**1. Who among the following singers was awarded Padma Shri in 2024 for his significant contribution to Himachali folk and classical music?**

(a) Hansraj Raghuvanshi
(b) Kuldeep Sharma
(c) Mohit Chauhan
(d) Som Dutt Battu **[d]**

**व्याख्या–**

In 2024, Som Dutt Battu was awarded the Padma Shri for his contribution to Himachali folk and classical music. He is the only recipient of this honor from Himachal Pradesh. He was born in 1937 in Jassur in Kangra district, and has been a distinguished singer of the Patiala Gharana. He contributed to classical and folk music for almost seven decades and promoted Indian music in many countries. Gurus like his father, Pt. Ram Lal Battu, and Ustad Aashiq Ali Khan played an important role in his musical journey. Som Dutt Battu served as a professor of music in various colleges in Shimla for 38 years. His disciples are promoting Indian music in the country and abroad. He has previously received honors like Sangeet Natak Akademi Award, Himachal Gaurav, Punjab Sangeet Ratna Award, and Life Time Achievement Award. He has been given this prestigious honor in view of his musical journey and contribution.

**2. The equivalent resistance of a series combination of R ohm and 5 ohm is 7 ohm. The value of R is _____.**

(a) 7 ohm
(b) 5 ohm
(c) 2 ohm
(d) 1 ohm **[c]**

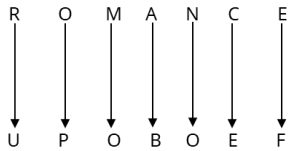
**Explanation –**

When resistors are connected in series combination, their equivalent resistance is equal to the sum of their individual resistances.
Given –
The value of one resistance is R ohm.
The value of the other resistance is 5 ohm.
The equivalent resistance of the series combination is 7 ohm.
So, we can write the equation:
R + 5 ohm = 7 ohm
To find the value of R, solve the equation:
R = 7 ohm – 5 ohm
R = 2 ohm
So, the value of R is 2 ohm.

**3. If each vowel of the word ROMANCE is replaced by the consonant immediately following it in the English alphabetical order, and each consonant is replaced by the vowel immediately following it in the English alphabetical order, then which of the following letters will appear twice in the new group of letters thus formed?**

(a) U
(b) O
(c) F
(d) P **[b]**

**व्याख्या –**




Letter appearing twice in the new letter group = O

**4. If the mean of a data is 65 and its mode is 23, then find the median using empirical formula.**

(a) 51
(b) 54
(c) 52
(d) 53 **[a]**

**व्याख्या:-**

Mean = 65
Mode = 23
Mode = 3 × Median – 2 × Mean
23 = 3 × Median – 2 × 65
23 = 3 × Median – 130
23 + 130 = 3 × Median
153 = 3 × Median
Median = 51

**5. Triangle ABC is similar to triangle DEF where $\frac{BC}{EF} = \frac{1}{4}$ is the value of $\frac{area(\text{triangle DEF})}{area(\text{triangle ABC})}$?**

(a) 4
(b) 16
(c) $\frac{1}{16}$
(d) $\frac{1}{4}$ **[b]**

**व्याख्या:-**

$\frac{BC}{EF} = \frac{1}{4}$

Since the triangles are similar, the ratio of their areas is equal to the square of the ratio of their sides.

$$\frac{\text{area}(\text{ triangleDEF })}{\text{area}(\text{triangle ABC})}=\left(\frac{BC}{EF}\right)^2=\left(\frac{1}{4}\right)^2=\frac{1}{16}$$

**6. What is the median of the given observations, 20, 23, 25, 30, 20, 31, 32, 35, 20, 41, 42, 43, 20, 20 and 20?**

(a) 25
(b) 23
(c) 26
(d) 28 **[a]**

**व्याख्या:-**

The given observations are:
20, 23, 25, 30, 20, 31, 32, 35, 20, 41, 42, 43, 20, 20, 20
To find the median, first arrange the observations in ascending order:
20, 20, 20, 20, 20, 20, 23, 25, 30, 31, 32, 35, 41, 42, 43
Here total number of observations = 15 (odd number)
Median will be the middle number which is at 8th place.
The value which is at 8th place = 25

