RRB JE CBT-1 Memory Based Paper 19 Feb 2026

Q.1 In a certain code language, 'GETS' is coded as '8106' and 'EGIS' is coded as '0167'. What is the code for 'I' in the given code language?

A. 1
B. 7
C. 0
D. 6

Answer: B

Sol: **Information Given:**
GETS → 8106
EGIS → 0167
Let's check:
GE T S → 8 1 0 6
EG I S → 0 1 6 7
So, code for **I** is:**7**
Thus, the correct option is: (b)

Q.2 Which of the following metals will exhibit a photoelectric effect most easily?

A. Sodium
B. Lithium
C. Magnesium
D. Caesium

Answer: D

Sol:
Concept:
· **Photoelectric effect:** When the light of a **sufficiently small wavelength is incident** on the metal surface, **electrons are ejected from the metal instantly**. This phenomenon is called the **photoelectric effect.**

Explanation
In the given options
· **Sodium, lithium, and magnesium** are electropositive and they also lose electrons easily but their **reactivity is much less than Caesium.**
· **Cesium is the most electropositive** element of all so it has the **minimum ionization energy** and so contains the **maximum capacity** to **lose electrons**.

Q.3 The curved surface area of a right circular cone is 4335π cm^2, and the diameter of its base is 102 cm. Find the height (in cm) of the cone.

A. 68
B. 64
C. 63
D. 69

Answer: A

Sol: **Given:**
$\text{Curved surface area of cone } = 4335\pi \text{cm}^2$
$\text{Diameter of base } = 102\text{cm}$
Formula Used:
$\text{CSA} = \pi r l$
$h = \sqrt{l^2 - r^2}$
Solution:
$r = \frac{102}{2} = 51$
$\pi \times 51 \times l = 4335\pi$
$51l = 4335$
$l = \frac{4335}{51} = 85$
$h = \sqrt{85^2 - 51^2}$

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$h = \sqrt{7225 - 2601}$
$h = \sqrt{4624}$
$h = 68$
Final Answer:
68

Q.4 Kunal ranked 29th from the top and 15th from the bottom in his class. How many students are there in his class?

A. 40
B. 44
C. 43
D. 41

Answer: C

Sol: **Information Given:**
Kunal's rank from top = 29
Rank from bottom = 15
Formula Used:
Total students = Top rank + Bottom rank − 1
Total = 29 + 15 − 1
= 44 − 1
= 43
Final Answer:
43
Final Correct Option:
(C)

Q.5 Simplify the given expression.
(1 + cos A) (cosec A − cot A)

A. tan A
B. cosec A
C. sec A
D. sin A

Answer: D

Sol: **Given:**
The expression to simplify is (1 + cos A)(cosec A - cot A).
Concept Used:
cosec A = $\frac{1}{\sin A}$
cot A = $\frac{\cos A}{\sin A}$
$1 - \cos^2 A = \sin^2 A$

Solution:

$(1 + \cos A)(\text{cosec } A - \cot A)$

$= (1 + \cos A)\left(\frac{1 - \cos A}{\sin A}\right)$
$= (1 + \cos A)\left(\frac{1 - \cos A}{\sin A}\right) = \frac{\sin^2 A}{\sin A} = \sin A$

Q.6 Which article of the Indian Constitution had been impacted by the 44th Amendment (1978)?

A. 301
B. 300 A
C. 298
D. 299

Answer: B

Sol: The correct answer is (b) 300 A.

· The 44th Amendment Act of 1978 inserted Article 300A into the Indian Constitution.

· Article 300A states that "No person shall be deprived of his property save by authority of law."

· This amendment removed the right to property from the list of Fundamental Rights and made it a legal right instead.

· Before the 44th Amendment, the right to property was a Fundamental Right under Article 31, which was then repealed.

Information Booster:

· **301:** Article 301 deals with the freedom of trade, commerce, and intercourse throughout the territory of India. It was not impacted by the 44th Amendment.

· **298:** Article 298 deals with the power of the Union and State governments to carry on any trade or business and to acquire, hold, and dispose of property. It was not impacted by the 44th Amendment.

· **299:** Article 299 pertains to the contracts made in the exercise of the executive power of the Union or a State. It was not impacted by the 44th Amendment.

Q.7 **In a dam, potential energy of water changes into _____, which rotates the turbine.**

A. Electric energy
B. Mechanical energy
C. Kinetic energ
D. Heat energy

Answer: C

Sol: **Correct Answer: (c) Kinetic energy**

Explanation:

- Water stored in a dam has **potential energy** due to its height.
- When released, this potential energy converts into **kinetic energy** as water flows downward.
- The fast-moving water (kinetic energy) strikes the turbine blades and rotates them.

Information Booster:

- Hydropower plants work on the **principle of conversion of potential → kinetic → mechanical → electrical energy**.
- The turbine connected to a generator converts **mechanical energy into electrical energy**.
- Higher the height (head) of stored water, greater the available potential energy.
- Kinetic energy depends on the **speed of flowing water**.

Q.8 **Escape velocity of a body projected from the surface of a planet is independent of which of the following factors?**

A. Mass of the planet
B. Radius of the planet
C. Mass of the body projected
D. Gravitational constant

Answer: C

Sol: **The correct answer is (c).**

Explanation Escape velocity is defined as the minimum velocity required for a body to escape the gravitational field of a planet without further propulsion. It is given by the relation v_e equals square root of {2GM divided by R}. From this expression, escape velocity depends on the mass of the planet, the radius of the planet, and the universal gravitational constant, but it does not depend on the mass of the body that is projected.

Additional Information • Option {a} is incorrect because a larger planetary mass increases gravitational attraction, thereby increasing escape velocity. • Option {b} is incorrect because escape velocity decreases with increase in the radius of the planet. • Option {d} is incorrect because the gravitational constant appears explicitly in the escape velocity formula and affects its value.

Q.9 **Which of the following letter-clusters will replace the question mark (?) in the given series to make it logically complete?**
OIX 28 MLT 17 ? IRL −5 GUH −16

A. KOP 6
B. KOQ 8

C. KNP 8
D. KNO 6

Answer: A

Sol: **Information Given:**
OIX 28, MLT 17, ?, IRL −5, GUH −16

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: Numbers: subtract 11 each time; Letters: −2, +3, −4 pattern position-wise.
28 → 17 → ? → −5 → −16
Pattern: −11 each step
28 − 11 = 17
17 − 11 = 6
6 − 11 = −5
−5 − 11 = −16
Missing number = 6
Letters:
1st letters: O → M → K → I → G (−2 each)
2nd letters: I → L → O → R → U (+3 each)
3rd letters: X → T → P → L → H (−4 each)
So missing cluster = K O P
Final Answer:
KOP 6
Final Correct Option:
(A)

Q.10 **In the Cannizzaro reaction, benzaldehyde with concentrated NaOH gives:**

A. Benzyl alcohol and sodium benzoate
B. Benzyl alcohol and benzyl alcohol
C. Sodium benzoate only
D. Benzyl alcohol only

Answer: A

Sol:
The correct answer is (a).
Explanation: $2C_6H_5CHO + NaOH \rightarrow C_6H_5CH_2OH + C_6H_5COONa$. This is disproportionation where one aldehyde molecule is reduced to alcohol and other is oxidized to carboxylate salt. Benzaldehyde has no α-hydrogens, so cannot undergo aldol condensation. The reaction involves hydride transfer between two aldehyde molecules.
Additional Information: Option {b} would require only reduction. Option {c} would require only oxidation. Option {d} is incomplete.

Q.11 **Which of the following is the SI unit for sound intensity?**

A. Metre per second (m/s)
B. Watt per square metre (W/m^2)
C. Pascal (Pa)
D. Watt (W)

Answer: B

Sol: **Correct Answer: (B) Watt per square metre (W/m²)**

Explanation:

- The **SI unit of sound intensity** is **Watt per square metre (W/m²)**.
- Sound intensity measures the **power of sound** passing through a unit area.

Information Booster:

- Sound intensity is a **physical quantity**, not the same as loudness (which is psychological).

- Sound level is often measured in **decibels (dB)**, but the *SI* unit is still **W/m²**.
- Threshold of hearing ≈ **1 × 10⁻¹² W/m²**.

Additional Knowledge:

- **m/s:**Unit of **speed**
- **Pascal (Pa):**Unit of **pressure**, used for *sound pressure level/*
- **Watt (W):**Unit of **power**.

Q.12 Pipe A can fill a tank in 16 hours, pipe B can fill the same tank in 26 hours and pipe C can fill the same tank in 16 hours. The time taken by them to fill the same tank if they operate together is:

A. $9\frac{2}{17}\text{hours}$
B. $2\frac{2}{17}\text{hours}$
C. $6\frac{2}{17}\text{hours}$
D. $3\frac{2}{17}\text{hours}$

Answer: C

Sol: **Given**

Time taken by Pipe A = 16 hours
Time taken by Pipe B = 26 hours
Time taken by Pipe C = 16 hours

Formula Used

$$\text{Total Work} = \text{Time} \times \text{Efficiency}$$

Solution

Total work to be done = LCM of (16, 26, 16) = 208 units
Efficiency of Pipe A = $\frac{208}{16}$ = 13 units/hour
Efficiency of Pipe B = $\frac{208}{26}$ = 8 units/hour

Efficiency of Pipe C = $\frac{208}{16}$ = 13 units/hour
Total combined efficiency = 13 + 8 + 13 = 34 units/hour
Time taken to fill the tank together = $\frac{208}{34}$ hours = $6\frac{2}{17}\text{hours}$

Final Answer

So the correct answer is (c)

Q.13 Who among the following was appointed as the new Chairman of the Union Public Service Commission (UPSC) in May 2025?

A. Shri Rajesh Verma
B. Dr. Anil Kumar
C. Dr. Ajay Kumar
D. Ms. Priya Sharma

Answer: C

Sol: **Answer: (C) Dr. Ajay Kumar**
Explanation:

- In **May 2025**, **Dr. Ajay Kumar**, a former Defence Secretary, was appointed as the new Chairman of the Union Public Service Commission (UPSC).
- He assumed office on **15 May 2025** after taking the **oath of office and secrecy**.
- His appointment was made under **Article 316** of the Indian Constitution.

Information Booster:

- Dr. Ajay Kumar is a 1985-batch IAS officer of the Kerala cadre.
- He has held several key positions in both the state government and central ministries before this appointment.
- The Chairman and Members of UPSC serve for **six years** or until the age of **65**, whichever is earlier.

Q.14 Find the effective discount for the scheme – Buy 12, get 8 free.

A. 10%
B. 21%
C. 40%
D. 20%

Answer: C

Sol: **Given**

Scheme: Buy 12, get 8 free

Formula Used

Discount $\% = \frac{\text{Free Items}}{\text{Total Items}} \times 100$

Solution

Number of items paid for = 12
Number of free items = 8
Total items received = 12 + 8 = 20
Discount Percentage:

$$D = \frac{8}{20} \times 100$$

$$D = \frac{2}{5} \times 100$$

$$D = 2 \times 20 = 40\%$$

Final Answer

So the correct answer is (c)

Q.15 The value of the discriminant of the quadratic equation $7x^2 - 18x - 11 = 0$ is:

A. 619
B. 638
C. 632
D. 616

Answer: C

Sol: **Given:**

Quadratic equation $7x^2$ - 18x - 11 = 0

Formula Used:

$$D = b^2 - 4ac$$

Where b = coefficient of x , a = coefficient of x^2 , c = non variable

Solution:

$$D = b^2 - 4ac$$

D = $(18)^2 - 4 \times 7 \times -11$

D = 324 + 308

D = 632

Q.16 When was the first complete Census conducted in India?

