net force is zero, there is no change in the object's velocity. An object at rest remains at rest, and an object in motion continues at a constant speed in a straight line. Therefore, balanced forces *cannot* change the speed or direction of an object. Statement II is incorrect.
- Force is a vector quantity, meaning it has both magnitude and direction. When multiple forces act on an object, we calculate the vector sum (resultant force). Only if this sum is non-zero (unbalanced) will the object accelerate according to $F = ma$.

Information Booster:

- Inertia is the inherent property of an object to resist any change in its state of motion. Mass is a measure of inertia.
- Acceleration occurs only when there is an 'unbalanced force' or 'net force'.
- Friction is a common force that often balances applied forces, preventing motion until the applied force exceeds the maximum static friction.
- If you push a heavy wall and it doesn't move, the forces are balanced, and your state of motion (rest) does not change.

Additional Knowledge:

- Second Law of Motion: The rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of the force ($F = \frac{\Delta p}{\Delta t} = ma$).
- Third Law of Motion: For every action, there is an equal and opposite reaction. These forces act on two different bodies and thus never cancel each other out to create 'balanced forces' in the context of a single object's motion.

Q.8 Which of the following is the SI unit of Frequency?

- A. Hertz
- B. Decibel
- C. Meter
- D. Second

Answer: A

Sol: The correct answer is **(A) Hertz**

Explanation:

- The SI unit of frequency is the hertz (Hz), named after the German physicist Heinrich Hertz.
- Frequency is defined as the number of occurrences of a repeating event per unit of time.
- One hertz is equal to one cycle per second ($1 \text{ Hz} = 1 \text{ s}^{-1}$).
- In the context of waves, frequency refers to the number of crests that pass a fixed point in a given amount of time.
- Frequency is inversely proportional to the period (T), where $f = \frac{1}{T}$.

Information Booster:

- Higher frequencies correspond to shorter wavelengths, while lower frequencies correspond to longer wavelengths in a vacuum.
- The human ear can typically hear frequencies between **20 Hz and 20,000 Hz**.
- Ultrasound refers to frequencies above the human hearing range, while infrasound refers to those below it.

Additional Knowledge:

Decibel (Option B):

- It is a logarithmic unit used to measure the intensity or loudness of sound.
- It is not an SI unit but is widely used in acoustics.

Meter (Option C):

- The meter (m) is the SI base unit of length or distance.
- It is used to measure wavelength in wave mechanics.

Second (Option D):

- The second (s) is the SI base unit of time.
- It is used to define the period (T) of a wave.

Q.9 The Supreme Court's ruling on menstrual health heavily relied on the provisions of the 'Right to Education (RTE) Act, 2009'. Which specific section of the Act mandates separate toilets for girls and boys?

- A. Section 3

- B. Section 12
- C. Section 19
- D. Section 21

Answer: C

Sol:

The correct answer is (c) **Section 19**

Explanation:

- **Section 19** of the **Right to Education (RTE) Act, 2009**, deals with the norms and standards for a school.
- The **Schedule** attached to Section 19 explicitly mandates the provision of **separate toilets for boys and girls** and a safe and adequate drinking water facility.
- The Supreme Court interpreted these provisions broadly, stating that "**barrier-free access**" mentioned in the Act includes the removal of barriers caused by inadequate **menstrual hygiene management**.
- The Court clarified that if a school fails to provide these basic amenities, it violates the statutory mandate of the RTE Act as well as the constitutional mandate of **Article 21**.
- This section ensures that every child has access to a school environment that is conducive to learning and maintains personal **hygiene and privacy**.

Information Booster:

- The **86th Constitutional Amendment Act, 2002**, inserted **Article 21-A**, which makes education a Fundamental Right for children aged 6–14 years.
- The RTE Act was enacted to give effect to Article 21-A and came into force on **1st April 2010**.

Additional Knowledge:

Section 3 (Option a):

- Grants every child of the age of **6 to 14 years** the right to free and compulsory education in a neighborhood school.

Section 12 (Option b):

- Mandates private unaided schools to reserve **25% of seats** for children belonging to weaker sections and disadvantaged groups.

Section 21 (Option d):

- Provides for the establishment of a **School Management Committee (SMC)** in every school (except unaided schools) to monitor the working of the school.

Q.10 The Andes Mountain Range is located in which continent?

- A. Australia
- B. Europe
- C. South America
- D. Asia

Answer: C

Sol: Correct Answer: (C) **South America**

Explanation:

- The Andes Mountains stretch along the western edge of South America.
- **They run through countries like Chile, Peru, and Bolivia.**
- It is the longest continental mountain range in the world.
- The range was formed due to plate tectonic activity.
- Therefore, option (C) is correct.

Information Booster:

- **The Andes extend over 7,000 km.**
- **Mount Aconcagua is the highest peak in the Andes.**
- The range influences climate and rainfall patterns.
- **It is rich in minerals like copper and silver.**
- Volcanic activity is common in the Andes.

Additional Information (Other Options):

Option (A) Australia: Australia has the Great Dividing Range, not the Andes.

Option (B) Europe: Europe has mountain systems like the Alps and Pyrenees.

Option (D) Asia: Asia has mountain ranges like the Himalayas and Karakoram.

Q.11 Uttar Pradesh's newly created 76th district is

- A. Ram Nagar
- B. Kalyan Singh Nagar
- C. Atal Nagar
- D. Lohia Nagar

Answer: B

Sol: Correct Answer: (B) **Kalyan Singh Nagar**

Explanation:

- **Kalyan Singh Nagar is declared the 76th district of Uttar Pradesh.**

- It was carved out for better administrative efficiency.
- The district was named in honour of Kalyan Singh.
- Creation of districts helps decentralised governance.
- Therefore, option (B) is correct.

Information Booster:

- Uttar Pradesh has the highest number of districts in India.
- District creation improves public service delivery.
- Administrative divisions evolve with population growth.
- Naming districts often reflects political or historical legacy.
- District status improves infrastructure development.

Q.12 Hemant starts from Point A and drives 3 km towards the east. He then takes a right turn, drives 5 km, turns right and drives 6 km. He then takes a right turn and drives 5 km. He takes a final left turn, drives 8 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degrees turns only unless specified).

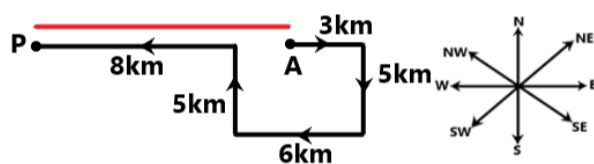
- A. 11 km towards the east
- B. 11 km towards the west
- C. 7 km towards the north
- D. 5 km towards the south

Answer: A

Sol: Given:

Hemant starts from Point A and drives 3 km towards the east.
 He then takes a right turn, drives 5 km, turns right and drives 6 km.
 He then takes a right turn and drives 5 km.
 He takes a final left turn, drives 8 km and stops at Point P.

From the given statements path diagram will be.



$8 + 6 = 14 \text{ km}$

$14 - 3 = 11 \text{ km}$

So, He far **11 km** and towards **east** direction should he drive in order to reach Point A again.

Thus, correct option is (a).

Q.13 Light pollution most severely affects observation of:

- A. Solar eclipses
- B. Meteors during daytime
- C. Faint galaxies and nebulae
- D. Moon phases

Answer: C

Sol: The correct answer is **(C) Faint galaxies and nebulae**

Explanation:

- Light pollution is the excessive or misdirected artificial light caused by urban centers. It increases the 'sky glow', which reduces the contrast between the stars and the background sky.
- Faint deep-sky objects like distant galaxies and nebulae have very low surface brightness. When the sky is bright due to light pollution, these objects become invisible to the naked eye and even to many telescopes.
- This is why major observatories (like the Indian Astronomical Observatory at Hanle) are built in remote, high-altitude locations far from cities.

Information Booster:

- **Bortle Scale:** A nine-level numeric scale that measures the night sky's brightness of a particular location (Class 1 is pristine dark; Class 9 is inner-city).
- **Impact on Wildlife:** Beyond astronomy, light pollution disrupts the migratory patterns of birds and the reproductive cycles of insects and sea turtles.
- **Dark Sky Reserves:** Hanle in Ladakh was recently designated as India's first 'Dark Sky Reserve' to protect the night sky from light pollution.

Additional Knowledge:

- **Solar eclipses (Option A):** These occur during the day when the sun is very bright; urban streetlights have no impact on viewing them.
- **Meteors during daytime (Option B):** Meteors are generally not visible during the day because the Sun's light is overwhelmingly brighter than any artificial light or meteor trail.
- **Moon phases (Option D):** The Moon is the second brightest object in our sky. Its phases are easily visible even from the most light-polluted cities.

Q.14 What should come in place of the question mark (?) in the given series?
2, 4, 12, 24, 72, ?

- A. 144
- B. 136
- C. 92
- D. 124

Answer: A

Sol: Given: 2, 4, 12, 24, 72, ?

Logic: Numbers are multiply by 2 and 3 alternately.

$$2 \times 2 = 4$$

$$4 \times 3 = 12$$

$$12 \times 2 = 24$$

$$24 \times 3 = 72$$

$$72 \times 2 = 144$$

So, the missing term is **144**.

Thus, correct option is (a).

Q.15 Let $\triangle ABC \sim \triangle PQR$ and $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \frac{64}{121}$. If $AB = 11\text{cm}$, $BC = 7\text{cm}$ and $AC = 8\text{cm}$, then QR (in cm) is equal to:

- A. 11
- B. 9
- C. 10
- D. 8

Answer: A

Sol: Given:

$$\triangle ABC \sim \triangle PQR$$

$$\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \frac{64}{121}$$

$$AB = 11 \text{ cm}, \quad BC = 7 \text{ cm}, \quad AC = 8 \text{ cm}$$

Formula Used:

$$\text{Linear scale factor} = \sqrt{\text{Area ratio}}$$

Solution:

Since $\triangle ABC \sim \triangle PQR$,

$A \leftrightarrow Q, B \leftrightarrow P, C \leftrightarrow R$

$\therefore AC \leftrightarrow QR$

$$\frac{AC}{QR} = \sqrt{\frac{64}{121}} = \frac{8}{11}$$

$$\Rightarrow \frac{8}{11} = \frac{AC}{QR}$$

$$\Rightarrow QR = \frac{11}{8} \times AC$$

$$QR = \frac{11}{8} \times 8 = 11 \text{ cm}$$

$$\therefore QR = 11 \text{ cm}$$

Q.16 What is the mode of the data given below? [Give your answer correct to 2 decimal places.]

Age in years 10-20 20-30 30-40 40-50 50-60 60-70 70-80

No. of patients 29 35 25 10 18 34 17

- A. 39.44
- B. 6.56
- C. 23.75
- D. 22.58

Answer: C

Sol: Formula Used:

$$\text{Mode} = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$$

Solution:

Highest frequency = 35

Modal class = 20-30

$l = 20$

$h = 10$

$f_1 = 35$

$f_0 = 29$

$f_2 = 25$

$$\text{Mode} = 20 + \frac{35 - 29}{2(35) - 29 - 25} \times 10$$

$$= 20 + \frac{6}{70 - 54} \times 10$$

$$= 20 + \frac{6}{16} \times 10$$

$$= 20 + 3.75$$

$$= 23.75$$

Final Answer:

23.75

Q.17 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

1. Some oranges are peaches.
2. No peach is a carrot.

Conclusions:

- I. Some oranges are carrots.
- II. All carrots are peaches.

- A. Only conclusion (I) follows.
- B. Both conclusions (I) and (II) follow.
- C. Neither conclusion (I) nor (II) follows.
- D. Only conclusion (II) follows.

Answer: C

Sol: Statements:

1. Some oranges are peaches.
2. No peach is a carrot.

From the given statements possible Venn diagram will be.

Oranges Peaches * Carrot

Conclusions:

I. Some oranges are carrots. (**False**, there is no relation between oranges and carrots).

II. All carrots are peaches. (**False**, no peach is a carrot).

So, **Neither conclusion (I) nor (II) follows.**

Thus, correct option is (c).

Q.18 AB is parallel to CD. A transversal PQ intersects AB and CD at E and F, respectively, and $\angle PEB = 78^\circ$, G is a point between AB and CD such that $\angle BEG = 18^\circ$ and $\angle GFE = 30^\circ$. What is the measure of $\angle EGF$?