So, median = 25

**7. In a certain code language, 'SKATE' is written as '35186', and 'TAKER' is written as '51623'. How will 'R' be written in the same code language?**

(a) 1
(b) 3
(c) 2
(d) 6 **[c]**

**व्याख्या –**

Just as
S K A T E — 3 5 1 8 6

T A K E R — 5 1 6 2 3

similarly
R = 2
Therefore option (c) is correct.

**8. In a certain code language, 'DOTH' is written as '3764' and 'HOLD' is written as '7943'. How will 'T' be written in that code language?**

(a) 6
(b) 7
(c) 4
(d) 3 **[a]**

**व्याख्या –**

Just as
D O T H — 3 7 6 4

H O L D — 7 9 4 3

Similarly
T = 6
Therefore option (A) is correct.

**9. Which of the following receptors helps in identifying taste?**

(a) Photoreceptors
(b) Gustatory receptors
(c) Sound receptors
(d) Olfactory receptors **[b]**

**Explanation –**

**Olfactory Receptors:** These are specialized sensory cells located inside the nose, in the olfactory epithelium. They detect chemical molecules (odorants) present in the air and send signals to the brain, making us perceive smell. The term 'olfaction' is directly related to the sense of smell.

**Gustatory Receptors:** These are also called taste buds. These are mainly located on the tongue and help in identifying taste (sweet, sour, salty, bitter, umami) by detecting chemicals present in food.

**Auditory Receptors:** These are located inside the ear, specifically in the cochlea. They detect sound waves and convert them into nerve impulses, which makes us feel heard.

**Photoreceptors:** These are located in the retina of the eyes (like rods and cones). They are sensitive to light and help us see.

**10. In 2024, which country is cooperating with India to counter China's military aggression and discussed technology transfer for UNICORN in the 2+2 ministerial dialogue?**

(a) Australia
(b) Japan
(c) United States of America
(d) France **[b]**

**व्याख्या–**

In 2024, Japan discussed the transfer of UNICORN (Unified Complex Radio Antenna) technology with India. The discussion took place during the India-Japan 2+2 ministerial meeting, attended by the foreign and defence ministers of the two countries. The Memorandum of Understanding (MoI) for the transfer of the UNICORN system was signed at the meeting. The agreement is the first instance of export of defence technology from Japan to India under the bilateral Defence Equipment and Technology Transfer Agreement signed in 2015. Earlier, Japan lifted its decades-old defence equipment export ban in 2014.

**11. Select the triad that follows the same pattern as followed by the two triads given below. Both the triads follow the same pattern.**

**GB-HC-JL**

**PK-QL-SU**

(a) NI-OJ-QR

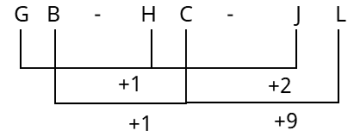
(b) RM-SN-UV

(c) QL-RM-TV

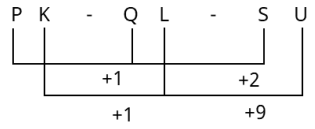
(d) SN-TO-VW **[c]**

**व्याख्या –**

Just as




and




similarly


Therefore option (c) is correct.

**12. In the following number-pairs, the second number is obtained by performing some mathematical operations on the first number. What numbers should come in place of X and Y so that the pattern followed by the two numbers on the left side of :: :: is followed by the same pattern on the right side of ::?**

**X : 66 : : 9 : Y**

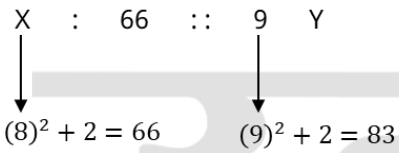
(a) X = 8, Y = 83

(b) X = 8, Y = 81

(c) X = 7, Y = 80

(d) X = 9, Y = 81 **[a]**

**व्याख्या –**




Hence, x = 8, and y = 83.