A. 1882
B. 1880
C. 1887
D. 1881

Answer: D

Sol: The correct answer is : **(d)1881.**

The first complete and systematic Census of India was conducted in 1881 under the British administration. It was the first synchronized census, meaning it covered the entire British-ruled India simultaneously.

The first attempt at a census was made in 1872, but it was not conducted uniformly across all regions. Therefore, it is not considered the first complete census.

Key Features of the 1881 Census:

Over 1 million enumerators were involved in data collection.

The census recorded demographic and socioeconomic characteristics, such as:

Age & Sex distribution

Religion & Caste

Occupation & Education

Housing & Literacy rates

Q.17 When acetic acid is mixed with sodium acetate, the pH value:

A. Increases
B. Decreases
C. Becomes 7
D. Does not change

Answer: D

Sol:

Correct Answer: (d)

Explanation:

Acetic acid (weak acid) mixed with sodium acetate (its salt) forms a **buffer solution**.

A buffer resists change in pH even when small amounts of acid or base are added.

Therefore, mixing acetic acid with sodium acetate keeps the **pH nearly constant**.

Additional Information:

• This is an acidic buffer • Used in labs to maintain fixed pH • Common example: $CH_3COOH + CH_3COONa$

Q.18 If a 3210 m long train crosses a pole in 107 seconds, then find the time (in seconds) taken by the train to cross a 150 m long platform.

A. 106
B. 114
C. 110
D. 112

Answer: D

Sol: **Given:**

Length of the train = 3210 m

Time taken to cross a pole = 107 seconds

Length of the platform = 150 m

Concept Used:

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

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

Solution:

Speed = $\frac{3210\ \text{m}}{107\ \text{seconds}}$ = 30 m/s

Total distance = 3210 m + 150 m = 3360 m

Time = $\frac{3360\ \text{m}}{30\ \text{m/s}}$ = 112 seconds

Q.19 Washing soda is:

A. a base
B. an acidic salt
C. a neutral salt
D. a basic salt

Answer: D

Sol: The correct answer **is** (d) basic salt.

Explanation:

- Washing soda is chemically known as **Sodium Carbonate (Na_2CO_3)**. It is a **basic salt** because it is derived from a **strong base (NaOH - Sodium Hydroxide)** and a **weak acid (H_2CO_3 - Carbonic Acid)**.
- When dissolved in water, washing soda produces **carbonate ions (CO_3^{2-})**, which can accept hydrogen ions (H^+), making the solution alkaline in nature.

Thus, washing soda exhibits **basic properties**, such as:

- Turning **red litmus paper blue**
- Reacting with acids to produce **carbon dioxide gas (CO_2)**
- Having a **pH greater than 7**

Information Booster:

Uses of Washing Soda (Na_2CO_3):

- Used in **laundry detergents** to remove grease and stains.
- Helps in **softening hard water** by precipitating calcium and magnesium ions.
- Used in **glass manufacturing** and the **paper industry**.

- Involved in **baking powder production** as a leavening agent.

Difference Between Washing Soda & Baking Soda:

- **Washing Soda (Na_2CO_3)**: Stronger, more alkaline, and used for cleaning.
- **Baking Soda ($NaHCO_3$)**: Milder, used for baking and as an antacid.

Additional Knowledge:

- **An Acidic Salt** – Acidic salts are formed when a **strong acid and a weak base** react, but washing soda comes from a **strong base (NaOH)** and a weak acid (H_2CO_3), making it basic, not acidic.
- **A Neutral Salt** – Neutral salts (like NaCl) result from a **strong acid and a strong base**, leading to a **neutral pH (around 7)**. Since washing soda has a pH above 7, it is not a neutral salt.

Q.20 **Which instrument is used to measure atmospheric pressure?**

A. Hygrometer
B. Barometer
C. Ammeter
D. Altimeter

Answer: B

Sol: The correct answer is (b) Barometer.
• A barometer measures **atmospheric pressure**.
• Pressure changes help in weather prediction.
• Lower pressure often indicates stormy weather.
Information Booster:
• Invented by **Evangelista Torricelli** in **1643**.
• Mercury and aneroid barometers are common types.
• Standard atmospheric pressure = **1013.25 millibars**.
Additional Knowledge:
• Hygrometer measures humidity.
• Altimeter measures altitude using pressure changes.

Q.21 **"In an atom no two electrons can have same values for all four quantum numbers." This is called:**

A. Aufbau Principle
B. Hund's Rule
C. Heisenberg Uncertainty Principle
D. Pauli's Exclusion Principle

Answer: D

Sol:
Correct Answer: **(d)**
Explanation:
Pauli's Exclusion Principle states that:
No two electrons in an atom can have identical quantum numbers.
This explains: • electron configuration • shell structure • chemical periodicity
Additional Information:
• Each orbital holds maximum 2 electrons • Basis of atomic structure • Proposed by Wolfgang Pauli

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Q.22 **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:
All mugs are cups.
Some mugs are forks.
Conclusions:
(I): Some cups are forks.
(II): Some forks are mugs.

A. Only conclusion I follows.
B. Both conclusions I and II follow.

C. Neither conclusion I nor II follow.
D. Only conclusion II follows.

Answer: B

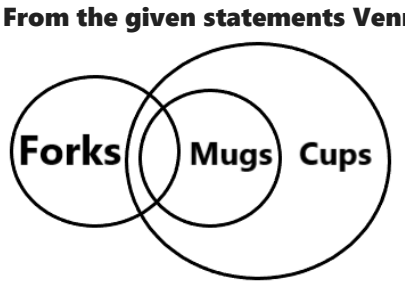
Sol: **Given:**

Statements:

All mugs are cups.

Some mugs are forks.

From the given statements Venn diagram will be:



Conclusions:

(I): Some cups are forks. →Since all mugs are cups ,Those mugs are also cups. So, Some cups are forks. **Follow**

(II): Some forks are mugs. - Convert: Some forks are mugs. **Follow**

Final Answer:

Both conclusions I and II follow.

Final Correct Option:

(B)

Q.23 **Who was the father of DNA fingerprinting?**

A. James Watson
B. Hargobind Khurana
C. Alec Jeffreys
D. Nirenberg

Answer: C

Sol:

Solution

The correct answer is **Alec Jeffreys.**

· DNA fingerprinting is a technique that shows the genetic makeup of living things.

· Father of DNA fingerprinting in the world is **Sir Alec John Jeffreys.**

· Father of DNA fingerprinting in India is **Dr Lalji Singh.**

Additional Information

Some other important names:

Scientists	Study
Carlous Linnaeus	Father of Taxonomy
Francis Galton	Father of Eugenics
Hippocrates	Father of Medicine
Hugo de Vries	Father of Mutation Theory
George Cuvier	Father of Palaeontology
William Harvey	Father of blood circulation
Rudolph Virchow	Father of Pathology
Karl Landsteiner	Father of Blood Groups

Gregor Mendel	Father of Modern Genetics
Robert Hooke	Father of Cytology
W. M. Stanley	Father of virology
Edward Jenner	Father of Immunology
Leeuwenhoek	Father of Microbiology
Eugene Odum	Father of Ecology
Louis Pasteur	Father of Bacteriology
Paul Berg	Father of Genetic Engineering
Ivan Pavlov	Father of Conditioned Reflex
Empedocles	Father of Evolutionary Ideas
Marcello Malpighi	Father of Microscopy
Anton de Bary	Father of Mycology
Christopher Hales	Father of Plant Physiology
Charaka	Father of Indian Medicine
Susruta	Father of Indian surgery
Birbal Sahni	Father of Indian Palaeobotany
R. Mishra	Father of Indian Ecology

Q.24 **A vertical post of a height 18 ft is broken at a certain height and its upper part, not completely separated, meets the ground at an angle of 30°. Find the height at which the post is broken.**

A. 4 ft
B. 6 ft
C. 7 ft
D. 5 ft

Answer: B

Sol: **Given:**

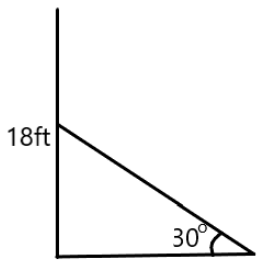
Height of the vertical post = 18 ft

Angle made by the broken upper part with the ground = 30°

Formula Used:

$$\sin\theta = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$$

Solution:



Let broken height = h ft; upper part = (18 − h) ft

h = $(18 - h) \times \sin 30^\circ$

h = (18 - h) $\times \frac{1}{2}$

h = $\frac{18 - h}{2}$

2h = 18 - h

3h = 18

h = 6

∴ The correct answer is 6 ft.

Q.25 **What is the name of the glycoprotein produced in the liver that plays a crucial role in blood clotting?**

A. Cadherin
B. Fibrinogen
C. Mucins
D. Selectin

Answer: B

Sol:

The correct answer is (b) Fibrinogen

Explanation:

· **Fibrinogen** is a soluble protein produced by the **liver** and released into the bloodstream.

· During tissue or vascular injury, it is converted by thrombin into **fibrin**, which forms the structural basis of a blood clot.

· This process is essential for wound healing and preventing excessive bleeding.

Information Booster:

· Fibrinogen is also known as Factor I in the coagulation cascade.

· Low levels of fibrinogen can lead to excessive bleeding, a condition known as hypofibrinogenemia.

Additional Knowledge:

· Cadherins are proteins involved in cell-to-cell adhesion.

· Mucins are the main component of mucus, providing lubrication and protection to surfaces.

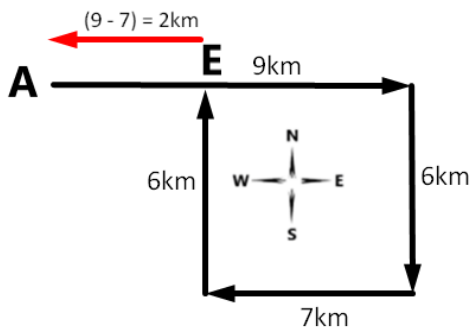
Q.26 **Amit started from Point A and travelled 9 km east. He then turned right and travelled 6 km. He then turned right and travelled 7 km. He finally turned right and travelled 6 km to stop at Point E. What is the shortest distance between Point E and Point A? (All turns are 90-degree turns only.)**

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

Answer: C

Sol: **Given:**

Amit started from Point A and travelled 9 km east.
He then turned right and travelled 6 km.
He then turned right and travelled 7 km.
He finally turned right and travelled 6 km to stop at Point E.



So, the shortest distance between Point E and Point A is **2km.**

Final Answer:

2 km

Final Correct Option:

(C)

Q.27 **In which year was the Indian National Congress founded?**

A. 1885
B. 1905
C. 1875
D. 1895

Answer: A

Sol: **The correct answer is (a) 1885**.

Explanation:

· The **Indian National Congress (INC)** was founded on **December 28, 1885**.

· Its first session was held at Gokuldas Tejpal Sanskrit College in **Bombay** (now Mumbai), attended by 72 delegates from all over India.

Information Booster

The formation of the INC was a pivotal moment in the Indian independence movement, marking the beginning of organized political opposition to British rule.

· **Founder:** The organization was formed under the initiative of **Allan Octavian Hume (A.O. Hume)**, a retired British civil servant.

· **First President: Womesh Chandra Bonnerjee** (W.C. Bonnerjee) was elected as the first president of the Congress.

· **Primary Objective:** Initially, the INC aimed to gain a greater share in government for educated Indians and create a platform for civic and political dialogue with the British Raj.