- A. 72°
- B. 58°
- C. 66°
- D. 68°

Answer: C



Sol: Given:

AB is parallel to CD. A transversal PQ Intersects AB and CD at E and F, respectively, and $\angle PEB = 78^\circ$.

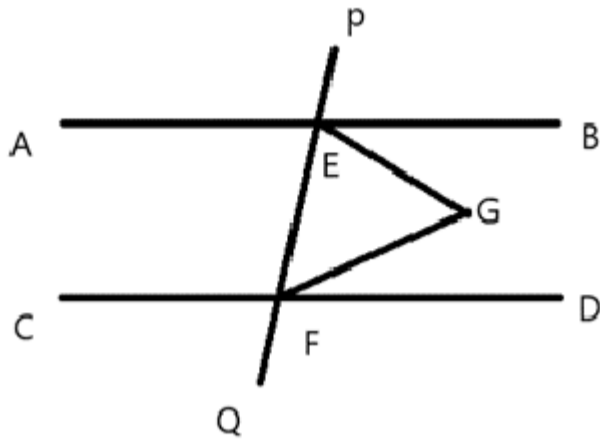
G is a point between AB and CD such that $\angle BEG = 18^\circ$ and $\angle GFE = 30^\circ$

Concept used:

Sum of angles on a straight line is 180° .

Sum of all angles of a triangle is 180° .

Solution:



We know that PEF is a line so:
 $\angle PEB + \angle BEG + \angle FEG = 180^\circ$

$$78^\circ + 18^\circ + \angle FEG = 180^\circ$$

$$\angle FEG = 84^\circ$$

Now, In triangle EGF,

$$\angle GFE + \angle EGF + \angle FEG = 180^\circ$$

$$30^\circ + \angle EGF + 84^\circ = 180^\circ$$

$$\angle EGF = 180^\circ - 84^\circ - 30^\circ$$

$$\angle EGF = 66^\circ$$

Hence, 'option 3' is the correct answer.

Q.19 Mukesh starts from Point A and drives 14 km towards the North. He then takes a left turn, drives 9 km, then turns left and drives 17 km. He then takes a left turn and drives 13 km. He takes a final left turn, drives 3 km, and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only, unless specified.)

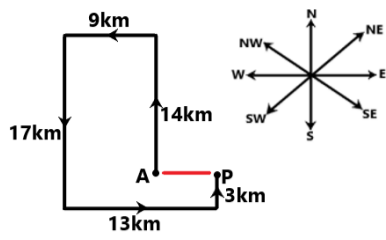
- A. 4 km to the east
- B. 4 km to the west
- C. 5 km to the west
- D. 5 km to the east

Answer: B

Sol: Given:

Mukesh starts from Point A and drives 14 km towards the North.
 He then takes a left turn, drives 9 km, then turns left and drives 17 km.
 He then takes a left turn and drives 13 km.
 He takes a final left turn, drives 3 km, and stops at Point P.

From the given statements path diagram will be.



$13 - 9 = 4 \text{ km}$

So, he far **4 km** and towards **west** direction should he drive in order to reach Point A again.
Thus, correct option is (b).

Q.20 Find the least possible number which when divided by 36, 49, 54 or 70 leaves remainders of 19, 32, 37 and 53, respectively.

- A. 26,447
- B. 26,446
- C. 26,443
- D. 26,441

Answer: C

Sol: Given:

Required number leaves remainders:

$36 \rightarrow 19$

$49 \rightarrow 32$

$54 \rightarrow 37$

$70 \rightarrow 53$

Formula Used:

Let required number = $\text{LCM}(36, 49, 54, 70) + \text{respective difference}$

All remainders = Divisor - Remainder = Constant difference

Solution:

Each remainder is 17 less than the divisor:

$36 - 19 = 17$

$49 - 32 = 17$

$54 - 37 = 17$

$70 - 53 = 17$

So, the number - 17 is divisible by all:

Prime factorizations:

$36 = 2^2 \times 3^2$

$49 = 7^2$

$54 = 2 \times 3^3$

$70 = 2 \times 5 \times 7$

$\text{LCM} = 2^2 \times 3^3 \times 5 \times 7^2 = 4 \times 27 \times 5 \times 49 = 26460$

Required number = $26460 - 17 = 26443$

Q.21 Which of the following books was written by Dr. B.R. Ambedkar?

- A. Discovery of India
- B. Annihilation of Caste
- C. Hind Swaraj
- D. India Wins Freedom

Answer: B

Sol: The correct answer is **(B) Annihilation of Caste**

Explanation:

- 'Annihilation of Caste' is an undelivered speech written in 1936 by Dr. B.R. Ambedkar.
- It is a profound critique of the caste system and Hindu religious texts.
- Ambedkar was the chief architect of the Indian Constitution and a champion for Dalit rights.
- Other notable books by him include 'The Untouchables' and 'Who Were the Shudras?'.
- His writings were fundamental to the social reform movements in modern India.

Information Booster:

- Dr. Ambedkar started newspapers like Mooknayak (1920) and Bahishkrit Bharat (1927).
- He led the Mahad Satyagraha in 1927 to establish the right of untouchables to use water from public tanks.

Additional Knowledge:

- Discovery of India (Option A): Written by Jawaharlal Nehru during his imprisonment at Ahmednagar Fort.
- Hind Swaraj (Option C): Written by Mahatma Gandhi in 1909, outlining his views on Swaraj and modern civilization.
- India Wins Freedom (Option D): An autobiographical narrative by Maulana Abul Kalam Azad.

Q.22 The monthly incomes of two friends Chetan and Vipul, are in the ratio 5 : 7 respectively and each of them saves ₹96000 every month. If the ratio of their monthly expenditure is 2 : 4, find the monthly income of Chetan(in ₹).

- A. 224000
- B. 160000
- C. 161000
- D. 159000

Answer: B

Sol: Given:

Income ratio (Chetan : Vipul) = 5 : 7

Expenditure ratio = 2 : 4

Each saves = ₹96,000

Formula Used:

Income = Expenditure + Savings

Solution:

Let incomes = 5x, 7x and expenditures = 2y, 4y.

For Chetan: $5x - 2y = 96,000$ For Vipul: $7x - 4y = 96,000$

Subtract

$$2x - 2y = 0$$

$$x = y.$$

$$\text{Then } 5x - 2x = 96,000$$

$$3x = 96,000$$

$$x = 32,000$$

$$\text{Chetan's income} = 5x = 5 \times 32,000 = ₹1,60,000$$

Q.23 Which of the following processes occurs when a solid changes directly into a gas?

- A. Condensation
- B. Sublimation
- C. Evaporation
- D. Freezing

Answer: B**Sol:** The correct answer is **(B) Sublimation****Explanation:**

- Sublimation is a phase transition where a substance changes directly from a solid state to a gaseous state without passing through the intermediate liquid phase.
- This happens when the vapor pressure of the substance is high enough at a specific temperature.
- Common examples of substances that undergo sublimation include dry ice (solid Carbon Dioxide), naphthalene balls (mothballs), camphor, and iodine crystals.
- In cold climates, snow and ice can also sublime directly into water vapor under certain conditions of low humidity and sunlight.
- The reverse process, where a gas changes directly into a solid, is known as Deposition or Desublimation (e.g., frost formation).

Information Booster:

- Latent Heat of Sublimation: The amount of heat required to convert a unit mass of solid into gas at a constant temperature.
- This process is used in 'freeze-drying' (lyophilization) to preserve food and pharmaceuticals by removing water through sublimation under vacuum.
- The Triple Point of a substance is the temperature and pressure at which all three phases (solid, liquid, and gas) coexist in equilibrium.

Additional Knowledge:

- Condensation (Option A): The process where a gas changes into a liquid (e.g., water droplets forming on a cold glass).
- Evaporation (Option C): The process where a liquid changes into a gas at any temperature below its boiling point (occurs only at the surface).
- Freezing (Option D): The process where a liquid changes into a solid (also called solidification).

Q.24 Evaluate: $(-9) - (-60) \div (-10) + (-2) \times 7$

- A. -32
- B. -31
- C. -28
- D. -29

Answer: D

Sol: Given:

Expression: $(-9) - (-60) \div (-10) + (-2) \times 7$

Formula Used:

BODMAS Rule.

Solution:

$(-9) - (-60) \div (-10) + (-2) \times 7$

$= (-9) - 6 + (-2) \times 7$

$= (-9) - 6 + (-14)$

$= -15 + (-14)$

$= -29$

Final Answer

So the correct answer is (d)

Q.25 Which of the following is included in the Central Nervous System of humans?

- I. Brain
- II. Spinal cord

- A. Only I
- B. Only II
- C. Both I and II
- D. Neither I nor II

Answer: C

Sol: The correct answer is **(C) Both I and II**

Explanation:

- The human nervous system is divided into two main parts: the Central Nervous System (CNS) and the Peripheral Nervous System (PNS).
- The CNS consists of the Brain and the Spinal Cord.
- The CNS acts as the processing center for the entire nervous system, receiving sensory information and sending out motor commands.
- The brain is protected by the skull, while the spinal cord is protected by the vertebral column.
- Both the brain and spinal cord are wrapped in protective membranes called meninges.

Information Booster:

- The Peripheral Nervous System (PNS) consists of cranial nerves and spinal nerves that connect the CNS to the rest of the body.
- The basic functional unit of the nervous system is the Neuron.
- Reflex actions are typically controlled by the spinal cord without the direct involvement of the brain to ensure rapid responses.

Additional Knowledge:

Brain (I):

- Divided into Forebrain, Midbrain, and Hindbrain; it controls voluntary movements, memory, and emotions.

Spinal Cord (II):

- A long tube-like structure that extends from the brainstem down the back; it transmits signals between the brain and the rest of the body.

Q.26 By the twelfth century, the Chero chiefdoms had emerged in the area corresponding to which present-day states?

- A. Gujarat and Maharashtra
- B. Bihar and Jharkhand
- C. Odisha and West Bengal
- D. Rajasthan and Haryana

Answer: B

Sol: The correct answer is (b) Bihar and Jharkhand

Explanation:

- The Chero chiefdoms emerged in the 12th century in the regions of present-day Bihar and Jharkhand.
- They were a powerful tribal group in the eastern part of India.
- They were famously attacked and defeated by Raja Man Singh (Akbar's general) in 1591, and later completely subjugated under Aurangzeb.

Information Booster:

- The Cheros ruled over parts of the Palamu and Shahabad regions.

- They are known for their distinct culture and for building several forts in the Chotanagpur plateau.

Additional Knowledge:

- Other major tribes mentioned in medieval history include the Khokhar and Gakkhars in Punjab, and the Ahoms in Assam.

Q.27 The Human Development Index (HDI) measures progress in:

- A. Income, health, and education
- B. Agriculture and industry
- C. Defence and security
- D. Trade and commerce

Answer: A

Sol: The correct answer is **(A) Income, health, and education**

Explanation:

- The HDI is a summary measure of average achievement in key dimensions of human development.
- It uses three indicators: (1) **Health:** Life expectancy at birth, (2) **Education:** Mean years of schooling and expected years of schooling, (3) **Income:** Gross National Income (GNI) per capita (PPP \$).
- It was developed by Pakistani economist Mahbub ul Haq and Indian economist Amartya Sen.

Information Booster:

- **UNDP:** The index is published annually by the United Nations Development Programme (UNDP) in the Human Development Report.
- **Scale:** The HDI value ranges between 0 and 1, where 1 indicates the highest human development.

Additional Knowledge:

- While agriculture, trade, and industry (Options B, C, D) contribute to the economy, the HDI specifically focuses on the *human* aspect of development rather than just economic or military output.

Q.28 How much cancer medicine did India deliver to Kabul as humanitarian assistance to Afghanistan in January 2026?

- A. 5 tonnes
- B. 7.5 tonnes
- C. 10 tonnes
- D. 12 tonnes

Answer: B

Sol: Correct Answer: (b) 7.5 tonnes

Solution

- India delivered **7.5 tonnes of life-saving cancer medicines** to Kabul as humanitarian assistance.
- The move reflects India's people-centric diplomacy and commitment to supporting the Afghan people in the health sector.