**13. Which Indian city recorded the highest PM2.5 levels in 2023, making it the most polluted metropolitan area globally?**

(a) Begusarai

(b) Guwahati

(c) Mullanpur

(d) Greater Noida **[a]**

**व्याख्या–**

In 2023, Begusarai, Bihar, set the unfortunate record of being the world's most polluted metropolitan area. The city topped the list with an average PM2.5 concentration of 118.9 micrograms per cubic meter, according to IQAir's 2023 World Air Quality Report.

However, Greater Noida, Uttar Pradesh, was also India's most polluted city in 2023, with PM2.5 levels recorded at 102.1 micrograms per cubic meter.

**14. A sum of money lent at simple interest becomes $\frac{7}{5}$ of itself in 4 years. Find the rate of annual interest.**

(a) 10%

(b) 15%

(c) 6%

(d) 12% **[a]**

**व्याख्या:-**

**The formula for simple interest is:**

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

**Where**

**P = Principal**

**R = Rate of Interest**

**T = Time**

**Now we will put the given values in the formula:**

$$\frac{2P}{5} = \frac{P \times R \times 4}{100}$$

**We can cancel out P from both sides:**

$$\frac{2}{5} = \frac{4R}{100}$$

**Now solve for R:**

$$2 \times 100 = 4R \times 5$$

$$200 = 20R$$

$$R = \frac{200}{20}$$

$$R = 10$$

**15. A, B, C, D, E and F are seated around a circular table facing the centre. F sits second to the right of C. D is the immediate neighbour of E and F. A sits second to the left of B. What is the position of E with respect to C?**

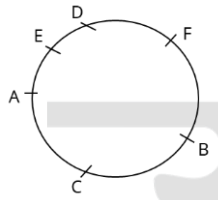
(a) Immediate right

(b) Third to the left

(c) Second to the right

(d) Second to the left **[d]**

**व्याख्या –**




It is clear from the diagram that the position of E with respect to C is second from the left.

**16. Which of the following molecules acts as the information source for making proteins?**

(a) Ribonucleic acid
(b) Phospholipids
(c) Deoxyribonucleic acid
(d) Carbohydrate **[c]**

**Explanation –**

The molecule that acts as the information source for making proteins is deoxyribonucleic acid, commonly called DNA. DNA is the molecule in which all the genetic information required for the formation and functioning of organisms is coded.
Ribonucleic acid (RNA): RNA plays an important role in protein synthesis, especially messenger RNA (mRNA) which carries genetic information from DNA to the ribosome. However, the basic information source is DNA.
Phospholipid: These are the major components of the cell membrane and do not act as information sources.
Carbohydrate: These are the sources of energy and structural components, but do not act as information sources for making proteins.

**17. If 60% of a number is added to 120, the result is the same number. What is 60% of the same number?**

(a) 200
(b) 300
(c) 180
(d) 320 **[c]**

**व्याख्या:-**

Let the number be x

$$x \times \frac{60}{100} + 120 = x$$

$$60x + 12000 = 100x$$

$$40x = 12000$$

$$x = 300$$

60% of the same number= $300 \times \frac{60}{100} = 180$

**18. What is the correct expression of 6.4646464646..... in fractional form?**

(a) $\frac{640}{99}$
(b) $\frac{6464}{1000}$
(c) $\frac{640}{100}$
(d) $\frac{646}{99}$ **[a]**