Additional Knowledge

1. The "Safety Valve" Theory

Some historians suggest that A.O. Hume founded the Congress as a "safety valve" to provide a peaceful outlet for growing Indian discontent, thereby preventing a violent rebellion like the one in 1857.

2. Significant Years in Options

· **1875 (c):** Marked the founding of the **Arya Samaj** by Swami Dayanand Saraswati and the Aligarh Movement by Sir Syed Ahmed Khan.

· **1905 (b):** The year of the **Partition of Bengal** by Lord Curzon, which led to the Swadeshi Movement and shifted the Congress toward more radical nationalist goals.

3. Transformation of the INC

The Congress evolved from a small group of Western-educated elites to a mass movement under the leadership of **Mahatma Gandhi** in the 1920s, eventually leading India to independence in 1947.

Q.28 **What is the mean of the following distribution?**

Marks	19	31	54	69	95
No. of Students	22	35	64	34	57

A. 60
B. 63
C. 82
D. 49

Answer: A

Sol: **Formula Used:**

Mean $\bar{x} = \frac{\sum fx}{\sum f}$

Solution:

$$\bar{x} = \frac{(22 \times 19) + (35 \times 31) + (64 \times 54) + (34 \times 69) + (57 \times 95)}{22 + 35 + 64 + 34 + 57}$$

$$\sum f = 22 + 35 + 64 + 34 + 57 = 212$$
$$\sum fx = 418 + 1085 + 3456 + 2346 + 5415 = 12,720$$

$$\bar{x} = \frac{12720}{212} = 60$$

Mean marks = 60

Q.29 **Which law is most frequently applied when calculating the electric field, particularly when high symmetry is present?**

A. Lenz's Law
B. Gauss's Law
C. Faraday's Law
D. Coulomb's Law

Answer: B

Sol:

Solution:
Correct Answer: (b) Gauss's Law
Explanation:
· Gauss's Law is especially useful for calculating electric fields when there is high symmetry (spherical, cylindrical, or planar).
· It relates the electric flux through a closed surface to the charge enclosed.
· It simplifies calculations compared to direct application of Coulomb's law in symmetric cases.
Information Booster:
· Mathematical form: $\oint E \cdot dA = Q_{enc} / \varepsilon_0$
· Common applications: charged sphere, infinite line charge, infinite plane sheet.
· It is one of Maxwell's equations.
Additional Knowledge:
· Coulomb's law is better for point charges without symmetry.
· Faraday's law deals with electromagnetic induction.
· Lenz's law gives the direction of induced current.

Q.30 **Which gas is mainly responsible for acid rain?**

A. Carbon monoxide
B. Sulphur dioxide
C. Methane
D. Ozone

Answer: B

Sol: The correct answer is **(B) Sulphur dioxide**

Explanation:
• Acid rain is caused by a chemical reaction that begins when compounds like sulphur dioxide (SO_2) and nitrogen oxides are released into the air.
• These substances can rise very high into the atmosphere, where they mix and react with water, oxygen, and other chemicals to form acidic pollutants.

Information Booster:
• Acid rain has a pH level of around 4.2–4.4, whereas normal rain is slightly acidic with a pH of about 5.6.

Additional Knowledge:
• Acid rain causes damage to buildings (like the Taj Mahal), forests, and aquatic life.

Q.31 **Study the following question and statements, and decide which of the statements is/are sufficient to answer the question.**
Question: **J, K, L, M, N and O are standing in a row. If we arrange them according to their height from tallest to shortest, who is standing in the third place?**
Statements:

1. **L is the tallest.**
2. **J is taller than K.**
3. **N is the shortest of all.**
4. **K is taller than O.**

A. All the statements are insufficient.
B. Statements 1, 2 and 3 are sufficient.
C. Statements 1, 2, 3 and 4 together are sufficient.
D. Statements 1 and 3 are sufficient.

Answer: A

Sol: **Question**: J, K, L, M, N and O are standing in a row. If we arrange them according to their height from tallest to shortest, who is standing in the third place?
Statements:
1. L is the tallest.
L > _ > _ > _ > _ > _
2. J is taller than K.
J > K
3. N is the shortest of all.
_ > _ > _ > _ > _ > N
4. K is taller than O.
K > O
Combine 1, 2, 3 and 4:
Case 1: L > J > K > O > M > N
Case 2: L > M > J > K > O > N
There is no information about the position of M.
So, **All the statements are insufficient.**
Thus, correct option is (a).

Q.32 **The cost of 4 pens and 3 notebooks is ₹277. The cost of 16 notebooks exceeds the cost of 12 pens by ₹144. What is the cost of 19 pens and 15 notebooks?**

A. ₹1,342
B. ₹1,347
C. ₹1,348
D. ₹1,345

Answer: D

Sol: **Given:**
$4x + 3y = 277$
$16y - 12x = 144$

Formula Used:
$ax + by = c$

Solution:
$4x + 3y = 277 \quad (1)$
$4y - 3x = 36 \quad (2)$
Multiply (1) by 3 :
$12x + 9y = 831 \quad (3)$
Multiply (2) by 4 :
$16y - 12x = 144 \quad (4)$
Add (3) and (4):
$25y = 975$
$y = 39$
Substitute $y = 39$ in (1):
$4x + 117 = 277$
$4x = 160$
$x = 40$

Required Cost $= 19x + 15y$
$= 19(40) + 15(39)$
$= 760 + 585$
$= 1345$

Final Answer:
$\boxed{1345}$

Q.33 Symbol for Methane is

A. CH_4
B. CH_3
C. CH_1
D. CH_2

Answer: A

Sol: **The correct answer is:(A) CH_4**

Explanation:

The chemical formula for **methane** is **CH_4**, which means it consists of one carbon (C) atom bonded to four hydrogen (H) atoms. It is the simplest alkane and a key component of natural gas.

Information Booster:

key facts about **methane**:

- **Structure:** Methane has a tetrahedral molecular structure where the carbon atom is at the center and the four hydrogen atoms are at the corners.
- **Source:** It is a primary component of natural gas and is produced naturally by the decomposition of organic matter.
- **Uses:** Methane is used as a fuel for heating, cooking, and electricity generation. It's also a starting material for producing chemicals like methanol and hydrogen.
- **Environmental Impact:** Methane is a potent greenhouse gas, more effective at trapping heat in the atmosphere than carbon dioxide, though it stays in the atmosphere for a shorter time.
- **Combustion:** When burned in the presence of oxygen, methane produces carbon dioxide and water, releasing energy: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + \text{energy}$

Additional Information:

- **CH_3:** Represents a methyl group, not methane.
- **CH_1 and CH_2:** These are not stable molecules on their own; they are parts of larger hydrocarbon chains.

Q.34 What is the primary function of mitochondria in a cell?

A. Protein synthesis
B. Energy production
C. Cell division
D. Storage of genetic material

Answer: B

Sol: The correct answer is **(B) Energy production**

Explanation:

• Mitochondria are known as the 'Powerhouse of the Cell' because they generate most of the cell's supply of adenosine triphosphate (ATP).
• ATP is used as a source of chemical energy for various cellular processes.

Information Booster:

• Mitochondria have their own DNA and ribosomes, allowing them to produce some of their own proteins.

Additional Knowledge:

• Protein synthesis (Option A): Primary function of Ribosomes.
• Storage of genetic material (Option D): Primary function of the Nucleus.

Q.35 What will come in the place of the question mark (?) in the following equation, if '+' and '÷' are interchanged, and '−' and '×' are interchanged?
11 − 2 × 48 + 6 ÷ 15 = ?

A. 10
B. 22
C. 16
D. 29

Answer: D

Sol: **Information Given:**
Original: 11 − 2 × 48 + 6 ÷ 15
Interchange:
+ ↔ ÷
− ↔ ×

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

After interchange:
11 × 2 − 48 ÷ 6 + 15
Now solve (BODMAS):
11 × 2 = 22
48 ÷ 6 = 8
Expression becomes:
22 − 8 + 15
22 − 8 = 14
14 + 15 = 29
Final Answer:
29
Final Correct Option:
(D)

Q.36 A patient suffering from liver disorder produces very little bile; which type of digestion will be most severely affected in his digestive system?

A. Carbohydrate digestion
B. Protein digestion
C. Fat digestion
D. Nucleic acid digestion

Answer: C

Sol: The correct answer is (c).
Explanation

Bile emulsifies fats, breaking them into smaller droplets for enzyme action.

Additional Information

{a} is incorrect because amylase digests carbohydrates. {b} is incorrect because proteases digest proteins. {d} is incorrect because nucleases digest nucleic acids.

Q.37 Which of the following Five-Year Plans was based on the Harrod–Domar Model?

A. Fifth
B. Third
C. Seventh
D. First

Answer: D

Sol:

The correct answer is (D) First

Explanation:

• The Harrod–Domar Model focuses on capital accumulation and savings rate.
• India's First Five-Year Plan (1951–56) adopted this growth model.
• The plan emphasised investment-led growth.
• Priority was given to agriculture and irrigation.
• Hence, the First Five-Year Plan was based on the Harrod–Domar Model.

Information Booster:

• First Five-Year Plan was influenced by Mahalanobis and Harrod–Domar ideas.
• It aimed at post-independence economic stability.

Additional Knowledge (Incorrect Options):

(A) Fifth
• Focused on poverty alleviation (Garibi Hatao).
(B) Third
• Emphasised self-reliance and industrial growth.
(C) Seventh
• Focused on productivity and employment generation.

Q.38 **L, M, N, O, Q, R and S are sitting around a circular table, facing the centre of the table. Q sits to the immediate right of N. Only three people sit between Q and S when counted from the left of Q. Only three people sit between N and M. L sits to the immediate right of R. How many people sit between O and R when counted from the left of R?**

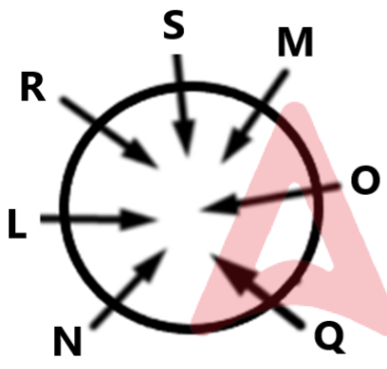
A. Three
B. One
C. Two
D. Four

Answer: C

Sol: **Given:**

L, M, N, O, Q, R and S are sitting around a circular table, facing the centre of the table.
Q sits to the immediate right of N.
Only three people sit between Q and S when counted from the left of Q.
Only three people sit between N and M.
L sits to the immediate right of R.

From the given information seating arrangement will be:



So, **Two** people sit between O and R when counted from the left of R.
Thus, the correct option is: (c)

Q.39 **The average of the first 7 multiples of 3 is:**

A. 11.3
B. 12
C. 10.5
D. 12.5

Answer: B

Sol: **Given:**

We need to find the average of the first 7 multiples of 3.