Information Booster

- The aid was delivered under India's humanitarian outreach through the Ministry of External Affairs.
- Afghanistan faces shortages of medicines and weak healthcare infrastructure.
- India has previously provided food, vaccines, medical equipment, and training support to Afghanistan.

Additional Knowledge

- India follows a "people-first diplomacy" approach in fragile and crisis-affected regions.
- Humanitarian assistance strengthens people-to-people ties and goodwill between nations.
- Medical aid is a key component of India's foreign policy in South Asia and Central Asia.

Q.29 What is the main purpose of India's Look East Policy?

- A. Promote agricultural development within India.
- B. Improve relations and trade with European Union countries.
- C. Enhance cultural exchanges and people-to-people contacts with countries in East Asia.

D. Strengthening economic and strategic ties with Southeast Asia.

Answer: D

Sol: The correct answer is (d) Strengthening economic and strategic ties with Southeast Asia.

Explanation:

- The Look East Policy (LEP) was launched in 1991 by the government of P.V. Narasimha Rao.
- It represented a strategic shift in India's perspective of the world during the post-Cold War era.
- The main goal was to reconnect with Southeast Asian countries to boost economic growth through trade and investment.
- It served as a counterweight to the influence of other regional powers.
- The policy eventually evolved into the more proactive 'Act East Policy' in 2014.

Information Booster:

- LEP was a response to India's 1991 economic crisis and the need for new markets.
- The policy significantly strengthened India's relationship with the ASEAN bloc.

Additional Knowledge:

Agricultural development (Option a)

- This is a domestic focus and not the primary driver of the foreign Look East Policy.

European Union (Option b)

- Relations with the EU are handled through separate bilateral and regional frameworks, not LEP.

Cultural exchanges (Option c)

- While cultural exchange is a component, the *main* purpose was economic and strategic integration.

So the correct answer is (d)

Q.30 4 men can complete a piece of work in 10 days, while 3 women can do it in 16 days. In how many days can 6 women and 5 men complete this work?

- A. 5 days
- B. 3 days
- C. 4 days
- D. 6 days

Answer: C

Sol: Given:

4 men → 10 days

3 women → 16 days

Find time taken by 6 women + 5 men.

Formula Used:

$$\text{Efficiency} = \frac{1}{\text{Time}}$$

Solution:

$$\text{Work done by 4 men in 1 day} = \frac{1}{10}$$

$$\text{So, work done by 1 man in 1 day} = \frac{1}{10 \times 4} = \frac{1}{40}$$

$$\text{Work done by 3 women in 1 day} = \frac{1}{16}$$

$$\text{So, work done by 1 woman in 1 day} = \frac{1}{16 \times 3} = \frac{1}{48}$$

$$\text{Efficiency of 5 men} = 5 \times \frac{1}{40} = \frac{5}{40} = \frac{1}{8}$$

$$\text{Efficiency of 6 women} = 6 \times \frac{1}{48} = \frac{6}{48} = \frac{1}{8}$$

$$\text{Total efficiency of group} = \frac{1}{8} + \frac{1}{8} = \frac{1}{4}$$

$$\text{Time required} = \frac{1}{\frac{1}{4}} = 4 \text{ days}$$

Alternate Solution (Exam Trick):

Handwritten solution on lined paper:

$$4M \times 10 = 3W \times 16$$

$$40M = 48W \rightarrow \boxed{5M = 6W}$$

Find: $6W + 5M$
 $\rightarrow 5M = 5M + 5M = 10M$

$$4M \times 10 = 10M \times ? \quad (? = 4 \text{ days})$$

Q.31 Which of the following statements about Red Fort are correct?

1. It was constructed during the reign of Shah Jahan.
2. It is located on the banks of the Yamuna River.
3. It served as the main residence of Mughal emperors.

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Answer: D

Sol: The correct answer is **(D) 1, 2 and 3**

Explanation:

- **Statement 1:** The Red Fort (Lal Qila) was commissioned by the Mughal Emperor Shah Jahan in 1638, when he decided to shift his capital from Agra to Delhi (Shahjahanabad).
- **Statement 2:** It is situated on the banks of the Yamuna River. Its design took advantage of the river's water for filling the moats and for the "Nahr-i-Bihisht" (Stream of Paradise) canals.
- **Statement 3:** For nearly 200 years, until 1857, it served as the main residence of the Mughal emperors. It was the ceremonial and political center of the Mughal state.

Information Booster:

- **UNESCO World Heritage Site:** The Red Fort Complex was designated a UNESCO World Heritage site in 2007.
- **Architect:** Ustad Ahmad Lahori, the same architect who designed the Taj Mahal, is credited with the design of the Red Fort.
- **Structures inside:** Key structures include the Diwan-i-Aam (Hall of Public Audience), Diwan-i-Khas (Hall of Private Audience), and the Moti Masjid (Pearl Mosque).

Additional Knowledge:

- The fort is named for its massive enclosing walls of red sandstone.
- It is the site from which the Prime Minister of India addresses the nation on Independence Day (August 15) every year.

Q.32 If the ratio of two numbers is 5 : 3 and the product of their LCM and their HCF is 135, then the sum of the reciprocals of the LCM and the HCF is:

- A. $\frac{16}{45}$
- B. $\frac{85}{16}$
- C. $\frac{61}{16}$
- D. $\frac{73}{16}$

Answer: A

Sol: Given:

The ratio of the two numbers is 5 : 3

The product of their LCM and HCF is 135

Formula Used:

LCM × HCF = Product of the numbers

Solution:

Let the two numbers be 5x and 3x

The product of the numbers:

$$(5x) \times (3x) = 135$$

$$15x^2 = 135$$

$$x^2 = \frac{135}{15} = 9$$

$$x = 3$$

The two numbers are 5x = 15 and 3x = 9

The HCF of 15 and 9 is 3, and the LCM of 15 and 9 is 45

The sum of the reciprocals of the LCM and HCF:

$$= \frac{1}{\text{LCM}} + \frac{1}{\text{HCF}}$$

$$= \frac{1}{45} + \frac{1}{3}$$

$$= \frac{1}{45} + \frac{15}{45}$$

$$= \frac{16}{45}$$

Thus, the sum of the reciprocals of the LCM and HCF = $\frac{16}{45}$

Q.33 Seven boxes A, B, C, D, P, Q and R are kept one over the other but not necessarily in the same order. Only four boxes are kept between R and B. Only Q is kept above R. Only two boxes are kept between A and P. D is kept immediately above C. P is not kept immediately above D. Which box is kept fourth from the top?

- A. C
- B. D
- C. A

D. Q

Answer: B

Sol: Given:

- Seven boxes A, B, C, D, P, Q and R are kept one over the other but not necessarily in the same order.
- Only four boxes are kept between R and B.
- Only Q is kept above R.
- Only two boxes are kept between A and P.
- D is kept immediately above C.
- P is not kept immediately above D.

From the given information arrangement will be.

OrderBoxes

7 Q

6 R

5 A

4 D

3 C

2 P

1 B

So, **D** box is kept fourth from the top.
Thus, correct option is (b).

Q.34 If each vowel in the word DREAMS is changed to the letter following it in the English alphabetical order and each consonant is changed to the letter following it in the English alphabetical order and the set of letters thus arrived are then rearranged in English alphabetical order, then which of the following letters will be fourth from the right in the group of letters thus formed?

- A. F
- B. N
- C. E
- D. S

Answer: A

Sol: Given: DREAMS

1	2	3	4	5	6	7	8	9	10	11	12	13
A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N
26	25	24	23	22	21	20	19	18	17	16	15	14

Logic: Change each vowel and consonant to the letter following it in the English alphabetical order.

D (consonant) → **E**

R (consonant) → **S**

E (vowel) → **F**

A (vowel) → **B**

M (consonant) → **N**

S (consonant) → **T**

We have the letters: **E, S, F, B, N, T**

When we arrange them alphabetically: **B, E, F, N, S, T**

The letters in alphabetical order are: **B, E, F, N, S, T**

Fourth letter from the **right** is **F**

Thus, the correct option is: **(A) F**

Q.35 The average weight of 14 boys in a class is 40.25 kg and that of the remaining 4 boys is 38 kg. Find the average weight (in kg, rounded off to two decimal place) of all the boys in the class.

- A. 41.75
- B. 40.75
- C. 39.75
- D. 38.75

Answer: C

Sol:

Given:

Number of boys = 14, Average weight = 40.25kg

Remaining boys = 4, Average weight = 38kg

Concept Used:

Average

Formula Used:

$$\text{Average} = \frac{\text{Total weight}}{\text{Total number of observations}}$$

Solution:

Total weight of 14 boys = $14 \times 40.25 = 563.5\text{kg}$

Total weight of 4 boys = $4 \times 38 = 152\text{kg}$

Total weight of all boys = $563.5 + 152 = 715.5\text{kg}$

Total number of boys = $14 + 4 = 18$

Average weight = $\frac{715.5}{18} = 39.75\text{kg}$

Final Answer:

39.75kg

Q.36 If $\cot A = \sqrt{5}$, then find the value of $\frac{\operatorname{cosec}^2 A - \sec^2 A}{\operatorname{cosec}^2 A + \sec^2 A}$.

- A. $\frac{\sqrt{5} + 1}{\sqrt{5} - 1}$
- B. $\frac{2}{3}$
- C. $\frac{\sqrt{5} - 1}{\sqrt{5} + 1}$
- D. $\frac{3}{2}$

Answer: B

Sol: Given

$$\cot A = \sqrt{5}$$

Formula Used

$$\operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$\sec^2 A = 1 + \tan^2 A$$

Solution

$$\cot^2 A = 5$$

$$\operatorname{cosec}^2 A = 1 + 5 = 6$$

$$\tan A = \frac{1}{\sqrt{5}}$$

$$\tan^2 A = \frac{1}{5}$$

$$\sec^2 A = 1 + \frac{1}{5} = \frac{6}{5}$$

$$\frac{\operatorname{cosec}^2 A - \sec^2 A}{\operatorname{cosec}^2 A + \sec^2 A} = \frac{6 - \frac{6}{5}}{6 + \frac{6}{5}} = \frac{24}{36} = \frac{2}{3}$$

Final Answer

$$\frac{2}{3}$$

Q.37 Five people, A, B, C, D and E are sitting in a row, facing north. D sits at the extreme left end of the line. E sits third to the right of A. B sits to the immediate right of A. How many people sit(s) between D and E?

- A. 1
- B. 2
- C. 3
- D. 0

Answer: C

Sol: Given:

Five people, A, B, C, D and E are sitting in a row, facing north.

D sits at the extreme left end of the line.

E sits third to the right of A.

B sits to the immediate right of A.

From the given information seating arrangement will be.



So, **3** people sit(s) between D and E.

Thus, correct option is (c).

Q.38 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

1. All cars are buildings.
2. All buildings are papers.

Conclusion:

- I. Some buildings are cars.
- II. All cars are papers.

- A. Neither conclusion (I) nor (II) follows.
- B. Only conclusion (II) follows.
- C. Only conclusion (I) follows.
- D. Both conclusions (I) and (II) follow.

Answer: D

Sol: Statements:

1. All cars are buildings.
2. All buildings are papers.

From the given statements possible Venn diagram will be.



Conclusion:

- I. Some buildings are cars. (**True**, all cars are buildings, so that means some building are cars).
- II. All cars are papers. (**True**, all cars are buildings and all buildings are papers, so that means all cars are papers).

So, **Both conclusions (I) and (II) follow.**

Thus, correct option is (d).

Q.39 If $96 : y :: y : 6$, find the positive value of y .

- A. 30
- B. 17
- C. 24
- D. 27

Answer: C

Sol: Given:

$$96 : y :: y : 6$$

This means:

$$\frac{96}{y} = \frac{y}{6}$$

Solution:

$$\frac{96}{y} = \frac{y}{6}$$

$$96 \times 6 = y^2$$

$$576 = y^2$$

$$y = \sqrt{576} = 24$$

Q.40 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. Some paddy are rice.
2. Some rice are wheat.

Conclusions:

- I. Some paddy are wheat.
- II. All wheat are rice.