**व्याख्या:-**

$$x = 6 + 0.46464646\ldots$$

$$y = 0.46464646\ldots$$

$$100y = 46.46464646\ldots$$

$$100y - y = 46.464646\ldots - 0.464646\ldots = 46$$

$$99y = 46$$

$$y = \frac{46}{99}$$

$$x = 6 + y$$

$$x = 6 + \frac{46}{99}$$

$$x = \frac{640}{99}$$

**19. In this question, a statement is given followed by two courses of action numbered I and II. You have to assume all the information given in the statement to be true and decide which course of action should be logically followed on the basis of the information given in the statement.**

**Statement:**

**Severe congestion is observed on the service road outside the apartment complex between 7.30 am and 9 am every day as many school buses of various schools are delayed due to the time taken by many people travelling for work to pick up children from the apartment complex gate.**

**Courses:**

**(I) No school bus should be allowed on the service road from 7.30 am to 9 am.**

**(II) School buses should be allowed to enter the society gate.**

(a) Neither I nor II follows
(b) Both I and II follow
(c) Only I follows
(d) Only II follows **[a]**

**व्याख्या –**

Analysis of actions:
(I) No school bus should be allowed on the service road from 7:30 am to 9:00 am.
This is a very harsh and impractical step. It will not be possible to stop school buses from going on the service road as it is the main route for bringing children. This will hamper the safety of

children and their access to school. Hence, it is unfair.

(II) School buses should be allowed inside the society gate. If the buses come inside, there will be no need to stop at the service road. This will reduce the traffic on the service road but will cause traffic jam inside the society gate. Hence, it is unfair.

Hence, neither I nor II follows

**20. Read the statements and conclusions given below carefully. You have to assume that the given statements are true even if they seem to be at variance from commonly known facts and decide which of the conclusions logically follows from the given statement/statements.**

**Statements:**

**No bike is a car.**

**All cars are aeroplanes.**

**Conclusions**

**(I) No aeroplane is a bike.**

**(II) All aeroplanes are cars.**

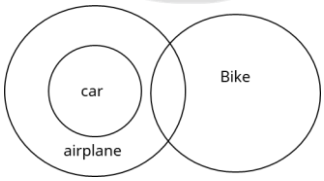
(a) Both conclusion I and II follow from the statements

(b) Only conclusion I follows from the statements

(c) Only conclusion II follows from the statements

(d) Neither conclusion I nor II follows from the statements **[d]**

**व्याख्या –**




Hence, it is clear from the Venn diagram that neither conclusion I nor conclusion II follows.

**21. If each vowel of the word WEIGHT is replaced by the letter immediately following it in the English alphabetical order, and each consonant is replaced by the letter immediately preceding it in the English alphabetical order, then which of the following letters will appear twice in the new group of letters thus formed?**

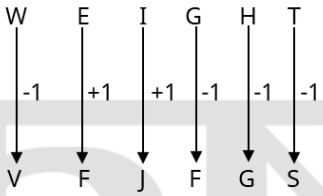
(a) F

(b) V

(c) G

(d) J **[a]**

**व्याख्या –**




Letter occurring twice in the new letter group = F

**22. Amita is 2 years older than her friend Amrita. Amita's father is twice Amita's age, and Amrita is twice her sister's age. The difference between Amita's father's age and her sister's age is 43 years. Find the difference between Amita and Amrita.**

(a) 4

(b) 1

(c) 3

(d) 2 **[d]**

**व्याख्या -**

Amita's age = A, Amrita's age = B, Amrita's sister's age = S, Father's age = F

$A = B + 2$

$F = 2A$

$B = 2S$

$F - S = 43$

$F - S = 2A - S = 43$

$S = \frac{B}{2}, A = B + 2$

$2(B + 2) - \frac{B}{2} = 43$

$\frac{3B}{2} = 39$

$B = 26$

$A = 28$

$A - B = 28 - 26 = 2$

**23. Which of the following options should come in place of the question mark (?) in the given series based on the English alphabetical order?**