Formula Used:

$$\text{Average} = \frac{\text{Sum of terms}}{\text{Number of terms}}$$

Solution:

= 3, 6, 9, 12, 15, 18, 21

$$= \frac{3+6+9+12+15+18+21}{7}$$

$$= \frac{84}{7}$$

= 12

Q.40 **A man is standing on a weighing scale in an elevator car. If the scale reads a lower than the weight of the man at rest, the elevator car could be moving:**

A. downward at increasing speed
B. upward at increasing speed
C. downward at constant speed
D. upward at constant speed

Answer: A

Sol:

Solution
Concept:
Apparent weight of a person inside a lift
{i) When the lift moves upward with acceleration *a* . Then the net upward force on the person is-
R - mg = ma
∴ Apparent weight, R = mg + ma = m (g + a)
So, when a lift accelerates upwards, the apparent weight of the person inside it **increases.**
{ii) When the lift moves downwards with acceleration *a* . Then the net downward force on the person is-
Mg - R = ma
∴ Apparent weight, R = mg - ma = m (g - a)
So, when a lift accelerates downwards, the apparent weight of the person inside it **decreases.**
(iii) When the lift is at rest or moving with uniform velocity v downward/upward. The acceleration *a* = 0, then the net force on the person is-
R - mg = m x 0 = 0
R = mg
∴ Apparent weight = Actual weight
{iv) When the lift falls freely. If the supporting cable of the lift breaks, the lift falls freely under gravity. Then *a* = *g*. The net downward force on the person is -
R = m(g - g) = 0.
Thus, the apparent weight of the man becomes zero. This is because both the man and the lift are moving downwards with same acceleration *'g'* and so there are no forces of action and reaction between the person and the lift. Hence a person develops a feeling of **weightlessness** when he falls freely under gravity.
Explanation -
When the lift moves downward with acceleration *a* -
Then the net upward force on the person is-
Mg - R = ma
∴ Apparent weight, R = mg - ma = m (g - a)
This is a reason why one **feels lighter** in a lift when the lift just begins to go down because our body starts moving in same direction as gravitational force hence there is less opposition on our body hence net force exerted on our body is less as compared to when lift was going up.
Thus, when a **lift accelerates downward at constant acceleration**, the **apparent weight of the person inside it decreases at constant rate** also.

Q.41 **Mushrooms are:**

A. phycomycetes
B. basidiomycetes
C. deuteromycetes
D. ascomycetes

Answer: B

Sol:

Solution
The correct answer is **basidiomycetes.**
Concept:
· **Fungi** constitute a unique kingdom of **heterotrophic** organisms.

· **Fungi** show a great **diversity** in morphology and habitat.
· **Fungi** are **cosmopolitan** and occur in air, water, soil, animals, and plants.
· The study of fungi is **Mycology**.
· Fungi are categorized into **4 classes: Phycomyctes, Ascomycetes, Basidiomycetes & Deuteromyctes**
Explanation:
· **Mushrooms** belong to the class **basidiomycetes** as they contain puffball type structure.
· Their scientific name is **Agaricus**
· They are terrestrial and lead a saprophytic and parasitic mode of life.
Additional Information
· **Phycomycetes**
· 'Phycomycetes' include fungal species of Oomycetes, Chytridiomycetes, and Zygomycetes.
· They are considered as **lower fungi.**
· **Ascomycetes**
· Ascomycetes include a wide range of fungi such as **yeasts, powdery mildews, cup fungi, morels.**
· **e.g** Morchella, Peziza
· **Basidiomycetes**
· Basidiomycetes include **puffballs**, toadstools, bird's nest fungi, bracket fungi, stinkhorns, rusts, and smuts.
· e.g Agaricus, Geaster
· **Deuteromycetes**
· The fungi belonging to this group lack sexual reproduction and are called **imperfect fungi.**
· **e.g** Pycnidium - Phoma, Acervulus - Colletotrichum

Q.42 What will come in the place of the question mark (?) in the following equation, if '÷' and '−' are interchanged and '×' and '+' are interchanged?
78 × 2 − 2 + 12 ÷ 6 × 5 + 4 ÷ 4 × 24 = ?

A. 124
B. 148
C. 154
D. 136

Answer: A

Sol: **Information Given:**
78 × 2 − 2 + 12 ÷ 6 × 5 + 4 ÷ 4 × 24
Rule:
'÷' ↔ '−'
'×' ↔ '+'

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

New expression:
78 + 2 ÷ 2 × 12 − 6 + 5 × 4 − 4 + 24
Now solve:
2 ÷ 2 = 1
1 × 12 = 12
5 × 4 = 20
Expression becomes:
78 + 12 − 6 + 20 − 4 + 24
Now left to right:
78 + 12 = 90
90 − 6 = 84
84 + 20 = 104
104 − 4 = 100
100 + 24 = 124
Final Answer:
124
Final Correct Option:
(A)

Q.43 Find the difference between simple interest and compound interest on Rs. 2000 for 2 years at 10% per annum?

A. Rs. 0
B. Rs. 30
C. Rs. 20
D. Rs. 10

Answer: C

Sol: **Given:**
Principal (P) = ₹2,000

Time (T) = 2 years

Rate of Interest (R) = 10% per annum

Formula Used:

The difference between Compound Interest and Simple Interest for 2 years :

Difference (CI - SI) = $P \times \left(\frac{R}{100}\right)^2$

Solution:

Using the formula for the difference:

Difference = $2,000 \times \left(\frac{10}{100}\right)^2 = 2,000 \times \frac{1}{100} = 20$

Thus, The difference between the compound interest and simple interest is ₹5

Q.44 **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.)
(46, 2208, 24)
(4, 192, 24)

A. (37, 451, 6)
B. (7, 245, 17)
C. (39, 546, 7)
D. (24, 967, 20)

Answer: C

Sol: **Information Given:**
(46, 2208, 24)
(4, 192, 24)
Logic: Middle number = First × Third × 2
(46, 2208, 24)
46 × 24 × 2 = 46 × 48 = 2208
(4, 192, 24)
4 × 24 × 2 = 4 × 48 = 192
Check options:
A) 37 × 6 × 2 = 37 × 12 = 444 ≠ 451
B) 7 × 17 × 2 = 7 × 34 = 238 ≠ 245
C) 39 × 7 × 2 = 39 × 14 = **546** ✔
D) 24 × 20 × 2 = 24 × 40 = 960 ≠ 967
Final Answer:
(39, 546, 7)
Final Correct Option:
(C)

Q.45 **A grocer marked his goods 40% above their cost price and sold them at a discount of X%. If he gained 33% profit, then find the value of X.**

A. 4
B. 2

C. 5
D. 3

Answer: C

Sol: **Given:**
Marked price is 40% above cost price

Discount given = X%

Overall profit = 33%

Formula Used:

$$\text{SP} = \text{CP} \times \left(1 + \frac{\text{Profit }\%}{100}\right)$$

$$\text{SP} = \text{MP} \times \left(1 - \frac{\text{Discount }\%}{100}\right)$$

Solution:

Let Cost Price (CP) = 100

Marked Price (MP) = 100 + 40% of 100 = 140

Selling Price (SP) with 33% profit:

SP = 100 + 33% of 100 = 133

Apply discount on MP:

$$133 = 140\left(1 - \frac{X}{100}\right)$$

$$\frac{133}{140} = 1 - \frac{X}{100}$$

$$1 - \frac{X}{100} = 0.95$$

$$\frac{X}{100} = 0.05$$

$$X = 5$$

The value of X = 5%

Q.46 **What should come in place of the question mark (?) in the given series?**
550 555 565 570 580 585 ? 600

A. 610
B. 595
C. 590
D. 605

Answer: B

Sol: **Information Given:**
Series: 550 555 565 570 580 585 ? 600
Logic: Alternating +5 and +10.
550 → 555 (+5)
555 → 565 (+10)
565 → 570 (+5)
570 → 580 (+10)

580 → 585 (+5)
585 → ? (+10)
? → 600 (+5)
So, 585 + 10 = 595
Check: 595 + 5 = 600 ✔
Final Answer:
595
Final Correct Option:
(B)

Q.47 The coordination number of atoms in a body-centered cubic (BCC) lattice is:

A. 8
B. 6
C. 4
D. 12

Answer: A

Sol: **The correct answer is (A) 8**
Explanation:
- In a **Body-Centered Cubic (BCC) lattice**, each atom is surrounded by **8 nearest neighboring atoms**, so the **coordination number is 8**.
- One atom is located at the center of the cube and it is surrounded by the 8 corner atoms of the cube.

Information Booster:
- BCC → Coordination number = **8**.
- FCC (Face-Centered Cubic) → Coordination number = **12**.
- Simple Cubic → Coordination number = **6**.
- BCC structures are generally **more rigid & less dense** than FCC.
- Example of BCC metals – **Iron (at room temperature), Chromium, Tungsten**.

Additional Knowledge:
- BCC has **2 atoms per unit cell**.
- FCC has **4 atoms per unit cell**.
- Packing efficiency of BCC ≈ **68%**.
- Packing efficiency of FCC ≈ **74%**.

Q.48 Seven boxes P, Q, R, S, X, Y and Z are kept one over the other, but not necessarily in the same order. Only S is kept above X. Only two boxes are kept between X and Z. Only P is kept below R. Q is not kept immediately above Z. How many boxes are kept between Y and P?

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

Answer: A

Sol: **Given:**
Seven boxes P, Q, R, S, X, Y and Z are kept one over the other, but not necessarily in the same order.
Only S is kept above X.
Only two boxes are kept between X and Z.
Only P is kept below R.
Q is not kept immediately above Z.

Position	Box
1	S
2	X
3	Q
4	Y
5	Z

Position	Box
6	R
7	P

So, **Two** boxes are kept between Y and P.
Thus, the correct option is: (A)

Q.49 **The tax on petrol is increased by 5%, but its consumption is decreased by 5%. The increase or decrease in the expenditure of money is:**

A. No change
B. 0.25% decrease
C. 0.25% increase
D. 5% increase

Answer: B

Sol: **Given:**

Tax on petrol is increased by 5%

Consumption of petrol is decreased by 5%

Concept Used:

Expenditure $\propto$ Price × Quantity

Formula Used:

If price changes by (+a%) and consumption changes by (-b%), then net change:

Net % = a - b - $\frac{ab}{100}$

Solution:

Here,

a = 5, b = 5

Net change = 5 - 5 - $\frac{5 \times 5}{100}$

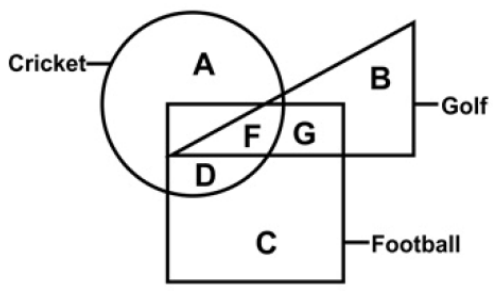
= 0 - $\frac{25}{100}$

= -0.25%

Negative sign indicates a decrease.

Thus, There is a decrease of 0.25% in the expenditure of money.

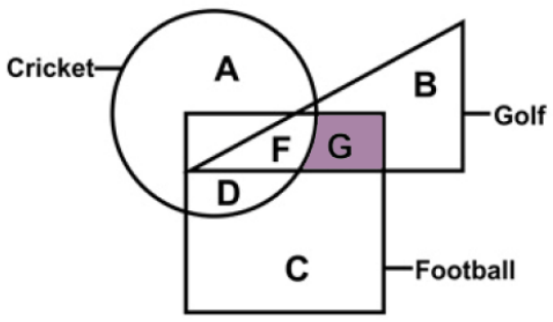
Q.50 **In the given figure, which letter represents the players who play only Golf and Football?**



A. D
B. G
C. B
D. F

Answer: B

Sol: G part plays only Golf and Football.



Thus, correct option is (B).

Q.51 **Which book written in Kannada received the 2025 International Booker Prize?**

A. Cascades
B. The Girl with the Seven Lives
C. Heart Lamp
D. Diotima

Answer: C

Sol:

The correct answer is (C) Heart Lamp

Explanation:

• The International Booker Prize 2025 recognised a work originally written in Kannada.
• Heart Lamp is the Kannada work that won the award.
• The prize honours translated fiction from around the world.
• The award acknowledges both author and translator.
• Therefore, the winning book was Heart Lamp.