- A. Only conclusion (II) follows
- B. Neither conclusion (I) nor (II) follows
- C. Both conclusions (I) and (II) follow
- D. Only conclusion (I) follows

Answer: B

Sol: Statements:

1. Some paddy are rice.
2. Some rice are wheat.

From the given statements possible Venn diagram will be.



Conclusions:

- I. Some paddy are wheat. (**False**, there is no relation between paddy and wheat).
- II. All wheat are rice. (**False**, some rice are wheat).

So, **Neither conclusion (I) nor (II) follows.**

Thus, correct option is (b).

Q.41 EQ 9 is related to HL -4 in a certain way. In the same way, MR 13 is related to PM 0. To which of the following is MU 19 related, following the same logic?

- A. KP 7

- B. RE 2
- C. YT 5
- D. PP 6

Answer: D

Sol: Given: EQ 9 is related to HL -4 and MR 13 is related to PM 0 with same logic.

1	2	3	4	5	6	7	8	9	10	11	12	13
A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N
26	25	24	23	22	21	20	19	18	17	16	15	14

Logic: 1st letter + 3, 2nd letter - 5 and number is decreasing - 13 place.

For, EQ 9 = HL -4

E + 3 = H, Q - 5 = L, 9 - 13 = - 4

For, MR 13 = PM 0

M + 3 = P, R - 5 = M, 13 - 13 = 0

Similarly,

MU 19 = ?

M + 3 = P, U - 5 = P, 19 - 13 = 6

So, MU 19 is related to **PP 6**.

Thus, correct option is (d).

Q.42 A hollow spherical shell is made of a metal of density 7 g/cm³. Its internal and external radii are 1 cm and 2 cm, respectively. What is the weight (in grams) of the shell?

(Use $\pi = 22/7$, and round off your answer to the nearest gram.)

- A. 273
- B. 205
- C. 221
- D. 214

Answer: B

Sol: Given :

Density of metal = 7 g/cm³

Internal radius (r) = 1 cm

External radius (R) = 2 cm

$$\pi = \frac{22}{7}$$

Formula Used :

Volume of hollow sphere

$$= \frac{4}{3}\pi(R^3 - r^3)$$

Weight (mass)

= Volume \times Density

Solution :

$$R^3 - r^3 = 2^3 - 1^3 = 8 - 1 = 7$$

$$\text{Volume} = \frac{4}{3} \times \frac{22}{7} \times 7$$

$$= \frac{4}{3} \times 22 = \frac{88}{3} \text{ cm}^3$$

Weight of shell:

$$= \frac{88}{3} \times 7 = \frac{616}{3} = 205.33 \text{ g}$$

Rounded to nearest gram:

205 g

Q.43 Dr. B.R. Ambedkar founded which of the following political parties in 1936?

- A. Bahujan Samaj Party
- B. Independent Labour Party
- C. Republican Party of India
- D. Scheduled Castes Federation

Answer: B

Sol: The correct answer is (b) Independent Labour Party

Explanation:

- **Foundation:** Dr. B.R. Ambedkar founded the **Independent Labour Party (ILP)** in **August 1936**.
- **Objective:** The party was formed to represent the interests of the **working class** and the depressed classes, aiming to contest the 1937 provincial elections.
- **Performance:** The ILP achieved significant success in the **1937 Bombay election**, winning 15 out of the 17 seats it contested.
- **Evolution:** In 1942, Dr. Ambedkar dissolved the ILP and formed the **Scheduled Castes Federation (SCF)** to focus more specifically on the rights of the marginalized communities.

Information Booster:

- **Republican Party of India (RPI):** Dr. Ambedkar conceptualized the RPI, but it was formally established on **3 October 1957**, after his death, by his followers.
- **First Law Minister:** Dr. Ambedkar served as independent India's **first Minister of Law and Justice** (1947–1951). He resigned in 1951 due to differences over the **Hindu Code Bill**.

Additional Knowledge:

- **Bahujan Samaj Party (a):** Founded by **Kanshi Ram** in 1984, inspired by the ideology of Ambedkar.
- **Scheduled Castes Federation (d):** Founded by Ambedkar in **1942** as a successor to the ILP; it later evolved into the Republican Party of India.

Q.44 If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '-', then what will come in place of the question mark (?) in the following equation?

$$11 \text{ B } 22 \text{ C } 288 \text{ A } 18 \text{ D } 50 = ?$$

- A. 202
- B. 220
- C. 208
- D. 212

Answer: C

Sol: Given: $11 \text{ B } 22 \text{ C } 288 \text{ A } 18 \text{ D } 50 = ?$

Given Letters ABCD

New Sign $\div \times + -$

Using **BODMAS** rule.

Operation preference wise	Symbol
Brackets	$[], , ()$
Orders, of	$(power), \sqrt{(root)}, of$
Division	\div
Multiplication	\times
Addition	$+$
Subtraction	$-$

New equation: $11 \times 22 + 288 \div 18 - 50 = ?$

$$11 \times 22 + 16 - 50 = ?$$

$$242 + 16 - 50 = ?$$

$$258 - 50 = ?$$

$$? = \mathbf{208}$$

Thus, correct option is (c).

Q.45 Bharat Rang Mahotsav 2026, organised by the National School of Drama, will be held during which period?

- A. 15 January – 10 February 2026
- B. 20 January – 15 February 2026
- C. 27 January – 20 February 2026
- D. 01 February – 28 February 2026

Answer: C

Sol: Correct Answer: (c) 27 January – 20 February 2026

Solution

- The 25th edition of **Bharat Rang Mahotsav (BRM) 2026**, organised by the National School of Drama (NSD), will be held from **27 January to 20 February 2026**.
- It is the world's largest international theatre festival.

Information Booster

- Locations: 40 cities/regions across India.
- Total productions: 277 (including Indian and international plays).
- First time representation from all seven continents.

Additional Knowledge

- Bharat Rang Mahotsav is organised annually by the National School of Drama.
- BRM 2026 includes inclusive performances by transgender communities, senior citizens, and other groups.
- Sub-festivals include Adirang Mahotsav, Jashne Bachpan, and Poorvottar Natya Samaroh.

Q.46 If $a^2 + b^2 = 179$ and $a \times b = 14$, then find $\frac{(a - b)}{(a + b)}$, where $a > b$.

- A. $\frac{411}{445}$
- B. $\sqrt{\frac{171}{217}}$
- C. $\sqrt{\frac{151}{207}}$
- D. $\frac{240}{281}$

Answer: C

Sol:

Given:

$$a^2 + b^2 = 179$$

$$ab = 14$$

$$a > b$$

Concept Used:

Algebraic identities

Formula Used:

$$(a - b)^2 = a^2 + b^2 - 2ab$$

$$(a + b)^2 = a^2 + b^2 + 2ab$$

Solution:

$$(a - b)^2 = 179 - 2(14)$$

$$= 179 - 28$$

$$= 151$$

$$(a + b)^2 = 179 + 28$$

$$= 207$$

$$\frac{a - b}{a + b} = \sqrt{\frac{151}{207}}$$

Final Answer:

$$\sqrt{\frac{151}{207}}$$

Q.47 Lucknow has become the first city in Uttar Pradesh to achieve which milestone in municipal solid waste management?

- A. 100% door-to-door waste collection
- B. 100% scientific processing of municipal solid waste
- C. Zero plastic waste city
- D. 100% waste-to-energy conversion

Answer: B

Sol: Correct Answer: (b) 100% scientific processing of municipal solid waste

Solution

- Lucknow commissioned its third waste processing plant at Shivari, enabling the city to scientifically process all fresh municipal solid waste.
- As a result, Lucknow became the first city in Uttar Pradesh to achieve **100% scientific processing of municipal solid waste** and earned the status of a “zero fresh waste dump” city.

Information Booster

- Processing capacity of Shivari plant: 700 metric tonnes per day.
- Total processing capacity: over 2,100 metric tonnes per day.
- Waste segregation: 55% organic and 45% inorganic.

Additional Knowledge

- Refuse Derived Fuel (RDF) is used in cement and paper industries.
- Source segregation exceeds 70%, and door-to-door collection efficiency is 96.53%.
- A 15 MW Waste-to-Energy plant is planned at Shivari under circular economy principles.

Q.48 Refer to the following number series and answer the question that follows (all numbers are single-digit numbers only). Counting to be done from left to right only.

(Left) 5 7 1 8 4 2 3 9 5 7 6 1 (Right)

How many even numbers are there which are immediately followed by odd numbers?

- A. More than three
- B. Three
- C. Two
- D. One

Answer: C

Sol: Given: (Left) 5 7 1 8 4 2 3 9 5 7 6 1 (Right)

Logic: Even numbers | Odd number

(Left) 5 7 1 8 4 2 3 9 5 7 6 1 (Right)

So, **two** even numbers are there which are immediately followed by odd numbers.

Thus, correct option is (c).

Q.49 The ISI mark is a certification related to:

- A. Agricultural products
- B. Industrial products
- C. Handicraft products
- D. Pharmaceutical products

Answer: B

Sol: The correct answer is **(B) Industrial products**

Explanation:

- The ISI mark is a standards-compliance mark for industrial products in India since 1955. The mark certifies that a product conforms to an Indian Standard (IS) developed by the Bureau of Indian Standards (BIS), the national standards body of India.
- The name 'ISI' comes from the Indian Standards Institution, which was the name of the body before it was replaced by the BIS in 1987.
- The ISI mark is mandatory for several products to be sold in India, particularly those affecting the health and safety of consumers, such as electrical appliances (switches, cables, heaters), LPG cylinders, cement, and automotive components.
- For other products, it is voluntary. If a manufacturer has the ISI mark on their product, it signifies that the product has undergone rigorous testing for quality and safety.
- The BIS carries out regular surveillance of the manufacturing process and tests samples from both the factory and the open market to ensure continued compliance.

Information Booster:

- AGMARK is the certification mark for agricultural products (like honey, ghee, spices) in India.
- FPO mark is a mandatory certification mark on all processed fruit products sold in India (like jams, fruit squashes).
- Hallmark is used for the certification of purity for gold and silver jewelry.

- Ecomark is a certification mark issued by the BIS to products conforming to a set of standards aimed at the least impact on the ecosystem.

Additional Knowledge:

- Agricultural products (Option A): Regulated by the Directorate of Marketing and Inspection through the AGMARK system.
- Pharmaceutical products (Option D): Regulated by the Central Drugs Standard Control Organisation (CDSCO) under the Drugs and Cosmetics Act.
- Handcrafted items (Option C): Often carry the 'Handloom Mark' or 'Silk Mark' to certify authenticity.

Q.50 Which encoding scheme can represent characters from almost all the languages of the world?

- A. American Standard Code for Information Interchange (ASCII)
- B. Unicode
- C. Indian Script Code for Information Interchange (ISCI)
- D. None of the above

Answer: B

Sol: The correct answer is (b) Unicode

Explanation:

- Unicode is an international standard that provides a unique number for every character, regardless of the platform, program, or language.
- It was developed to overcome the limitations of traditional encoding schemes that were language-specific.
- It supports over 140,000 characters, including emojis and ancient scripts.
- The most common implementations are UTF-8, UTF-16, and UTF-32.
- UTF-8 is the dominant encoding for the World Wide Web.

Information Booster:

- Before Unicode, different systems used conflicting encoding standards, often leading to data corruption (mojibake) when transferring text.
- Unicode is maintained by the Unicode Consortium.

Additional Knowledge:

ASCII (Option a)

- Represents only 128 characters (English letters, digits, and basic punctuation).
- Uses 7 bits per character.

ISCI (Option c)

- A coding system for representing various writing systems of India.
- It is an 8-bit code designed to handle Indian scripts like Devanagari, Bengali, etc.

So the correct answer is (b)

Q.51 Which of the following was the main thrust under India's 1991 New Industrial Policy?

- A. Entrench public-sector monopolies
- B. Limit private enterprise
- C. Raise import tariffs
- D. Boost efficiency by fostering competition

Answer: D

Sol: The correct answer is (d) Boost efficiency by fostering competition

Explanation:

- The New Industrial Policy (1991) was launched to steer the Indian economy toward liberalization and global integration.
- Its main thrust was to boost efficiency by reducing government interference, ending the "License Raj," and fostering healthy competition between public and private players.
- It aimed to make Indian industry more competitive globally by allowing foreign investment and technology.