**BDF, IKM, PRT, WYA, ?**

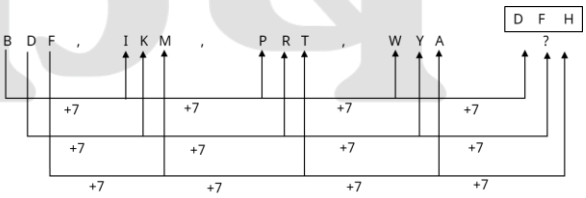
(a) CFI

(b) CEG

(c) DFH

(d) DGJ **[c]**

**व्याख्या -**

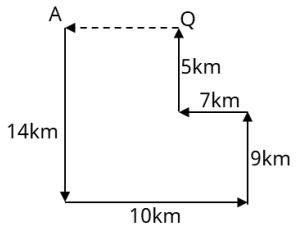



? = DFH

**24. He starts from point A and travels 14 km towards south. Then he turns left, travels 10 km, turns left and travels 9 km. Then he turns left and travels 7 km. He takes a last right turn, travels 5 km and stops at point P. How far (shortest distance) and in which direction should he drive to reach point A again? (Unless specified, all turns are 90 degree turns.)**

(a) 3km towards north
(b) 3km towards south
(c) 3km towards east
(d) 3km towards west **[d]**

**व्याख्या –**




It is clear from the diagram that to reach point A again one has to drive 3km towards west.

**25. Which cell keeps changing its shape?**

(a) Nerve cell
(b) Ovum
(c) Smooth muscle
(d) Amoeba **[d]**

**Explanation –**

The cell whose shape keeps changing is Amoeba. Amoeba is a single-celled organism which keeps changing its shape continuously. It does this by extending temporary projections called pseudopodia or "false feet", which it uses for movement and for obtaining food.

Nerve cell: Nerve cells have a specific and stable shape, consisting of a cell body, dendrites, and an axon. Their shape usually does not change.

Ovum: The shape of the ovum is usually spherical or oval and remains constant.

Smooth muscle cell: Smooth muscle cells are usually fusiform and their shape may change slightly when they contract or relax, but it does not change continuously in an irregular manner like amoeba.

**26. If 'P' means '×', 'Q' means '÷', 'R' means '-' and 'S' means '+', then what will come in place of question mark '?' in the following equation?**
**(32 P 4) R (21 P 5) S (9 Q 3) P 6 = ?**

(a) 47
(b) 41
(c) 50
(d) 33 **[b]**

**व्याख्या –**

$(32\ P\ 4)\ R\ (21\ P\ 5)\ s\ (9\ Q\ 3)\ P\ 6 = ?$

$(32 \times 4) - (21 \times 5) + (9 \div 3) \times 6 = ?$

$128 - 105 + 3 \times 6 = ?$

$128 - 105 + 18 = ?$

$146 - 105 = ?$

$41 = ?$

**27. Which of the following is the highest award in National Science Award?**

(a) Science Vajra
(b) Science Ratna
(c) Science Shree
(d) Science Mahaan **[b]**

**व्याख्या–**

Vigyan Ratna is the highest award for outstanding contribution in the field of science at the national level. This award is given by the Indian Institute of Science (IISc), Bangalore and it honors scientists for their exceptional work.

Vigyan Ratna Award is considered to be the highest honor in the field of science in India, which is given to scientists for their contribution and special achievements in research.

This award is recognized by the government and through the amount and honor given by it, scientists are motivated to reach new heights in their work.

**28. A dishonest shopkeeper pretends to sell his goods at the cost price. However, he uses a wrong weight which is written as 200 gm but actually weighs less. By using this wrong weight, the shopkeeper makes a profit of 25%. What is the actual measure of the weight used?**

(a) 200 gm
(b) 160 gm
(c) 180 gm
(d) 150 gm **[b]**

**व्याख्या –**

Shopkeeper shows 200 grams, actual weight is x grams.