Information Booster:

• The International Booker Prize focuses on international literature in translation.
• Kannada literature gained global recognition through this award.
• The prize strengthens visibility of Indian regional languages.

Additional Knowledge (Incorrect Options):

(A) Cascades
• Not a Kannada literary work.
• Not associated with the 2025 Booker Prize.
(B) The Girl with the Seven Lives
• Not written originally in Kannada.
• Did not win the 2025 award.
(D) Diotima
• A philosophical literary reference.
• Not the International Booker Prize winner.

Q.52 **Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.**
JUN : HRP
QWJ : OTL

A. JTE : HQH
B. UTM : SRO
C. HXB : FUE
D. GSK : EPM

Answer: D

Sol: **Information Given:**
JUN : HRP
QWJ : OTL

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: Each letter shifts −2, −3, +2 respectively.

JUN → HRP

J → H (−2)

U → R (−3)

N → P (+2)

QWJ → OTL

Q → O (−2)

W → T (−3)

J → L (+2)

Check options:

A) JTE → HQH

J→H (−2)

T→Q (−3)

E→H (+3) ✗

B) UTM → SRO

U→S (−2)

T→R (−2) ✗

C) HXB → FUE

H→F (−2)

X→U (−3)

B→E (+3) ✗

D) GSK → EPM

G→E (−2)

S→P (−3)

K→M (+2)

Final Answer:

GSK : EPM

Final Correct Option:

(D)

Q.53 An amount of ₹301 is divided among three persons in the ratio of 6 : 17 : 5. The difference between the largest and the smallest shares (in ₹) in the distribution is:

A. 130

B. 153

C. 150

D. 129

Answer: D

Sol: **Given:**

Total amount = ₹301

Ratio of shares = 6 : 17 : 5

Solution:

Sum of the ratio = 6 + 17 + 5 = 28

Value of one part = $\frac{301}{28}$ = 10.75

Shares of the three persons:

6× 10.75 = 64.50

17 × 10.75 = 182.75

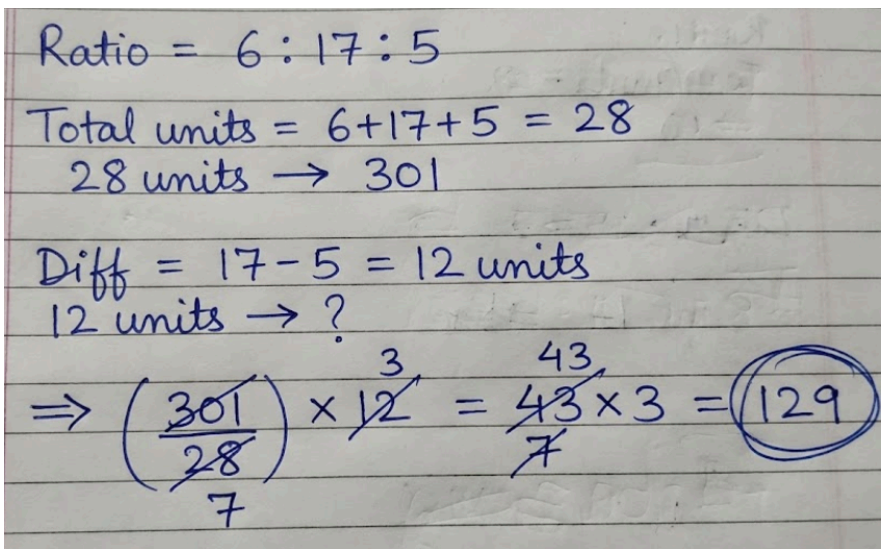
5 × 10.75 = 53.75

Largest share = ₹182.75

Smallest share = ₹53.75

Difference = 182.75 - 53.75 = 129

Alternate Solution (Exam Trick Method):



Q.54 If the equations 14x + 8y + 5 = 0 and 21x – ky – 7 = 0 have no solution, then the value of k is:

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

Answer: B

Sol: **Given:**

1) 14x + 8y + 5 = 0
2) 21x – ky – 7 = 0

Formula Used:

For two linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$:

Condition for no solution (parallel lines) is:

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Solution:

From equation (1): $a_1 = 14$, $b_1 = 8$, $c_1 = 5$

From equation (2): $a_2 = 21$, $b_2 = -k$, $c_2 = -7$

Now apply condition for parallel lines:

$$\frac{a_1}{a_2} = \frac{b_1}{b_2}$$
$$\frac{14}{21} = \frac{8}{-k}$$
$$\frac{2}{3} = \frac{8}{-k}$$
$$2(-k) = 24$$
$$-2k = 24$$
$$k = -12$$

Q.55 The number of cardinal points in a thin lens is:

A. zero
B. two
C. three
D. six

Answer: D

Sol:

Correct Answer: **(d)**

Explanation:

In optics, a lens system has six cardinal points:
• Two focal points • Two principal points • Two nodal points
Together these make a total of six cardinal points which describe image formation completely.
Additional Information:
• Used in geometrical optics • Help trace ray paths • Important in complex lens systems

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Q.56 **The sum of two numbers is 66 and their L.C.M. is 400. What are the two numbers?**

A. 21, 45
B. 14, 52
C. 16, 50
D. 9, 57

Answer: C

Sol: **Given:**
Sum of two numbers = 66
L.C.M. of two numbers = 400
Solution:
Let's check the options to find the pair that satisfies both conditions.
Option (c): 16 and 50
Sum = 16 + 50 = 66. (Condition satisfied)
L.C.M. of 16 and 50:
16 = 2^4
50 = 2×5^2
L.C.M. = $2^4 \times 5^2 = 16 \times 25 = 400$. (Condition satisfied)
Thus, the numbers are 16 and 50.
Final Answer
So the correct answer is (c)

Q.57 **Examine the dynamics of a rigid body pivoted or fixed. Which describes the possible motion?**

A. Only rotation
B. Combination of rotation and translation
C. Only translation
D. Linear motion

Answer: A

Sol: **Correct Answer: (a) Only rotation**

Explanation:

- A **rigid body pivoted or fixed at a point** cannot shift its position; the pivot **restricts translation**.
- Therefore, the body can only undergo **rotation about the fixed point or fixed axis**.

Information Booster:

- When a rigid body is fixed, its **centre of mass cannot move**, eliminating any translational motion.
- The motion is described by **angular displacement, angular velocity, and angular acceleration**.
- Examples:
  - A **door** rotating about its hinges
  - A **ceiling fan** rotating about its axis
  - A **pendulum rod** pivoted at the top
- Torque causes rotational motion when applied **away from the axis** of rotation.

Additional Knowledge:

- **Option (b)** is possible only when the body is *not* pivoted or fixed.
- **Option (c)** and **(d)** are impossible because fixation prevents movement of the body's centre of mass.
- Rigid body dynamics with a pivot follow **rotational equations of motion**, analogous to linear equations but using moment of inertia.

Q.58 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

A. GE–BC
B. TR–PN
C. RP–NL
D. WU–SQ

Answer: A

Sol:

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: Alphabetical shift (each letter moves −4).
Explanation:
A) G→B (−5), E→C (−2) ✗
B) T→P (−4), R→N (−4)
C) R→N (−4), P→L (−4)
D) W→S (−4), U→Q (−4)
Only A does not follow −4 shift rule.
So, odd one out is: **GE – BC**
Final Correct Option:
(A)

Q.59 The process of impeachment of the President of India is mentioned under which Article of the Indian Constitution?

A. Article 66
B. Article 59
C. Article 61
D. Article 63

Answer: C

Sol: The correct answer is (c) Article 61
Explanation:
● Article 61 provides the detailed procedure for the impeachment of the President of India.
● The only ground for impeachment is the "violation of the Constitution".
Information Booster:
● Impeachment charges can be initiated by either House of Parliament.
● A 14-day notice signed by at least one-fourth of the members must be given to the President.
● The resolution must be passed by a majority of at least two-thirds of the total membership of the House.
Additional Knowledge:
● Article 52: Provides for the office of the President.
● Article 63: Provides for the office of the Vice-President.
● Article 66: Deals with the election of the Vice-President.

Q.60 Caustic soda is generally NOT used in the

A. detergent industry
B. paper and pulp industry
C. manufacture of ammonia
D. fabric industry

Answer: C

Sol: The correct answer is **(C) manufacture of ammonia**.
· **Caustic soda (sodium hydroxide, NaOH)** is a versatile chemical used in many industries, but it is **not typically used in the manufacture of ammonia**.

· Instead, ammonia is produced primarily through the **Haber-Bosch process**, which involves nitrogen and hydrogen gases under high pressure and temperature, using a catalyst.

Use of Caustic Soda in Other Industries:

- **Detergent Industry** : Used for saponification, which is the process of converting fats and oils into soap.
- **Paper and Pulp Industry** : Used for pulping wood and removing lignin from fibers.
- **Fabric Industry** : Used in mercerization to improve the texture and strength of fabrics like cotton.

Why Not in Ammonia Production:

- The production of ammonia does not require **caustic soda** as it relies on chemical reactions involving nitrogen and hydrogen, not hydroxides.

Q.61 For the quadratic equation $7x^2$ - 28x + 21 = 0, what is the sum of the roots?

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

Answer: A

Sol: **Given**

Quadratic equation: $7x^2 - 28x + 21 = 0$

Formula Used

Sum of roots = −(Coefficient of x) ÷ Coefficient of x^2

Solution

Here, a = 7 and b = −28

Sum of roots = $\frac{28}{7}$ = 4

Final Answer

So the correct answer is (a)

Q.62 The sum of five numbers is 655. The average of the first two numbers is 75 and the third number is 109. Find the average of the remaining two numbers?

A. 199
B. 198
C. 184
D. 185

Answer: B

Sol: **Given**

Sum of five numbers $= 655$

Average of first two numbers $= 75$

Third number $= 109$

Formula Used

$$\text{Average} = \frac{\text{Sum}}{\text{Number of observations}}$$

Solution

Sum of first two numbers $= 75 \times 2 = 150$

Sum of first three numbers $= 150 + 109 = 259$

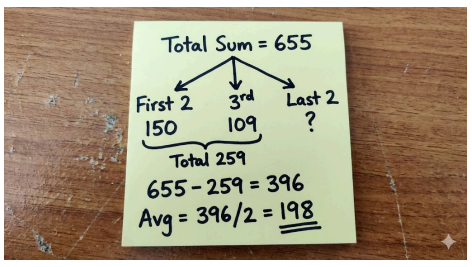
Sum of remaining two numbers $= 655 - 259 = 396$

Average of remaining two numbers $= \frac{396}{2} = 198$

Final Answer

198

Exam Hall Method:



Q.63 If $x = 2 + \sqrt{3}$, what is the value of $x^2 + \frac{1}{x^2}$?

A. 14
B. 16
C. 30
D. 26

Answer: A

Sol: **Given:**

x = 2 + $\sqrt{3}$

Formula Used:

$$(x + \frac{1}{x})^2 = x^2 + \frac{1}{x^2} + 2$$

Solution:

$$\frac{1}{x} = 2 - \sqrt{3}$$

$$x + \frac{1}{x} = 4$$

$$(x + \frac{1}{x})^2 = 16$$

$$x^2 + \frac{1}{x^2} + 2 = 16$$

$$x^2 + \frac{1}{x^2} = 14$$

Q.64 What is the unit of measurement for frequency?

A. Hertz (Hz)
B. Joule
C. Pascal
D. Millisecond

Answer: A

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

Explanation:

- Frequency refers to the **number of cycles or vibrations per second**.
- It is measured in **Hertz (Hz)**, where **1 Hz = 1 cycle per second**.
- It is commonly used in sound waves, AC currents, and electromagnetic waves.