Information Booster:

- Liberalization: Abolished industrial licensing for most industries.
- Privatization: Reduced the number of industries reserved for the public sector from 17 to 8 (and eventually even fewer).
- Globalisation: Encouraged Foreign Direct Investment (FDI) and reduced import tariffs to facilitate trade.

Additional Knowledge:

- The policy was introduced during a severe Balance of Payments (BoP) crisis.
- It marked a shift from a "command and control" economy to a "market-oriented" economy.

Q.52 60 people are standing in a row facing north. Mayank is 13th from the right end while Kishan is 18th from the left end. How many people are there between Mayank and Kishan?

- A. 28
- B. 27
- C. 29
- D. 30

Answer: C

Sol: Given:

60 people are standing in a row facing north.

Mayank is 13th from the right end while Kishan is 18th from the left end.

Solution:

Total people = 60

Mayank is 13th from the right.

Convert his position from the left:

Position from left = $60 - 13 + 1 = 48$

So, Mayank is 48th from the left.

Kishan is 18th from the left.

Now find number of people between them:

$48 - 18 - 1 = 29$

So, **29** people are there between Mayank and Kishan.

Thus, correct option is (c).

Q.53 Ishaan and Meghna have to travel from Delhi to Kanpur in their respective cars. Ishaan is driving at 77 km/hr while Meghna is driving at 33 km/hr. Find the time taken by Meghna to reach Kanpur if Ishaan takes 12 hours.

- A. 28 hours
- B. 34 hours
- C. 33 hours
- D. 29 hours

Answer: A

Sol: Given:

Ishaan's speed = 77 km/h

Meghna's speed = 33 km/h

Ishaan's time = 12 hours

Required: Time taken by Meghna to reach Kanpur

Formula Used:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Solution:

Distance = $77 \times 12 = 924$ km

$$\text{Time of Meghna} = \frac{924}{33} = 28 \text{ hours}$$

Thus, Meghna will take 28 hours to reach Kanpur

Q.54 In a certain code language, 'virus book two' is coded as 'zv jo db' and 'book wet theme' is coded as 'xh im jo'. How is 'book' coded in that language?

- A. xh
- B. jo
- C. db
- D. zv

Answer: B

Sol: Given:

In a certain code language, 'virus book two' is coded as 'zv jo db' and 'book wet theme' is coded as 'xh im jo'.

virus **book** two = zv **jo** db

book wet theme = xh im **jo**

So, the code of 'book' is 'jo'.
Thus, correct option is (b).

Q.55 If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark (?) in the following equation?

$$21 B 16 C 20 D 26 A 2 = ?$$

- A. 341
- B. 342
- C. 343
- D. 340

Answer: C

Sol: Given: 21 B 16 C 20 D 26 A 2 = ?

Given Letter ABCD

New Sign ÷ × + -

Using **BODMAS** rule.

Operation preference wise	Symbol
Brackets	[], ()
Orders, of	(power), √(root), of
Division	÷
Multiplication	×
Addition	+
Subtraction	-

New equation: $21 \times 16 + 20 - 26 \div 2 = ?$

$$21 \times 16 + 20 - 13 = ?$$

$$336 + 20 - 13 = ?$$

$$356 - 13 = ?$$

$$? = 343$$

Thus, correct option is (c).

Q.56 Raman ranked 31st from the top and 12th from the bottom in his class. How many students are there in his class?

- A. 41
- B. 42
- C. 40
- D. 43

Answer: B

Sol: Given: Raman ranked 31st from the top and 12th from the bottom in his class.

Solution:

$$\text{Total students} = \text{Rank from top} + \text{Rank from bottom} - 1$$

$$= 31 + 12 - 1$$

$$= 42$$

So, **42** students are there in his class.

Thus, correct option is (b).

Q.57 Which of the following statements about money is INCORRECT?

- A. Rising price levels cannot erode the purchasing power of money.
- B. Money can act as a store of value.

- C. Money acts as a medium of exchange.
- D. The value of all goods and services can be expressed in monetary units.

Answer: A

Sol: The correct answer is (a) Rising price levels cannot erode the purchasing power of money.

Explanation:

- This statement is incorrect because Inflation (rising price levels) specifically erodes the purchasing power of money.
- As prices rise, the amount of goods or services that one unit of money can buy decreases.

Information Booster:

- Medium of Exchange: Money is used to facilitate transactions, avoiding the problems of the barter system.
- Store of Value: Money can be kept and used in the future without losing its primary utility (unless inflation is high).
- Unit of Account: Money provides a common measure for the value of goods and services.

Additional Knowledge:

- Fiat Money: Currency that a government has declared to be legal tender, but is not backed by a physical commodity.

Q.58 What is the median of the following data?

74, 85, 67, 27, 47, 16, 41, 32, 98, 38, 88

- A. 46.5
- B. 47
- C. 47.5
- D. 48

Answer: B

Sol: Given:

The data values are 74, 85, 67, 27, 47, 16, 41, 32, 98, 38, 88

Concept Used:

Median is the middle value of the arranged data in ascending order.

Formula Used:

For odd number of observations,

$$\text{Median} = \text{value of } \left(\frac{n+1}{2}\right)^{\text{th}} \text{ term}$$

Solution:

Arrange the data in ascending order:

16, 27, 32, 38, 41, 47, 67, 74, 85, 88, 98

$$n = 11$$

$$\frac{n+1}{2} = \frac{12}{2} = 6$$

Median is the 6th term

Median = 47

Final Answer:

47

Q.59 _____ is the oldest Cricket Stadium in India, which is situated in (ii) _____.

- A. (i) Brabourne Stadium (ii) Mumbai
- B. (i) Ferozeshah Kotla (ii) Delhi
- C. (i) Eden Gardens (ii) Kolkata
- D. (i) Wankhede Stadium (ii) Mumbai

Answer: C

Sol: The correct answer is (c) (i) Eden Gardens (ii) Kolkata

Explanation:

- Eden Gardens was established in 1864 in Kolkata and is the oldest and one of the largest cricket stadiums in India.

Information Booster:

- It is often referred to as "Cricket's answer to the Colosseum".
- Narendra Modi Stadium (Ahmedabad) is currently the largest cricket stadium in the world.

Additional Knowledge:

- Ferozeshah Kotla – Renamed as Arun Jaitley Stadium.
- Wankhede – Home of the BCCI headquarters.

Q.60 What is the main benefit of using functions in programming?

- A. Reduces readability
- B. Increases code length
- C. Increases code reusability
- D. Reduces the need for debugging

Answer: C

Sol: The correct answer is (c) Increases code reusability

Explanation:

- Functions allow a programmer to group a sequence of statements into a unit that can be called multiple times throughout a program.
- Instead of rewriting the same logic, you just call the function, which significantly increases code reusability.
- This also makes the program more modular and easier to maintain.
- Functions help in breaking down complex problems into smaller, manageable sub-tasks.
- They improve readability by providing descriptive names for blocks of code.

Information Booster:

- The DRY (Don't Repeat Yourself) principle is a core philosophy in software engineering that relies heavily on functions.
- Functions can take inputs (parameters) and return outputs (return values).

Additional Knowledge:

Reduces readability (Option a)

- Incorrect; functions actually enhance readability by organizing code.

Increases code length (Option b)

- Incorrect; functions usually reduce the overall length of the code by eliminating duplication.

Reduces the need for debugging (Option d)

- While functions make debugging easier by isolating logic, they do not eliminate the need for it entirely.

So the correct answer is (c)

Q.61 What was the main feature of the Gandhi-Irwin Pact (1931)?

- A. Acceptance of Pakistan's demand
- B. Suspension of Civil Disobedience and release of political prisoners
- C. Agreement on Dominion Status
- D. End of the Non-Cooperation Movement

Answer: B

Sol: The correct answer is (b) Suspension of Civil Disobedience and release of political prisoners

Explanation:

- The Gandhi-Irwin Pact was signed on March 5, 1931.
- Key features included:
 1. The INC agreed to suspend the Civil Disobedience Movement.
 2. The INC agreed to participate in the Second Round Table Conference.
 3. The British government agreed to release political prisoners (except those involved in violence).
 4. Permission was given to collect salt for personal consumption.

Information Booster:

- The pact was seen as a strategic retreat by some but a significant recognition of the INC as an equal partner in negotiations.

Additional Knowledge:

- Gandhi attended the Second Round Table Conference in London but returned disappointed as no concrete results were achieved.

Q.62 The amount on a sum of ₹9,400 at 20% per annum compound interest, compounded annually, in 2 years will be:

- A. ₹12,838
- B. ₹13,536
- C. ₹13,189
- D. ₹14,133

Answer: B

Sol: Given:

P = ₹9400, R = 20%, T = 2 years

Formula Used:

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

Solution:

$$A = 9400 \left(1 + \frac{20}{100} \right)^2 = 9400(1.2)^2$$

$$A = 9400 \times 1.44 = \mathbf{13536}$$

So the correct answer is (b).

Q.63 Seven boxes, B, D, E, P, S, T and W, are kept one over the other but not necessarily in the same order. Only two boxes are kept below B. Only one box is kept above W. Only one box is kept between W and E. T is kept immediately above S. P is kept at some place below D. How many boxes are kept between D and T?

- A. One
- B. Three
- C. Two
- D. Four

Answer: D

Sol: Given:

Seven boxes, B, D, E, P, S, T and W, are kept one over the other but not necessarily in the same order.

Only two boxes are kept below B.

Only one box is kept above W.

Only one box is kept between W and E.

T is kept immediately above S.

P is kept at some place below D.

From the given information arrangement will be.

OrderBoxes

7 D

6 W

5 P

4 E

3 B

2 T

1 S

So, **four** boxes are kept between D and T.

Thus, correct option is (d).

Q.64 Evaluate: $16 + 12 \div 6 - 2 \times 3$

- A. 12
- B. 14
- C. 15
- D. 11

Answer: A

Sol: Given

$$\text{Expression} = 16 + 12 \div 6 - 2 \times 3$$

Solution

$$16 + 12 \div 6 - 2 \times 3$$

$$\Rightarrow 16 + 2 - 2 \times 3$$

$$\Rightarrow 16 + 2 - 2 \times 3$$

$$\Rightarrow 16 + 2 - 6$$

$$\Rightarrow 18 - 6$$

$$\Rightarrow 12$$

Final Answer

So the correct answer is (a)

Q.65 From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 55^\circ$, find $\angle AOB$.

- A. 125°
- B. 35°
- C. 110°
- D. 100°

Answer: C

Sol: Given:

PA and PB are tangents to the circle from an external point P.

O is the center of the circle.

$$\angle PAB = 55^\circ.$$

Concept Used:

Tangents from an external point are equal in length, i.e., $PA=PB$.

The line joining the center to the point of tangency is perpendicular to the tangent, i.e., $OA \perp PA$ and $OB \perp PB$.

Quadrilateral OAPB is cyclic, meaning the sum of opposite angles is 180° .

Exterior angle property of cyclic quadrilateral:

$$\angle AOB = 2\angle PAB$$

Solution:

Using the exterior angle theorem:

$$\begin{aligned} \angle AOB &= 2 \times \angle PAB \\ &= 2 \times 55^\circ \\ &= 110^\circ \end{aligned}$$

Option (c) is right.

Q.66 The proposed Alwar Biological Park in Rajasthan will house wildlife belonging to how many species?

- A. 50 species
- B. 65 species
- C. 100 species
- D. 81 species

Answer: D

Sol: Correct Answer: (d) 81 species

Solution

- The Alwar Biological Park is planned to house more than **400 animals belonging to 81 wildlife species.**
- The project aims to strengthen wildlife conservation and boost tourism in Rajasthan.

Information Booster

- Location: Kati Ghati–Jaisamand area, Alwar district, Rajasthan.
- Area: About 100 hectares (30% zoo, 70% green space).
- Features: Lion, tiger, and herbivore safaris, butterfly park, rescue centre, and veterinary hospital.

Additional Knowledge

- The park will be the first biological park of its kind in the NCR region.
- High-tech animal rescue centre will be developed on the model of Gir National Park.
- Animals will be brought from zoos across India after approval from the Union Ministry of Environment, Forest and Climate Change.

Q.67 As per the Ministry of Power, India's non-fossil fuel energy capacity target by 2030 is ____ GW.