Profit is 25%,

$\frac{200 - x}{x} = \frac{25}{100}$

$200 = \frac{5x}{4}$

$x = 160$

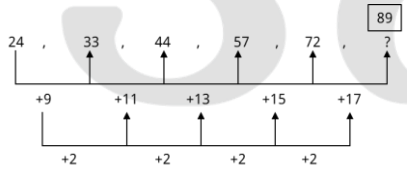
Actual weight 160 grams.

**29. Which of the following options should come in place of question mark (?) to complete the given series logically?**

**24, 33, 44, 57, 72,?**

(a) 96
(b) 94
(c) 100
(d) 89 **[d]**

**व्याख्या –**




? = 89

**30. Which of the following organisms has the ability to regenerate?**

(a) Tick
(b) Earthworm
(c) Planaria
(d) Leech **[c]**

**Explanation –**

Planarians have the amazing ability to regrow a whole new organism from damaged or cut parts of their body.

If the body of a planaria is cut into several pieces, each piece (as long as it has enough cells) can grow into a complete, new planaria. For example, if you cut a planaria vertically or horizontally, a new organism can grow from each section that includes the head, torso and tail.

This ability is due to the presence of a high level of regenerative cells (stem cells) that can differentiate into any type of cell and form new tissues and organs.

This ability to form a new organism from each piece is called regeneration.

**31. There are two classes A and B. If 7 students are transferred from A to B, then B will have twice the number of students as A. If 3 students are transferred from B to A, then the number of students in both the classes will become equal. Find the positive difference between the number of students in the two classes.**

(a) 7
(b) 6
(c) 8
(d) 5 **[b]**

**व्याख्या –**

7 students are sent from A to B, then

$B+7=2(A-7)$

$B=2A-21$.....(i)

3 students are sent from B to A, then

$A+3=B-3$

$B=A+6$.....(ii)

On solving equations (i) and (ii), we get

$2A-21=A+6$

$A=27$

Substituting the value of B from equation (ii),

$B=A+6.$

$B=27+6=33$

$B-A=33-27=6$

The positive difference between the number of students in the two classes is 6.

**32. Two persons drive towards each other from two places 56 km apart. The first person's speed is 12 km/h and the second person's speed is 14 km/h. If they start driving together, after how much time will they be 4 km apart from each other?**

(a) 2 hours
(b) 2 hours 10 minutes
(c) 1 hour
(d) 1 hour 30 minutes **[a]**

**व्याख्या –**

Total distance = 56 km
Speed of first person = 12 km/h
Speed of second person = 14 km/h
Relative speed = (12 + 14) km/h = 26 km/h
We have to find the time when they will be 4 km away from each other. This means they would have covered 56 km - 4 km = 52 km of the total distance.
Distance covered = Relative speed × Time
So, we can write the equation as:
52 km = 26 km/h × Time

Time = $\frac{52}{26}=2$ hours

**33. Shilpkar Mahakumbh 2024, organised by Government of India in Mumbai, was organized to promote craftsmen under which of the following schemes?**

(a) Scheme of Fund for Regeneration of Traditional Industries (SFURTI)
(b) Pradhan Mantri Rojgar Srijan Karyakram
(c) Ustaad (Upgrading the Skills and Training in Traditional Arts Crafts for Development)
(d) Pradhan Mantri Kaushal Vikas Yojana **[c]**

**व्याख्या–**

Shilpkar Mahakumbh 2024 was organized by the Government of India in Mumbai, and it took place under the Ustaad scheme. The main objective of the Ustaad scheme is to promote the skill capacity of artisans of traditional arts and crafts. Under this, training, resources and marketing opportunities are provided to the craftsmen.