Information Booster:

- SI unit of frequency – Hertz (Hz).
- Named after **Heinrich Hertz**, German physicist.
- Used in radio waves and audio signals.
- Higher frequency → higher pitch of sound.
- Measured using oscilloscope or frequency meter.

Additional Knowledge:

- Joule – Unit of energy.
- Pascal – Unit of pressure.
- Millisecond – Unit of time.

Q.65 **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:

Some orchids are cacti.

No cactus is a marigold.

Conclusions:

(I) No marigold is a cactus.

(II) Some cacti are orchids.

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

Answer: D

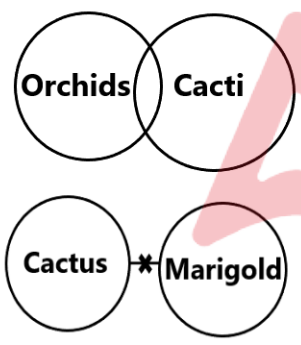
Sol: **Given:**

Statements:

Some orchids are cacti.

No cactus is a marigold.

From the given statements Venn diagram will be:



Conclusions:

(I) No marigold is a cactus. - No cactus is a marigold. This can be rewritten as: No marigold is a cactus. (Universal negative statements are reversible.)

Conclusion (I) follows.

(II) Some cacti are orchids. - Some orchids are cacti. This directly implies: Some cacti are orchids. **Follows.**

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

Thus, the correct option is: (d)

Q.66 **Tarun, Manav, Nitu, Hema, and Priya are standing in a row according to their height. Which of the following statements is sufficient to answer the following question?**

Who among the five is standing in the middle?

Statements:

1. Nitu is the tallest

2. Tarun is taller than Manav

3. Hema is the shortest of them all

4. Manav is taller than Priya

A. Statements 1, 2, 3 and 4 together are sufficient
B. Statement 1 and 3 are sufficient
C. Statement 1, 2 and 3 alone are sufficient
D. None of the statements are sufficient

Answer: A

Sol: Who among the five is standing in the middle?

Statements:

1. Nitu is the tallest

Nitu > _ > _ > _ > _

2. Tarun is taller than Manav

Tarun > Manav

3. Hema is the shortest of them all

_ > _ > _ > _ > Hema

4. Manav is taller than Priya

Manav > Priya

From 1, 2, 3 and 4 statements:

Nitu > Tarun > Manav > Priya > Hema

Manav is standing in the middle.

So, **Statements 1, 2, 3 and 4 together are sufficient**

Thus, correct option is (a).

Q.67 **Which of the following Articles of the Indian Constitution guarantee religious freedom?**

A. Article 19-22
B. Article 25-28
C. Article 22-23
D. Article 14-18

Answer: B

Sol: The correct answer is **(B) Article 25-28**

Explanation:

The **Right to Freedom of Religion** is guaranteed under Articles 25 to 28 of the Indian Constitution:

- **Article 25:** Freedom of conscience and free profession, practice and propagation of religion.
- **Article 26:** Freedom to manage religious affairs.
- **Article 27:** Freedom from payment of taxes for promotion of any particular religion.
- **Article 28:** Freedom from attending religious instruction in certain educational institutions.

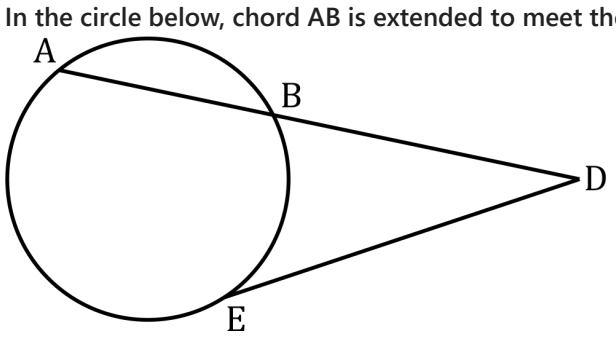
Information Booster:

- These rights are available to both citizens and non-citizens.
- They are subject to public order, morality, and health.

Additional Knowledge:

- **Article 14-18 (Option D):** Right to Equality.
- **Article 19-22 (Option A):** Right to Freedom (Speech, Assembly, etc.).
- **Article 23-24:** Right against Exploitation.

Q.68 **In the circle below, chord AB is extended to meet the tangent DE at D. If AB = 9 cm and BD = 3 cm, find the length of DE.**



A. 5 cm
B. 4 cm
C. $\sqrt{27}cm$
D. 6 cm

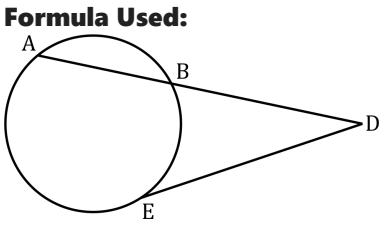
Answer: D

Sol: **Given:**

AB = 9 cm

BD = 3cm

Formula Used:



If DBA is the intersecting line of the circle which intersects the circle at A and B and DE is a tangent, then

$DE^2 = AD \times BD$

Solution:

According to the question,

$DE^2 = AD \times BD$

$\Rightarrow DE^2 = (AB + BD) \times BD$

$\Rightarrow DE^2 = (9 + 3) \times 3$

$\Rightarrow DE^2 = \sqrt{36}$

$\Rightarrow DE = 6$ cm

Q.69 **A boat travels 14 km upstream in 14 hours and 171 km downstream in 9 hours. What is the speed of the boat in still water?**

A. 18 km/hr
B. 6 km/hr
C. 17 km/hr
D. 10 km/hr

Answer: D

Sol: **Given:**

Upstream: $14\ \text{km in } 14\ \text{h}$

Downstream: $171\ \text{km in } 9\ \text{h}$

Find speed of boat in still water.

Formula Used:

Upstream speed = (b - c)

Downstream speed = (b + c)

Boat speed in still water = $\frac{(b+c)+(b-c)}{2}$

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

Solution:

Upstream speed:

$\frac{14}{14} = 1\ \text{km/h}$

Downstream speed:

$\frac{171}{9} = 19\ \text{km/h}$

Boat speed in still water:

$\frac{1+19}{2} = \frac{20}{2} = 10\ \text{km/hr}$

Q.70 **The relation between focal length and radius of curvature for a spherical mirror is:**

A. R = f/2
B. f = 3R
C. f = R/4
D. f = R/2

Answer: D

Sol: **The correct answer is (d).**

Explanation

For spherical mirrors, the focal point lies midway between the pole and the center of curvature. Hence focal length is half of the radius of curvature. Therefore the mathematical relation is focal length equals radius of curvature divided by two.

Additional Information

• Option {a} reverses the relation. • Option {b} and {c} are incorrect proportionalities. • This relation holds for both concave and convex mirrors under paraxial approximation.

Q.71 Which Indian naval ship visited Port Louis, Mauritius, in March 2025 to participate in the 57th National Day celebrations?

A. INS Vikrant
B. INS Imphal
C. INS Chennai
D. INS Kolkata

Answer: B

Sol: **The correct answer is (C) INS Chennai**

Explanation:

● In **March 2025**, **INS Chennai**, a Kolkata-class stealth guided missile destroyer of the Indian Navy, visited **Port Louis, Mauritius**, to participate in the nation's **57th National Day celebrations**.
● The visit strengthened India–Mauritius maritime partnership and showcased India's commitment to the Indian Ocean Region (IOR).
● INS Chennai routinely participates in international deployments to enhance naval diplomacy and regional security cooperation.
● Its presence in Mauritius was part of India's broader vision of **SAGAR (Security and Growth for All in the Region)**.

Information Booster:

● INS Chennai was commissioned in **2016**.
● It belongs to the **Project 15A** class of destroyers.
● Mauritius celebrates National Day on **12 March**.
● India and Mauritius share strong defence and cultural ties.
● Indian Navy ships often assist Mauritius in EEZ surveillance.

Additional Knowledge:

● INS Vikrant – India's first indigenous aircraft carrier; not part of this event.
● INS Imphal – A Project 15B destroyer commissioned in 2023.

Q.72 What sum (in ₹) will earn an interest of ₹420 in 2 years at 5% simple interest per year?

A. ₹4,350
B. ₹4,400
C. ₹4,000
D. ₹4,200

Answer: D

Sol: **Given:**

SI = 420

R = 5%

T = 2

Formula Used:

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

Solution:

$$420 = \frac{P \times 5 \times 2}{100}$$

$$420 = \frac{10P}{100}$$

$$420 = \frac{P}{10}$$

P = 4200

Q.73 The average weight of A, B and C is 45 kg. If the average weight of A and B is 39 kg and that of B and C is 48 kg, then the weight of B (in kg) is:

A. 54
B. 39
C. 29
D. 49

Answer: B

Sol: Given:
Average weight of $A, B, C = 45$ kg
Average weight of $A, B = 39$ kg
Average weight of $B, C = 48$ kg
Concept Used:
Average
Formula Used:
$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$
Solution:
$A + B + C = 3 \times 45 = 135$
$A + B = 2 \times 39 = 78$
$B + C = 2 \times 48 = 96$
$(A + B) + (B + C) = 78 + 96$
$A + 2B + C = 174$
$(A + B + C) + B = 174$
$135 + B = 174$
$B = 39$
Final Answer:
39 kg

Q.74 India holds which position in the Global Hunger Index (GHI) 2025?

A. 100th
B. 102nd
C. 110th
D. 95th

Answer: B

Sol: The correct answer is **(B) 102nd**

Explanation:
• India was ranked 102nd in the Global Hunger Index (GHI) 2025.
• The index calculates hunger scores based on undernourishment, child wasting, child stunting, and child mortality.

Information Booster:
• The GHI is a tool designed to measure and track hunger at global, regional, and national levels.

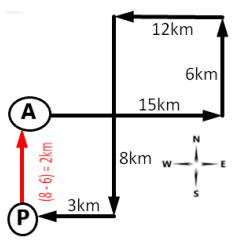
Additional Knowledge:
• India has often contested the methodology of the GHI, particularly regarding the opinion-based survey components.

Q.75 **Samad starts from Point A and drives 15 km towards East. He then takes a left turn, drives 6 km, turns left and drives 12 km. He then takes a left turn and drives 8 km. He takes a final right 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° turns only unless specified.)**

A. 2 km towards North
B. 4 km towards South
C. 2 km towards West
D. 4 km towards North

Answer: A

Sol: **Given:**
Samad starts from Point A and drives 15 km towards East.
He then takes a left turn, drives 6 km, turns left and drives 12 km.
He then takes a left turn and drives 8 km.
He takes a final right turn, drives 3 km and stops at Point P.



So, To reach A → drive 2 km North.
Final Answer:
2 km towards North
Final Correct Option:
(A)

Q.76 Simplify: $[2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times \left[\frac{2}{5} \text{ of } \frac{3}{5} \text{ of } 100\right]$

A. 25
B. 0
C. 24
D. 12

Answer: C

Sol: **Given:**
$[2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times \left[\frac{2}{5} \text{ of } \frac{3}{5} \text{ of } 100\right]$

Solution:

$[2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times \left[\frac{2}{5} \text{ of } \frac{3}{5} \text{ of } 100\right]$

$= [2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times \left[\frac{2}{5} \times \frac{3}{5} \times 100\right]$

$$= [2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times \left[\frac{2}{5} \times \frac{3}{5} \times 100\right]$$
$$= [2 \times \frac{3}{2} - 3 \times \frac{2}{3}] \times [24]$$
$$= [3 - 2] \times [24]$$
$$= 24$$

Q.77 Which among the plant kingdoms is also known as the amphibians of the plant kingdom?