- A. 300
- B. 400
- C. 500
- D. 600

Answer: C

Sol: The correct answer is **(C) 500**

Explanation:

- India has committed to achieving 500 GW of non-fossil fuel-based energy capacity by the year 2030.
- This target was a key part of the 'Panchamrit' (five nectar elements) pledges made by the Prime Minister at COP26 in Glasgow.
- Non-fossil fuel sources include solar, wind, hydropower, biomass, and nuclear energy.
- The aim is to meet 50% of India's energy requirements from renewable energy by 2030.
- This initiative is part of India's larger goal to reach Net Zero carbon emissions by 2070.

Information Booster:

- India currently ranks 4th globally in installed Renewable Energy capacity.
- The National Green Hydrogen Mission is another flagship project intended to support this transition to clean energy.
- Solar energy contributes the largest share to India's renewable energy mix, followed by wind and large hydro projects.

Additional Knowledge:**300 GW (Option A):**

- While a significant milestone, India passed the 150 GW mark recently and is aiming much higher than 300 for the 2030 deadline.

400 GW (Option B):

- This represents an intermediate milestone, but the formal international commitment is specifically set at 500 GW.

600 GW (Option D):

- Some optimistic projections suggest India might exceed its targets, but the official policy target remains 500 GW.

Q.68 From a taxi stand, two cabs start at a speed of 57 km/hr at an interval of 12 minutes, both cabs travelling in the same direction. A man coming in the opposite direction towards the taxi stand meets the cabs at an interval of 10 minutes. Find the speed (in km/hr) of the man.

- A. 9.5
- B. 12.7
- C. 7.9
- D. 11.4

Answer: D

Sol: Given:

Speed of each cab = 57 km/hr

Time interval between cabs = 12 min = $12/60 = 0.2$ hr

Man meets the cabs at an interval of 10 min = $10/60 = 1/6$ hr

Formula Used:

Relative speed concept (since man moves in opposite direction):

$$\frac{\text{Distance between cabs}}{\text{Relative speed w.r.t. man}} = \text{Time interval of meeting}$$

Distance between cabs = Speed of cab × Time interval between departures.

Solution:

$$\text{Distance between cabs} = 57 \times 0.2 = 11.4 \text{ km}$$

Let speed of man = x km/hr

Relative speed = (57 + x) km/hr

$$\frac{11.4}{57 + x} = \frac{1}{6}$$

$$57 + x = 11.4 \times 6 = 68.4$$

$$x = 68.4 - 57 = 11.4$$

Speed of the man = 11.4 km/hr

Q.69 The successive discounts of 24%, 18% and 20% are equivalent to a single discount of:
(Rounded up to two decimal places.)

- A. 51.51%
- B. 52.84%
- C. 49.27%
- D. 50.14%

Answer: D

Sol: Given:

Successive discounts = 24%, 18%, and 20%

Find the single equivalent discount (rounded to two decimal places)

Concept Used:

Successive Discount Formula

$$\text{Equivalent discount} = (1 - (1 - d_1)(1 - d_2)(1 - d_3))$$

Formula Used:

$$\text{Net Price Factor} = \left(1 - \frac{24}{100}\right)\left(1 - \frac{18}{100}\right)\left(1 - \frac{20}{100}\right)$$

$$\text{Equivalent Discount} = 1 - \text{Net Price Factor}$$

Solution:

$$\text{Remaining price after 24\% discount} = 0.76$$

$$\text{Remaining price after 18\% discount} = 0.82$$

$$\text{Remaining price after 20\% discount} = 0.80$$

$$\text{Net Price Factor} = 0.76 \times 0.82 \times 0.80$$

$$= 0.49856$$

Equivalent Discount:

$$= 1 - 0.49856$$

$$= 0.50144$$

$$= 50.14\%$$

Equivalent Discount = 50.14%

Alternate Solution:

Using exam trick:

$$\text{Net Discount} = 24 + 18 + 20$$

$$= 62\%$$

$$\frac{24 \times 18}{100}$$

$$\frac{(24 + 18 - \frac{24 \times 18}{100}) \times 20}{100}$$

First two discounts:

$$= 24 + 18 - \frac{432}{100}$$

$$= 42 - 4.32 = 37.68\%$$

Now apply 20%:

$$= 37.68 + 20 - \frac{37.68 \times 20}{100}$$

$$= 57.68 - 7.536$$

$$= 50.144\% \approx 50.14\%$$

$$= 50.14\%$$

Q.70 _____ is defined as the structure of a website and its pages: how the site and the site navigations are organized.

- A. Wireframes
- B. Mock-up
- C. Information architecture
- D. User experience

Answer: C

Sol: The correct answer is (C) Information architecture

Explanation:

- **Information Architecture (IA)** is the practice of deciding how to arrange the parts of something to be understandable; in web design, it refers specifically to the structural design of shared information environments.
- It focuses on organizing, structuring, and labeling content in an effective and sustainable way to help users find information and complete tasks.
- The goal of IA is to create a site map and navigation system that reflects the user's mental model rather than the internal organizational structure.
- It involves the creation of hierarchies, categories, and metadata that define the relationships between different pieces of content.
- Good IA is the foundation of a usable website, ensuring that users don't get lost or frustrated while navigating through various pages.

Information Booster:

- The three main components of Information Architecture are often referred to as the "**3 Cs**": Context (business goals), Content (data/functionality), and Users (audience needs).
- Common tools used by IA specialists include **card sorting** (to understand how users group information) and **tree testing** (to validate if a hierarchy works).

Additional Knowledge:

Wireframes (Option A)

- A wireframe is a **low-fidelity visual guide** that represents the skeletal framework of a single webpage.
- While it uses the IA as a guide, it focuses more on the layout of individual elements like buttons and images rather than the overall site structure.

Mock-up (Option B)

- A mock-up is a **static, high-fidelity visual design** draft of a website or application.
- It represents the final look of the site, including color schemes, typography, and branding, but it is not functional or primarily about organization.

User experience (Option D)

- **User Experience (UX)** is a broad umbrella term that encompasses all aspects of a person's interaction with a company, its services, and its products.
- While IA is a crucial subset of UX, UX also includes interaction design, visual design, and user research.

Q.71 Which one of the following rivers originates from Germany and drains into the Black Sea?

- Rhine River
- Danube River
- Elbe River
- Volga River

Answer: B

Sol: The correct answer is **(B) Danube River**

Explanation:

- The Danube is Europe's second-longest river (after the Volga).
- It originates in the **Black Forest** mountains of **Germany**.
- It flows through or borders 10 countries (Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova, and Ukraine) before emptying into the **Black Sea**.

Information Booster:

- **Capital Cities:** The Danube flows through four national capitals: Vienna (Austria), Bratislava (Slovakia), Budapest (Hungary), and Belgrade (Serbia).
- **Danube Delta:** Located mostly in Romania, it is a UNESCO World Heritage site.

Additional Knowledge:

- **Rhine River (Option A):** Originates in the Swiss Alps and flows into the North Sea.
- **Elbe River (Option C):** Originates in the Czech Republic and flows through Germany into the North Sea.
- **Volga River (Option D):** The longest river in Europe; it is entirely in Russia and drains into the Caspian Sea.

Q.72 Seven boxes B, C, D, I, J, K and L are kept one over the other but not necessarily in the same order. Only I is kept above C. Only L is kept between C and J. Only K is kept below D. How many boxes are kept between B and I?

- Two
- Four
- One
- Three

Answer: D

Sol: Given:

- Seven boxes B, C, D, I, J, K and L are kept one over the other but not necessarily in the same order.
- Only I is kept above C.
- Only L is kept between C and J.
- Only K is kept below D.

From the given information arrangement will be.

OrderBoxes

7 I

6 C

5 L

4 J

3 B

2 D

1 K

So, **three** boxes are kept between B and I.
Thus, correct option is (d).

Q.73 A ____ is a record of information that most servers collect by default and is often accessible from the hosting company or Internet Service Provider (ISP) for the site.

- A. Cascaded Style Sheet
- B. Server Log
- C. Boot Record
- D. Root File System

Answer: B

Sol: The correct answer is (b) Server Log

Explanation:

- A Server Log is a file that automatically records activities and transactions performed on a web server.
- These logs typically include details like the IP address of the visitor, timestamps, HTTP status codes, and requested URLs.
- Most hosting companies provide access to these logs to help web administrators analyze traffic and errors.
- They are essential for technical troubleshooting, security auditing, and monitoring site performance.
- Server logs are generally stored in plain text and collected by default without requiring any special configuration.

Information Booster:

- Log analysis tools can convert raw server log data into readable traffic reports.
- Error logs specifically record issues encountered by the server when fulfilling requests.

Additional Knowledge:

Cascaded Style Sheet (Option a)

- A file used to define the visual layout and styling of web pages.

Boot Record (Option c)

- A section of a storage device that contains code for booting the operating system.

Root File System (Option d)

- The top-level directory in a file system hierarchy.

So the correct answer is (b)

Q.74 The external length, breadth and depth of a cuboidal iron storage space are 4 m, 3.6 m, and 1.5 m, respectively. It is open at the top. What is the cost (in Rs.) of painting its outer surface at the rate of Rs.55 per ?

- A. 1,991
- B. 2,046
- C. 1,936
- D. 2,838

Answer: B

Sol: Given:

Length (l) = 4 m

Breadth (b) = 3.6 m

Depth (h) = 1.5 m

Cost of painting = Rs. 55 per square meter

Solution:

Total Surface Area = Bottom Area + Lateral Surface Area

Bottom Area = $l \times b$

Lateral Surface Area = $2(h \times l) + 2(h \times b)$

Total Painting Cost = Total Surface Area \times Cost per m^2

Solution:

Bottom Area =

$$4 \times 3.6 = 14.4 \text{ m}^2$$

Lateral Surface Area

$$2(1.5 \times 4) + 2(1.5 \times 3.6)$$

$$= 2(6) + 2(5.4)$$

$$= 12 + 10.8$$

$$= 22.8 \text{ m}$$

Box is open, So;

Total Surface Area to be Painted

$$= 14.4 + 22.8 = 37.2 \text{ m}^2$$

Total Cost ;

$$= 37.2 \times 55 = \text{₹}2046$$

Q.75 Mr. Sharma, Mr. Gupta and Ms. Sinha invested ₹4,000, ₹8,000 and ₹6,000, respectively, in a business. Mr. Sharma left the business after 6 months. If after 8 months, there was a gain of ₹34,000, then what will be the share of Mr. Gupta?

- A. ₹12,000
- B. ₹20,000
- C. ₹16,000

D. ₹14,000

Answer: C

Sol: Given

Investments: Sharma = ₹4,000, Gupta = ₹8,000, Sinha = ₹6,000

Time Period: Sharma = 6 months, Gupta = 8 months, Sinha = 8 months

Total Gain = ₹34,000

Formula Used

Ratio of Profit = Ratio of (Investment × Time)

Solution

Ratio of shares (Sharma : Gupta : Sinha) = $(4000 \times 6) : (8000 \times 8) : (6000 \times 8) = 24000 : 64000 : 48000$

Divide by 8000:

Ratio of shares (Sharma : Gupta : Sinha) = 3 : 8 : 6

Total units = 3 + 8 + 6 = 17 units

17 units = ₹34,000

1 unit = $\frac{34000}{17} = ₹2,000$

Share of Mr. Gupta = 8 units = $8 \times 2000 = ₹16,000$

Final Answer

So the correct answer is (c)

Q.76 Which of the following is an example of self-employment?

- A. A farmer growing crops on their own land
- B. A doctor employed in a hospital
- C. A teacher working in a school
- D. A cashier working at a store

Answer: A

Sol: The correct answer is (a) A farmer growing crops on their own land

Explanation:

- Self-employment refers to a situation where an individual works for themselves rather than for an employer.
- A farmer owning and cultivating their own land is the primary owner and worker of that enterprise, bearing both the risk and the profit.

Information Booster:

- Regular Salaried Employees: Doctors, teachers, or cashiers working for an organization in exchange for a fixed salary.
- In India, a significant portion of the workforce (over 50%) is self-employed, particularly in agriculture and small businesses.

Additional Knowledge:

- Self-employed workers can be further categorized into "Own-account workers" and "Employers" (who hire others).