A. Bryophyte
B. Thallophyte
C. Gymnosperms
D. Angiosperms

Answer: A

Sol: **Correct Answer:** (a)

Explanation:

· **Bryophytes** are known as the amphibians of the plant kingdom because they live in soil but are dependent on **water for sexual reproduction**.
· These plants lack true roots, stems, or leaves, but possess root-like (rhizoids), leaf-like, or stem-like structures.
· The plant body is more differentiated than that of thallophytes and is commonly found in damp, humid, and shaded localities.

Information Booster:

· Bryophytes are characterized by the absence of specialized **vascular tissues** (xylem and phloem) for the conduction of water and other substances.
· Common examples include **Mosses** (*Funaria*) and **Liverworts** (*Marchantia*).
· They play an important role in plant succession on bare rocks and soil.

Additional Knowledge:

· **Thallophyte:** These plants have a body that is not differentiated into roots, stems, and leaves; this group primarily includes algae (e.g., *Spirogyra*) and they are mostly aquatic.
· **Gymnosperms:** These are "naked-seeded" plants where the ovules are not enclosed by any ovary wall and remain exposed both before and after fertilization (e.g., Pine, Deodar).
· **Angiosperms:** These are flowering plants where the seeds are enclosed within fruits. They are the most highly evolved and diverse group of plants.

Q.78 In a certain code language,
'A # B' means 'A is the brother of B',
'A % B' means 'A is the daughter of B',
'A = B' means 'A is the wife of B' and
'A ¥ B' means 'A is the father of B'.
How is D related to S if 'D = O # M ¥ E % S'?

A. Father's brother's son
B. Father's brother's sister
C. Husband's brother's wife
D. Father's brother's daughter

Answer: C

Sol: **Given:**

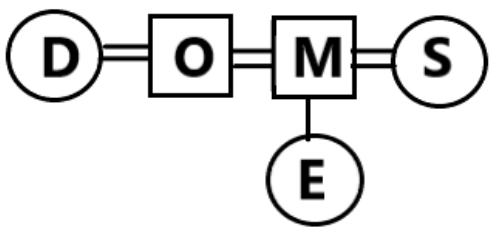
'A # B' means 'A is the brother of B',

Sign	#	%	=	¥
Relations	Brother	Daughter	Wife	Father

Symbol in Diagram	Meaning
- / O	Female
+ / □	Male
=	Married Couple
—	Siblings
|	Difference Of Generation

D = O # M ¥ E % S'?

From the given information relationship diagram will be:



Therefore, D is wife of S's brother-in-law **= Husband's brother's wife**

Final Answer:

Husband's brother's wife

Final Correct Option:

(C)

Q.79 **Pooja and Ritu invest in a business in the ratio 4 : 1. If total profit is Rs. 1480, then what is difference between the profit (in Rs.) of Pooja and Ritu?**

A. 788
B. 988
C. 888
D. 938

Answer: C

Sol: **Given:**

Investment ratio of Pooja and Ritu = 4 : 1

Total profit = Rs. 1,480

Solution:

4x + x = 5x

5x = 1480

x = 296

4x - x = 3x

3x = 3×296

3x = 888

Q.80 **Who is the author of the 2025 novel Dream Count?**

A. Chimamanda Ngozi Adichie
B. Dan Brown
C. Ocean Vuong
D. Philip Pullman

Answer: A

Sol: **The correct answer is (A) Chimamanda Ngozi Adichie**

Explanation:

- The 2025 novel **"Dream Count"** is authored by **Chimamanda Ngozi Adichie**, a globally acclaimed Nigerian writer.
- She is known for works like *Half of a Yellow Sun*, *Americanah*, and *The Thing Around Your Neck*.
- "Dream Count" continues her focus on themes of identity, migration, memory, and human relationships.
- The novel received international attention upon release due to Adichie's literary influence.

Information Booster:

- Adichie is a winner of the **Orange Prize for Fiction**.
- She delivered the famous TED Talk **"We Should All Be Feminists."**

- Her writing blends African storytelling with global themes.
- Considered one of the most influential contemporary authors.
- Frequently features in global literary rankings and awards.

Additional Knowledge:

- Dan Brown – Famous for thrillers like *The Da Vinci Code*.
- Ocean Vuong – Vietnamese-American poet and novelist; known for *On Earth We're Briefly Gorgeous*.
- Philip Pullman – British author of *His Dark Materials* series.

Q.81 **"Interpreter of Maladies" was written by:**

A. Kiran Desai
B. Aravind Adiga
C. Jhumpa Lahiri
D. Anita Nair

Answer: C

Sol: The correct answer is **(C) Jhumpa Lahiri**

Explanation:

• 'Interpreter of Maladies' is a collection of nine short stories by Indian-American author Jhumpa Lahiri, published in 1999.
• The book won the **Pulitzer Prize for Fiction** in 2000, making Lahiri one of the youngest recipients of the award.
• The stories explore themes of the immigrant experience, the clash of cultures (Indian vs. American), and the complexities of human relationships and communication.
• The title story follows an Indian-American family on vacation in India and their interaction with a local tour guide.

Information Booster:

• **Other Works:** Lahiri is also famous for her novel 'The Namesake' and 'The Lowland.'
• **Awards:** Besides the Pulitzer, the collection won the PEN/Hemingway Award for Debut Fiction.
• **Style:** Her writing is characterized by its plain, elegant prose and sensitive portrayal of the emotional landscapes of her characters.

Additional Knowledge:

• **Kiran Desai (Option A):** Famous for 'The Inheritance of Loss,' which won the Man Booker Prize in 2006.
• **Aravind Adiga (Option B):** Best known for his debut novel 'The White Tiger,' which won the Man Booker Prize in 2008.
• **Anita Nair (Option D):** A prominent Indian English novelist known for works like 'Ladies Coupé' and 'The Better Man.'

Q.82 **The process by which traits are passed from parents to offspring is known as _____.**

A. mutation
B. heredity
C. hybridisation
D. linkage

Answer: B

Sol: The correct answer is **(B) heredity**

Explanation:

• Heredity is the transmission of genetic characteristics from one generation to the next.
• This process is the basis of continuity of life and variations within a species.

Information Booster:

• Gregor Mendel is known as the 'Father of Genetics' for his work on pea plants regarding heredity.

Additional Knowledge:

• Mutation (Option A): A sudden, permanent change in the DNA sequence.
• Hybridisation (Option C): The process of crossing two different individuals to create offspring with combined traits.

Q.83 **If 1 is added to each even digit and 2 is subtracted from each odd digit in the number 4268953, then how many digits will appear more than once in the new number thus formed?**

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

Answer: D

Sol: **Information Given:**
Number: 4268953
Rule:
+1 to each even digit
−2 from each odd digit
Explanation:
4 (even) → 5
2 (even) → 3
6 (even) → 7
8 (even) → 9
9 (odd) → 7
5 (odd) → 3
3 (odd) → 1
New number: 5 3 7 9 7 3 1
Repeated digits:
3 appears twice
7 appears twice
So digits appearing more than once = 2
Final Answer:
Two
Final Correct Option:
(D)

Q.84 **What should come in place of the question mark (?) in the given series?**
24 ? 45 66 94 129

A. 44
B. 41
C. 31
D. 38

Answer: C

Sol: **Information Given:**
Series: 24 ? 45 66 94 129
Logic: Differences increase by consecutive integers (+7, +8, +9, +10, +11).
Let missing term = x
45 − x = 8
66 − 45 = 21? (Check properly stepwise)
Check known differences:
66 − 45 = 21
94 − 66 = 28
129 − 94 = 35
Pattern: 21, 28, 35 → increase by 7
So previous differences must be 7 and 14.
Thus:
24 + 7 = 31
31 + 14 = 45
45 + 21 = 66
66 + 28 = 94
94 + 35 = 129
Hence missing term = 31
Final Answer:
31
Final Correct Option:
(C)

Q.85 **A is the sister of H. H is the mother of R. R is the son of M. G is the mother of M. How is A related to M?**

A. Son's daughter
B. Son's wife's mother
C. Wife's sister
D. Son's wife's sister

Answer: C

Sol: **Given:**

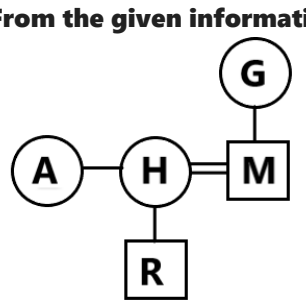
A is the sister of H.

H is the mother of R.

R is the son of M.

G is the mother of M.

From the given information relationship diagram will be:



Thus, A = wife's sister of M.

Final Answer:

Wife's sister

Final Correct Option:

(C)

Q.86 **In sickle cell anaemia:**

A. valine is replaced by glutamic acid
B. glutamic acid is replaced by valine
C. tryptophan is replaced by glutamic acid
D. alanine is replaced by glutamic acid

Answer: B

Sol:

Explanation:

· Sickle cell anaemia is an inherited **red blood cell disorders** in which there are not enough healthy red blood cells to carry oxygen throughout your body.

· **Haemoglobin** (Hb) is the iron-containing oxygen-transport metalloprotein in the red blood cells of the blood in vertebrates and other animals.

· Normal haemoglobin is called haemoglobin A, but people with sickle cell disease have only **haemoglobin S**, which turns normal, round red blood cells into abnormally curved (sickle) shapes.

· Disease is caused by a **point mutation** in the **ß-globin chain of haemoglobin**, replacing the amino acid glutamic acid with the **less polar amino acid valine** at the **sixth** position of the ß chain.

So Sickle-cell anaemia **glutamic acid is replaced by valine** amino Acid.

Additional Information

· **Normally RBCs are discs like shapes**, which give them the flexibility to travel through even the smallest blood vessels. However, in sickle cell anaemia, the RBCs have an **abnormal crescent shape resembling a sickle**.

· **Red blood cells** usually **live** for about **120 days** but sickle cells usually **die in 10 to 20 days,** and **chronic anaemia** caused by excessive destruction of the abnormal red blood cells.

Q.87 **During El Niño, heavy rainfall occurs in which region?**

A. Australia
B. South America
C. North America
D. Equator region

Answer: B

N/A

Q.88 **What will come in the place of the question mark (?) in the following equation, if '+' and '÷' are interchanged, and '–' and '×' are interchanged?**
27 × 11 – 3 ÷ 56 + 2 = ?

A. 22
B. 41
C. 34
D. 26

Answer: A

Sol: **Information Given:**

Expression: 27 × 11 − 3 ÷ 56 + 2

Rule:

'+' ↔ '÷'

'−' ↔ '×'

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

New expression:

27 − 11 × 3 + 56 ÷ 2

Solve:

11 × 3 = 33

56 ÷ 2 = 28

Now: 27 − 33 + 28

= −6 + 28

= 22

Final Answer:

22

Final Correct Option:

(A)

Q.89 **Which of the following is paramagnetic?**

A. CN

B. CO

C. **O_2**

D. NO+

Answer: C

Sol: **Concept:**

Paramagnetic materials:

• Small positive susceptibility to magnetic fields • These materials are slightly attracted by a magnetic field • Paramagnetic properties are due to the presence of some **unpaired electrons**, and from the realignment of the electron paths caused by the external magnetic field • Paramagnetic materials include **magnesium, molybdenum, lithium, and tantalum**.

Bond order:

• It is the number of bonds between two atoms. • The bonding electrons being **stable** contributes to **increasing** the bond order. • The antibonding electrons being **unstable** contributes to **decreasing** the bond order.

Bond order is given by

1/2 (No. of bonding – no. of antibonding electrons)

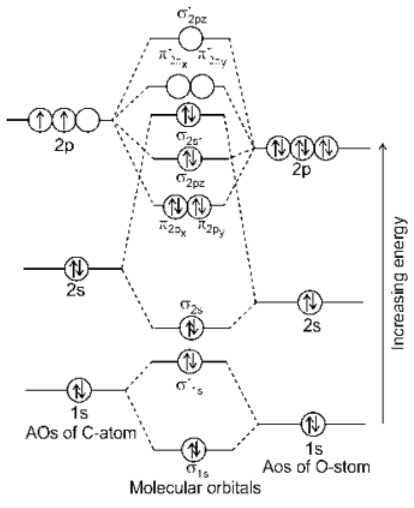
• For filling up of electrons, we need to follow the series: σ 1 s σ* 1 s σ 2 s σ* 2 s σ 2pz π 2px π 2py π* 2px π* 2py σ* 2pz

• For molecules till nitrogen, there is a **slight change in the M. O energy order:**

σ 1 s σ* 1 s σ 2s σ* 2 s π 2px π 2py σ 2pz π* 2px π* 2py σ* 2pz

Explanation:

• The M. O diagram of CO is



• From the M. O diagram of CO, we see that there are **no unpaired electrons** and the molecule is thus **diamagnetic**.

O_2 molecule, the electronic configuration is:

σ 1 s ^{2} σ* 1 s ^{2} σ 2 s ^{2} σ* 2 s ^{2} σ 2pz ^{2} π 2px ^{2} π 2py ^{2} π* 2px ^{1}

• There are **10 bonding and 7 antibonding electrons** out of which **one electron in antibonding orbital is unpaired**. • The unpaired electron makes it **paramagnetic in nature**.

The M. O of NO^+ is as follows:

(energy diagram shown)

• From the M.O diagram of NO^+, we see that there are **no unpaired electrons** and the molecule is thus **diamagnetic**.
If we construct the M.O diagram of **CN**, we will see that there are **no unpaired electrons**.
Hence O_2 is paramagnetic.

Q.90 What will be the area of a parallelogram with base 44 cm and height 22 cm?

A. 968 cm^2
B. 988 cm^2
C. 958 cm^2
D. 978 cm^2

Answer: A

Sol: **Given:**
Base = 44 cm

Height = 22 cm

Formula used:

Area of a parallelogram = Base × Height

Solution:

The area of the parallelogram = 44 × 22 = 968 cm^2

∴ The area of the parallelogram will be **968 cm^2.**

Q.91 What is the remainder when $7^2 \times 9^2$ is divided by 8?

A. 0
B. 6
C. 1
D. 3

Answer: C

Sol: **Given:**
Number = $7^2 \times 9^2$
Divisor = 8

Solution:
$7^2 \times 9^2 = 3969$

$$
\begin{array}{r|l}
8 & 3969 \\
 & \underline{32} \\
 & 769 \\
 & \underline{72} \\
 & 49 \\
 & \underline{48} \\
 & 1\ (\text{Remainder})
\end{array}
$$

Trick:

$$\frac{7^2 \times 9^2}{8} = \frac{(8-1)^2 \times (8+1)^2}{8}$$
$$= \frac{(-1)^2 \times (+1)^2}{8}$$
$$= 1 \times 1$$

Remainder = 1

Q.92 **Which of the following Bollywood actresses was honoured at the inaugural Global Vanguard Honour, 2025, held in Los Angeles?**

A. Deepika Padukone
B. Nitanshi Goel
C. Pratibha Ranta
D. Priyanka Chopra

Answer: D

Sol: The correct answer is **(D) Priyanka Chopra**

Explanation:
• Priyanka Chopra was recognized at the Global Vanguard Honour in early 2025 for her contribution to global cinema and her philanthropic work.
• The event celebrates icons who bridge the gap between different entertainment industries worldwide.

Information Booster:
• Priyanka Chopra is a UNICEF Goodwill Ambassador and has been a prominent face for India in Hollywood.

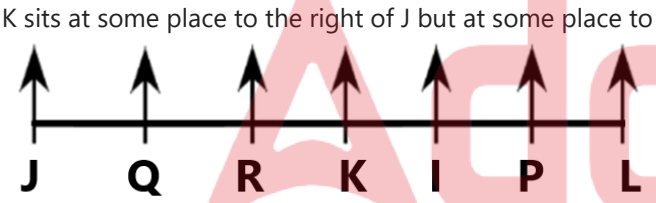
Additional Knowledge:
• Nitanshi Goel and Pratibha Ranta (Options B & C): Young actresses who gained significant fame recently for the film 'Laapataa Ladies'.

Q.93 **Seven people, I, J, K, L, P, Q and R are sitting in a row, facing north. Only two people sit to the left of R. Only three people sit between R and L. I sits second to the right of R. Only two people sit between I and Q. K sits at some place to the right of J but at some place to the left of P. How many people sit to the right of K?**

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

Answer: A

Sol: **Given:**
Seven people, I, J, K, L, P, Q and R are sitting in a row, facing north.
Only two people sit to the left of R.
Only three people sit between R and L.
I sits second to the right of R.
Only two people sit between I and Q.
K sits at some place to the right of J but at some place to the left of P.



So, **Three** people sit to the right of K.
Thus, the correct option is: (a)

Q.94 **The quadratic equation $2x^2 + 4x + 8 = 0$ has:**

A. two equal real roots
B. two distinct real roots
C. more than 2 real roots
D. no real roots

Answer: D

Sol: **Given:**
$2x^2 + 4x + 8 = 0$

Formula Used:

The nature of the roots of a quadratic equation is determined using the discriminant:

$\Delta = b^2 - 4ac$

If Δ > 0: Two distinct real roots
If Δ = 0: Two equal real roots
If Δ < 0: No real roots

Solution:

Given equation: $2x^2 + 4x + 8 = 0$

Here, a = 2, b = 4, c = 8

Discriminant formula: $\Delta = b^2 - 4ac$

$\Delta = 4^2 - 4 \times 2 \times 8$
$\Delta = 16 - 64$
$\Delta = -48$

Since Δ < 0, the equation has no real roots.

Q.95 **If the mode of a data set exceeds its mean by 37.8, then the mode exceeds the median by ____. (Use empirical formula.)**

A. 29.3
B. 31.6
C. 24.8
D. 25.2

Answer: D

Sol: **Given:**
Mode exceeds Mean by 37.8
$\text{Mode} - \text{Mean} = 37.8$

Formula Used:

Mode = 3 Median - 2 Mean

Solution:

Given,
$\text{Mode} - \text{Mean} = 37.8$

$\text{Mode} - \text{Mean} = 3(\text{Median} - \text{Mean})$
37.8 = 3(Median - Mean)
$\text{Median} - \text{Mean} = \frac{37.8}{3} = 12.6$
Now,
$\text{Mode} - \text{Median} = (\text{Mode} - \text{Mean}) - (\text{Median} - \text{Mean})$
= 37.8 - 12.6 = 25.2

Q.96 **In 1932, the Poona Pact was signed between Mahatma Gandhi and _____.**

A. C. Natesa Mudaliar
B. Taravath Madhavan Nair
C. Ramaswami Naicker-Periyar
D. Dr. Babasaheb Ambedkar

Answer: D

Sol: **Correct Answer**: (d) **Dr. Babasaheb Ambedkar**

Explanation: The **Poona Pact** was an agreement signed on **24th September 1932** between **Mahatma Gandhi** and **Dr. B.R. Ambedkar** to resolve the issue of separate electorates for the "Depressed Classes" (Scheduled Castes). This pact was a result of the communal award announced by the British Prime Minister Ramsay MacDonald, which granted separate electorates for various communities, including Dalits.

Mahatma Gandhi strongly opposed the idea of separate electorates for Dalits, fearing it would divide the Hindu community. While Ambedkar initially supported the provision to ensure political representation for Dalits, a compromise was reached through the Poona Pact. As per the agreement:

· The idea of separate electorates for Dalits was dropped.

· Instead, **reserved seats** for Dalits in provincial legislatures were increased.

· Dalits were to be elected by a joint electorate, ensuring representation while preserving unity.

Key Facts (Exam-Oriented):

· The **Poona Pact** was signed on **24th September 1932**.

· It provided **reserved seats** for Dalits in legislatures instead of separate electorates.

· The reservation quota for Scheduled Castes in provincial legislatures was fixed at **148 seats**.

· The pact symbolized a compromise between the demands of Dalit leaders and the broader nationalist movement.

· This agreement played a crucial role in shaping the political rights of Scheduled Castes in India.

Q.97 Evaluate: 16 + 18 ÷ 3 - 3 × 3

A. 13
B. 15
C. 12
D. 16

Answer: A

Sol: **Given:**

16 + 18 ÷ 3 - 3 × 3

Concept used:

Operation preference wise	Symbol
$Brackets$	$[], , ()$
$Orders, of$	$^2(power), \sqrt{}(root), of$
$Division$	$\div$
$Multiplication$	$\times$
$Addition$	$+$
$Subtraction$	$-$

Solution:

$16 + 18 \div 3 - 3 \times 3$

$= 16 + 6 - 3 \times 3$

$= 16 + 6 - 9$

$= 22 - 9$

$= 13$

Q.98 What should come in place of the question mark (?) in the given series?
16 28 50 82 124 ?

A. 162
B. 176
C. 194
D. 185

Answer: B

Sol: **Information Given:**

Series: 16 28 50 82 124 ?

Logic: Differences increase by +10 each time.
28 − 16 = 12
50 − 28 = 22
82 − 50 = 32
124 − 82 = 42
Pattern: 12, 22, 32, 42 → increase by 10
Next difference = 52
Next term = 124 + 52 = 176
Final Answer:
176
Final Correct Option:
(B)

Q.99 **Which one of the following correctly describes the role of oxytocin in childbirth?**

A. Stimulates milk production in mammary glands
B. Inhibits uterine contraction
C. Triggers strong uterine contractions during labor
D. Prepares cervix by breaking fetal membranes

Answer: C

Sol: **The correct answer is (c).**
Explanation

Oxytocin is secreted by the posterior pituitary and causes rhythmic contraction of the uterus, helping in the delivery of the baby.

Additional Information:
· {a} is the role of prolactin.
· {b} is incorrect as oxytocin stimulates—not inhibits—contraction.
· {d} is more related to prostaglandins and enzymatic action.

Q.100 **What makes the xylem vessels waterproof?**

A. Cutin
B. Cellulose
C. Lignin
D. Suberin

Answer: C

Sol: The correct answer is (C) Lignin

- **Lignin** is a complex organic polymer that is deposited in the **cell walls** of xylem vessels.
- It **strengthens** the walls and **makes them waterproof**, enabling efficient **transport of water and minerals** from the roots to other parts of the plant.
- Lignification also helps the xylem resist **collapse under tension** caused by the transpiration pull.

Information Booster:

- **Xylem** tissue consists of **tracheids, vessels, xylem parenchyma, and xylem fibers**.
- **Vessels and tracheids** are the main conducting elements and are **dead cells** at maturity.
- **Lignin deposition** creates **thickenings** such as annular, spiral, and pitted patterns in vessel walls.
- The **rigidity and impermeability** provided by lignin are essential for the **unidirectional flow** of water.

Additional Information:

- **Option A (Cutin):** Found in the **cuticle** of leaves, not in xylem; prevents water loss from the leaf surface.
- **Option B (Cellulose):** Main component of plant cell walls, but not responsible for waterproofing.
- **Option D (Suberin):** Found in the **cork (bark)** and **Casparian strip** of roots; it prevents water loss but not specific to xylem waterproofing.