Q.77 Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 - Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(3, -2, 11)

(46,2107,9)

A. (34,1135,21)

B. (25,607,17)

C. (38,1433,10)

D. (33,1081,7)

Answer: A

Sol: Given:

(3, -2, 11)

(46,2107,9)

Logic: $(1st\ number)^2 - 3rd\ number = 2nd\ number$

For, (3, -2, 11)

$(9)^2 - 11 = 9 - 11 = -2$

For, (46,2107,9)

$(46)^2 - 9 = 2116 - 9 = 2107$

Now, we check each options.

Option (a): (34,1135,21)

$(34)^2 - 21 = 1156 - 21 = 1135$

Option (b): (25,607,17)

$(25)^2 - 17 = 625 - 17 \neq 607$

Option (c): (38,1433,10)

$(38)^2 - 10 = 1444 - 10 \neq 1433$

Option (d): $(33, 1081, 7)$

$(33)^2 - 7 = 1089 - 7 \neq 1081$

Thus, correct option is (a).

Q.78 If 'A' stands for '×', 'B' stands for '÷', 'C' stands for '-' and 'D' stands for '+', then what will come in place of question mark (?) in the following equation?

$27 \text{ B } 3 \text{ D } 5 \text{ A } 10 \text{ C } 12 \text{ D } 15 \text{ C } 27 = ?$

- A. 35
- B. 32
- C. 36
- D. 34

Answer: A

Sol: Given: $27 \text{ B } 3 \text{ D } 5 \text{ A } 10 \text{ C } 12 \text{ D } 15 \text{ C } 27 = ?$

Given Letters ABCD

New Sign $\times \div - +$

Using **BODMAS** rule.

Operation preference wise	Symbol
Brackets	$[], (), \{, \}$
Orders, of	$(power), \sqrt{(root)}, of$
Division	\div
Multiplication	\times
Addition	$+$
Subtraction	$-$

New equation: $27 \div 3 + 5 \times 10 - 12 + 15 - 27 = ?$

$9 + 5 \times 10 - 12 + 15 - 27 = ?$

$9 + 50 - 12 + 15 - 27 = ?$

$59 - 12 + 15 - 27 = ?$

$74 - 12 - 27 = ?$

$74 - 39 = ?$

$? = 35$

Thus, correct option is (a).

Q.79 Which classical music tradition did Ravi Shankar represent as a global ambassador?

- A. Hindustani classical music
- B. Carnatic classical music
- C. Both Hindustani and Carnatic music
- D. Sufi music

Answer: A

Sol: The correct answer is **(A) Hindustani classical music**

Explanation:

- Pandit Ravi Shankar was a maestro of the Sitar and a key figure in Hindustani classical music.
- He played a major role in popularizing Indian classical music in the West.

Information Booster:

- He was a disciple of Allauddin Khan (Maihar gharana) and collaborated with The Beatles.

Additional Knowledge:

- Carnatic Music (Option B): The classical music tradition of Southern India.

Q.80 In a certain code language, 'nail post fish' is coded as 'pl mg qn' and 'fish urn knife' is coded as 'ix pl ko'. How is 'fish' coded in the given language?

- A. qn

- B. ix
- C. mg
- D. pl

Answer: D

Sol: Given: In a certain code language, 'nail post fish' is coded as 'pl mg qn' and 'fish urn knife' is coded as 'ix pl ko'.

nail post **fish** = **pl** mg qn

fish urn knife = ix **pl** ko

So, the code of 'fish' is **pl**.
Thus, correct option is (d).

Q.81 If α and β are the roots of the quadratic equation $y^2 - 9y + 8 = 0$, then find the value of $\alpha + \beta - \alpha\beta$.

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

Answer: B

Sol: Given:

The quadratic equation is $y^2 - 9y + 8 = 0$.

Formula Used:

For any quadratic equation of the form $ay^2 + by + c = 0$, the sum and product of the roots are given by:

$$\alpha + \beta = -\frac{b}{a}$$

$$\alpha\beta = \frac{c}{a}$$

Solution:

Let α and β be the roots of the equation.

Here, $a = 1$, $b = -9$, and $c = 8$.

$$\alpha + \beta = -\frac{-9}{1} = 9$$

$$\alpha\beta = \frac{8}{1} = 8$$

Now,

$$\alpha + \beta - \alpha\beta = 9 - 8 = 1$$

Q.82 The Ramayana, composed by Rishi Valmiki, is also referred to as '___'.

- A. Mukhyakavya
- B. Paramkavya
- C. Pradhankavya
- D. Adikavya

Answer: D

Sol: The correct answer is (d) Adikavya

Explanation:

- The Ramayana is traditionally known as the 'Adikavya' (the first poem).
- Maharishi Valmiki is revered as the 'Adikavi' (the first poet) for composing this epic.

Information Booster:

- The epic consists of 24,000 verses divided into seven books called Kandas.
- The seven Kandas are: Bala Kanda, Ayodhya Kanda, Aranya Kanda, Kishkindha Kanda, Sundara Kanda, Yuddha Kanda, and Uttara Kanda.

Additional Knowledge:

- Ramcharitmanas is the Awadhi version of the story, written by Goswami Tulsidas in the 16th century.

Q.83 Who appoints the Governor of an Indian state?

- A. Prime Minister
- B. Chief Minister
- C. President of India
- D. Parliament

Answer: C

Sol: The correct answer is **(C) President of India**

Explanation:

- According to Article 155 of the Indian Constitution, the Governor of a State is appointed by the President by warrant under his hand and seal.
- The Governor is the constitutional head of the state and acts on the advice of the State Council of Ministers headed by the Chief Minister.
- The Governor holds office during the pleasure of the President (Article 156).
- The normal term of office for a Governor is five years.
- A Governor can be transferred from one state to another by the President.

Information Booster:

- To be appointed as a Governor, a person must be a citizen of India and have completed the age of 35 years.
- The Governor should not be a member of either House of Parliament or a House of the State Legislature.
- The 7th Constitutional Amendment Act of 1956 facilitated the appointment of the same person as a Governor for two or more states.

Additional Knowledge:

Prime Minister (Option A):

- The PM heads the Union Cabinet which advises the President on such appointments, but the formal appointment is made by the President.

Chief Minister (Option B):

- The CM is appointed by the Governor, not the other way around.

Parliament (Option D):

- Parliament makes laws regarding the administration, but it does not have the power to appoint Governors.

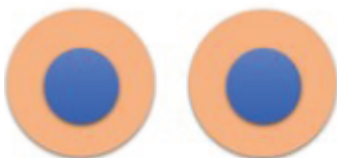
Q.84 Choose the figure that best represents the relationship among the classes given below.

Indoor games, Chess, Table tennis, Cricket

A.



B.



C.



D.



Answer: A

Sol:

Indoor Games are played within a closed environment and a number of them are played by sitting at one place. They include chess, card games, games played with gamesmen, dice, and carom, table tennis. Whereas Cricket is an outdoor game. Therefore, option (a) is correct.

Q.85 A, B, C, D, E, F and G are sitting around a circular table facing the centre. C sits third to the right of D . E sits second to the right of C . F is the immediate neighbour of B and C . G is not an immediate neighbour of D . How many people sit between A and G when counted from the left of G?

- A. Two
- B. Four
- C. Three
- D. One

Answer: B

Sol: Given:

A, B, C, D, E, F and G are sitting around a circular table facing the centre.

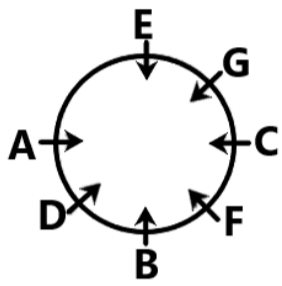
C sits third to the right of D.

E sits second to the right of C.

F is the immediate neighbour of B and C.

G is not an immediate neighbour of D.

From the given information seating arrangement will be.



So, **four** people sit between A and G when counted from the left of G.
Thus, correct option is (b).

Q.86 Seven people, A, B, C, D, E, F and G, are sitting in a row, facing north. Only two people sit to the right of F. Only three people sit between F and A. Both E and C are immediate neighbours of G. D sits immediately to the left of B. C is not an immediate neighbour of A. How many people sit between D and E?

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

Answer: B

Sol: Given:

Seven people, A, B, C, D, E, F and G, are sitting in a row, facing north.

Only two people sit to the right of F.

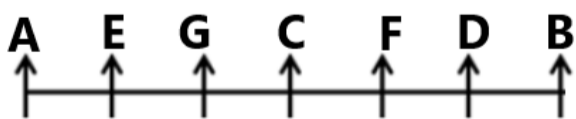
Only three people sit between F and A.

Both E and C are immediate neighbours of G.

D sits immediately to the left of B.

C is not an immediate neighbour of A.

From the given information seating arrangement will be.



So, **3** people sit between D and E.
Thus, correct option is (b).

Q.87 Vijay Hazare Trophy is associated with which of the following sport?

- A. Hockey
- B. Football
- C. Cricket
- D. Kabaddi

Answer: C

Sol: The correct answer is (c) Cricket

Explanation:

- The Vijay Hazare Trophy, also known as the Ranji One-Day Trophy, is an annual domestic limited-overs cricket competition in India.
- It is played between the state teams from the Ranji Trophy plates.
- It is named after the legendary Indian cricketer Vijay Hazare.

Information Booster:

- Other domestic cricket tournaments in India: Ranji Trophy (First-class), Syed Mushtaq Ali Trophy (T20), and Irani Cup.
- Tamil Nadu has won the most Vijay Hazare titles.

Additional Knowledge:

- Santosh Trophy: Football.
- Agha Khan Cup: Hockey.

Q.88 Karnataka-born environmentalist Kirtida Mekani, known as Singapore's "Tree Lady," was associated with which major environmental initiative that led to the planting of over 76,000 trees?

- Green India Mission
- Community in Bloom Programme
- Plant-A-Tree Programme
- National Afforestation Drive

Answer: C

Sol: Correct Answer: (c) Plant-A-Tree Programme

Solution

- Kirtida Mekani played a key role in the **Plant-A-Tree Programme**, launched in 2007 with Singapore's National Parks Board.
- The programme resulted in the planting of more than **76,000 trees**, making it one of Singapore's major citizen-led green initiatives.

Information Booster

- Kirtida Mekani died on 19 January 2026 at the age of 66 in Singapore.
- She was the first executive director of the Singapore Environment Council in 1993.
- Known as Singapore's "Tree Lady" for her environmental activism.

Additional Knowledge

- She received the President's Award for the Environment (Singapore) in 2015.
- Inducted into the Singapore Women's Hall of Fame in 2024.
- She co-founded the Biomimicry Singapore Network in 2016.

Q.89 Two pipes, A and B, together fill a tank in 8 hours. If they are opened separately, then B would take 12 hours more than A to fill the tank. Find the time taken (in hours) by A to fill the tank separately.

- 12
- 24
- 16
- 18

Answer: A

Sol: Given:

Time taken by pipes A and B together to fill the tank = 8 hours

Time taken by B alone is 12 hours more than the time taken by A alone.

Formula Used:

If a pipe can fill a tank in x hours, the part of the tank filled by it in 1 hour = $\frac{1}{x}$

Solution:

Let the time taken by pipe A to fill the tank separately be a hours.

Then, the time taken by pipe B to fill the tank separately = $a + 12$ hours.

Part of the tank filled by A in 1 hour = $\frac{1}{a}$

Part of the tank filled by B in 1 hour = $\frac{1}{a+12}$

According to the question:

$$\frac{1}{a} + \frac{1}{a+12} = \frac{1}{8}$$

$$\frac{a+12+a}{a(a+12)} = \frac{1}{8}$$

$$\frac{2a+12}{a^2+12a} = \frac{1}{8}$$

$$16a+96 = a^2+12a$$

$$a^2-4a-96 = 0$$

$$a^2-12a+8a-96 = 0$$

$$a(a-12)+8(a-12) = 0$$

$$(a-12)(a+8) = 0$$

Since time cannot be negative, $a = 12$

Thus, the time taken by A to fill the tank separately is 12 hours.

Final Answer

So the correct answer is (a)

Q.90 A, B, C, R, S, T and U are sitting around a circular table facing the centre of the table. Only two people sit between C and U when counted from the left of U. B sits third to the left of A. T sits to the immediate right of A. T sits second to the left of C. R is not an immediate neighbour of B. Who sits third to the right of S?

- A. U
- B. T
- C. A
- D. C

Answer: B

Sol: Given:

A, B, C, R, S, T and U are sitting around a circular table facing the centre of the table.

Only two people sit between C and U when counted from the left of U.

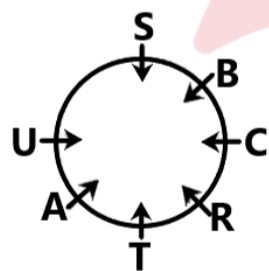
B sits third to the left of A.

T sits to the immediate right of A.

T sits second to the left of C.

R is not an immediate neighbour of B.

From the given information seating arrangement will be.



So, **T** sits third to the right of S.

Thus, correct option is (b).

Q.91 Employees Ravi, Suresh and Mahesh competed for promotion. One was promoted. They belong to Permanent, Contract and Trainee categories.

Permanent always speak truth. Contract always lie. Trainee may lie or speak truth.

Statements:

Ravi says Suresh got promotion and Mahesh is contract. Suresh says he is not permanent and Ravi is lying. Mahesh says Ravi did not get promotion and he is trainee.

Question: Mahesh belongs to which category?

Options:

- A. Permanent
- B. Contract
- C. Trainee
- D. Cannot be determined

Answer: C

Sol:

Solution: If Ravi is permanent, contradictions arise in Mahesh's statements. If Suresh is permanent, his first statement becomes false. Hence, Mahesh must be trainee. Then Ravi becomes permanent and Suresh contract, fitting all statements. Correct option is (c).

Q.92 The Supreme Court of India recently declared menstrual health as an integral part of which Fundamental Right?

- A. Article 14
- B. Article 19
- C. Article 21
- D. Article 25

Answer: C

Sol:

The correct answer is (c) **Article 21**

Explanation:

- The **Supreme Court of India**, in a landmark judgment delivered by a Bench of **Justices J B Pardiwala and R Mahadevan**, has ruled that **menstrual health** is an inseparable part of the **Right to Life** under **Article 21** of the Constitution.
- The Court observed that **dignity** is not an abstract concept and must be reflected in the everyday living conditions of citizens.
- For adolescent girls, the lack of basic facilities like **sanitary napkins**, separate toilets, and water leads to exclusion and humiliation, which directly violates their **constitutional right to live with dignity**.
- The ruling mandates that all schools— **government, government-aided, and private**—must provide free sanitary pads and functional, **gender-segregated toilets** with water connectivity.
- The Court highlighted that "barrier-free access" under the **Right to Education (RTE) Act, 2009**, must include the removal of menstrual barriers to prevent absenteeism and dropouts among girl students.

Information Booster:

- The Supreme Court set a strict **three-month deadline** for States and Union Territories to ensure compliance with these directives.
- The judgment specifies that schools must provide **oxo-biodegradable sanitary napkins** compliant with **ASTM D-6954 standards** to ensure environmental safety.
- **Non-compliance** by private institutions can lead to **de-recognition**, while State governments will be held directly accountable for failures in government schools.

Additional Knowledge:

Article 14 (Option a):

- Guarantees **Equality before Law** and **Equal Protection of Laws** within the territory of India.
- It prohibits unreasonable discrimination but allows for "**reasonable classification**" based on intelligible differentia.
- While menstrual health involves gender equality, the SC specifically anchored this ruling under the broader ambit of **Right to Dignity (Article 21)**.

Article 19 (Option b):

- Protects six fundamental freedoms, including **Freedom of Speech and Expression**, Assembly, Association, Movement, Residence, and Profession.
- These rights are available only to **citizens** and are subject to **reasonable restrictions** like public order, decency, or morality.

Article 25 (Option d):

- Guarantees the **Freedom of Conscience** and the right to freely profess, practice, and propagate religion.
- This right is subject to **public order, morality, and health**, as well as other provisions of Part III of the Constitution.

Q.93 Refer to the number series given below and answer the question that follows. Counting to be done from left to right only.

(NOTE: All numbers are single-digit numbers only.)

(Left) 3 1 3 9 6 3 4 1 1 5 6 9 9 6 8 9 7 5 6 6 2 (Right)

How many such even digits are there each of which is immediately preceded by a perfect square and also immediately followed by an even digit?

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

Answer: B

Sol: Given: (Left) 3 1 3 9 6 3 4 1 1 5 6 9 9 6 8 9 7 5 6 6 2 (Right)

Logic: Perfect square | Even digits | Even digit

(Left) 3 1 3 9 6 3 4 1 1 5 6 9 **9 6 8** 9 7 5 6 6 2 (Right)

So, **1** such even digits are there each of which is immediately preceded by a perfect square and also immediately followed by an even digit. Thus, correct option is (b).

Q.94 In a certain code language, 'ROME' is coded as '1398' and 'DEMO' is coded as '4138'. What is the code for 'D' in the given code language?

- A. 4
- B. 3
- C. 1
- D. 8

Answer: A

Sol: Given: In a certain code language, 'ROME' is coded as '1398' and 'DEMO' is coded as '4138'.

R O M E = 1 3 9 8

D E M O = 4 1 3 8

So, the code of 'D' is 4.
Thus, correct option is (a).

Q.95 Which of the following was NOT a typical feature of Harappan architecture?

- A. Public baths
- B. Drainage systems
- C. Pyramidal temples
- D. Large granaries

Answer: C

Sol: The correct answer is (c) Pyramidal temples

Explanation:

- Harappan Civilization (Indus Valley Civilization) is known for its advanced urban planning but notably lacks monumental temples or religious structures like pyramids.
- Their religious life is inferred from seals and figurines (e.g., Pashupati Seal, Mother Goddess).

Information Booster:

- The Great Bath at Mohenjo-daro is a prime example of their public architecture.
- Drainage System: Every house was connected to a street drain made of bricks, showcasing superior hygiene.
- Granaries: Found at Harappa and Mohenjo-daro for storing food grains.

Additional Knowledge:

- Pyramidal structures (Ziggurats) were characteristic of the Mesopotamian civilization, which was contemporary to the Harappan.

Q.96 Which of the following statements correctly explains overexploitation of minerals?

- A. Excessive extraction of minerals can lead to depletion of natural resources and environmental imbalance
- B. Overexploitation of minerals increases their availability for future generations
- C. Mining has no impact on ecosystems or biodiversity
- D. Minerals are unlimited and cannot be exhausted

Answer: A

Sol: The correct answer is (a).

Explanation Overexploitation of minerals refers to extracting mineral resources at a rate faster than they can be naturally replenished. This leads to resource depletion, environmental degradation, habitat destruction, and ecological imbalance.

Additional Information Option {b} is incorrect because excessive extraction reduces availability for future generations. Option {c} is incorrect because mining significantly affects ecosystems and biodiversity. Option {d} is incorrect because minerals are finite resources. Option {a} is correct as it accurately defines the consequences of overexploitation.

Q.97 In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

MIST - TIMS - ISMT
HOPE - EOHP - OPHE

- A. WIDE - EIWD - DIVE
- B. BUSY - YUBS - USBY
- C. NUMB - NMUB - BMUN
- D. PUTS - UPTS - SUTP

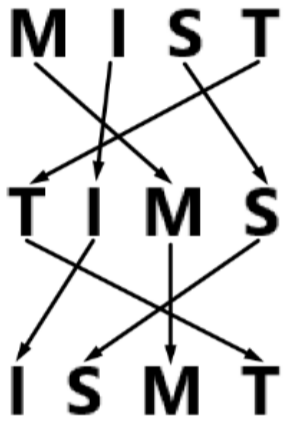
Answer: B

Sol: Given:

MIST - TIMS - ISMT
HOPE - EOHP - OPHE

Logic: Position of letters are interchanged.

For, MIST - TIMS - ISMT

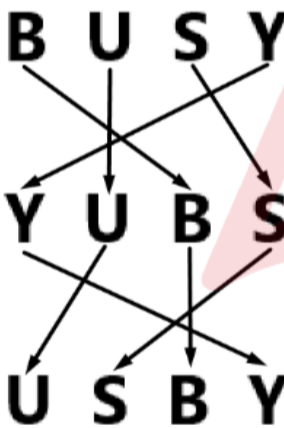


For, HOPE - EOHP - OPHE



Similarly,

BUSY - YUBS - USBY



Thus, correct option is (b).

Q.98 The volume of a solid spherical ball was $972\pi\text{cm}^3$. It was melted and 27 identical spheres were made with the molten material, leaving no wastage. What is the total surface area of the 27 smaller spheres taken together?

- A. $810\pi\text{ cm}^2$
- B. $972\pi\text{ cm}^2$
- C. $324\pi\text{ cm}^2$
- D. $648\pi\text{ cm}^2$

Answer: B

Sol: Given:

Volume of big sphere(V_1) = $972\pi\text{ cm}^3$.

Melted into 27 identical smaller spheres; no wastage.

Formula Used:

$$\text{Volume: } V = \frac{4}{3}\pi r^3$$

$$\text{Surface area: } S = 4\pi r^2$$

Solution:

According to the question,

It was melted into 27 smaller spheres of radius r and Volumes (V_2)

$$\begin{aligned} V_1 &= V_2 \\ 972\pi &= 27\left(\frac{4}{3} \times \pi \times r^3\right) \\ 972\pi &= 36\pi \times r^3 \\ r^3 &= 27 = 3 \text{ cm} \end{aligned}$$

Now, the total surface area of 27 spheres:

$$\begin{aligned} \text{TSA} &= 27 \times 4 \times \pi \times r^2 \\ \text{TSA} &= 27 \times 4 \times 9 \times \pi = 972\pi \text{ cm}^2 \end{aligned}$$

Thus, the total surface area of the 27 smaller spheres taken together will be $972\pi \text{ cm}^2$.

Q.99 The price of fuel decreases by 10%, 50% and 10% in three successive months, but increases by 45% in the fourth month. What is the percentage increase/decrease in the price of fuel in the fourth month as compared to its original price? (Round off your answer to two decimal places.)

- A. Increases by 46.86%
- B. Decreases by 44.56%
- C. Decreases by 41.28%
- D. Increases by 42.91%

Answer: C

Sol: Given:

Successive decreases for the first three months = 10%, 50%, and 10%
Increase in the fourth month = 45%

Formula Used:

$$\text{Final Value} = \text{Initial Value} \times \left(1 - \frac{D_1}{100}\right) \times \left(1 - \frac{D_2}{100}\right) \times \left(1 - \frac{D_3}{100}\right) \times \left(1 + \frac{I_1}{100}\right)$$

Solution:

Let the original price of the fuel be 100.

$$\text{Price after 1st month} = 100 \times \frac{90}{100} = 90$$

$$\text{Price after 2nd month} = 90 \times \frac{50}{100} = 45$$

$$\text{Price after 3rd month} = 45 \times \frac{90}{100} = 40.5$$

$$\text{Price after 4th month} = 40.5 \times \frac{145}{100} = 40.5 \times 1.45 = 58.725$$

Since the final price (58.725) is less than the original price (100), there is a decrease.

$$\text{Percentage decrease} = 100 - 58.725 = 41.275\%$$

Rounding off to two decimal places, we get 41.28%

Final Answer

So the correct answer is (c)

Q.100 The average weight of Gopal, Akshay and Atul is 45 kg. If the average weight of Gopal and Akshay is 44 kg and that of Akshay and Atul is 46 kg, then the weight of Akshay (in kg) is:

- A. 65
- B. 55
- C. 60
- D. 45

Answer: D

Sol: Given

Average(Gopal, Akshay, Atul) = 45 kg

Average(Gopal, Akshay) = 44 kg

Average(Akshay, Atul) = 46 kg

Formula Used

Sum = Average \times Number of items

Solution

Sum of weight of all three = $45 \times 3 = 135$ kg

Sum of Gopal and Akshay = $44 \times 2 = 88$ kg

Sum of Akshay and Atul = $46 \times 2 = 92$ kg

Weight of Akshay = (Sum of G & Ak) + (Sum of Ak & At) - (Sum of all three)

Weight of Akshay = $88 + 92 - 135$

= $180 - 135 = 45$ kg

Final Answer

So the correct answer is (d)