**34. In the following number-pairs, the second number is obtained by performing certain mathematical operations on the first number. What numbers should come in place of X and Y so that the pattern followed by the two numbers on the left of :: is followed by the same pattern on the right of ::?**
**(Note: Operations should be performed on whole numbers without breaking the numbers into their constituent digits. Ex. 13 - Operations on number 13 like addition/subtraction/multiplying 13 etc. can be performed. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)**
**X : 192 : : 34 : Y**
(a) X = 59, Y = 117
(b) X = 45, Y = 136
(c) X = 48, Y = 128
(d) X = 52, Y = 102

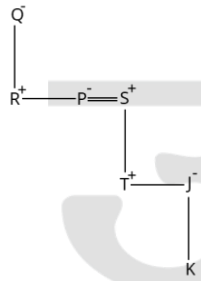
**व्याख्या –**

X : 192 :: 34 : Y
59 × 3 + 15 = 192 34 × 3 + 15 = 117

Hence x = 59 and Y = 117.

**35. In a certain code language,**
**A + B means 'A is the mother of B',**
**A - B means 'A is the brother of B',**
**A × B means 'A is the wife of B',**
**A ÷ B means 'A is the father of B',**
**and A # B means 'A is the daughter of B'.**
**If 'Q + R – P × S ÷ T – J + K', then how is Q related to S?**
(a) Son's daughter
(b) Mother's mother
(c) Father's mother
(d) Daughter's son **[b]**

**व्याख्या –**




Hence, it is clear from the diagram that Q is the mother of J's mother.

**36. Which of the following lacks membrane-bound organelles?**
(a) Both eukaryotic cells and prokaryotic cells
(b) Only eukaryotic cells
(c) Neither eukaryotic cells nor prokaryotic cells
(d) Only prokaryotic cells **[d]**

**Explanation –**
Lack of membrane-bound organelles is found only in prokaryotic cells.
Cells are mainly classified into two types:
**Prokaryotic cells:-**
They lack a well-organised nucleus; genetic material is dispersed in the cytoplasm.
They do not contain any membrane-bound organelles like mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, chloroplasts. Ribosomes are present but they are not membrane-bound.
Example: Bacteria and Archaea.
**Eukaryotic cells:-**
They contain a well-organized nucleus and many membrane-bound organelles.
These organelles include mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, vacuoles, and chloroplasts in plant cells.
Examples: Plants, animals, fungi, and protists.

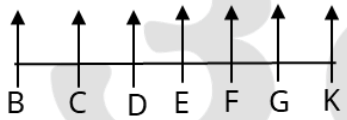
**37. The final match of the Irani Trophy 2024-25, won by Mumbai, was held in _____.**
(a) Ahmedabad
(b) Lucknow
(c) Hyderabad
(d) Patna **[b]**

**व्याख्या–**
The final match of the 2024–25 Irani Trophy was played between Mumbai and Rest of India at Atal Bihari Vajpayee Ekana Cricket Stadium, Lucknow from 1 to 5 October 2024. The match was originally scheduled to be held in Mumbai but was moved to Lucknow due to the extended monsoon there.
Mumbai won the match on the basis of first innings lead as the match was drawn. Sarfaraz Khan made a vital contribution by scoring an unbeaten 222 in the first innings.

**38. Seven persons, B, C, D, E, F, G and K are sitting in a straight row facing north. Only five persons are sitting between B and K. G is sitting to the immediate left of K. Only one person is sitting between G and E. D is sitting one place to the left of F but one place to the right of C.**
**Who is sitting third from the left end of the row?**
(a) C

(b) F
(c) D
(d) E **[c]**

**व्याख्या –**




It is clear from the diagram that D will be at the third place from the left end in the row.

**39. Which of the following statements is/are correct?**
**Statements:**
**(I) The gravitational force between two objects is independent of the separation distance between them.**
**(II) The gravitational force between two objects is inversely proportional to the square of the separation distance between them.**
**(III) The gravitational force between two objects is directly proportional to the product of their masses.**
**(IV) The gravitational force between two objects is directly proportional to the product of their masses.**
(a) Statements I and II are correct
(b) Statements I, II and III are correct
(c) Statements II and III are correct
(d) Statements I and III are correct **[c]**

**Explanation –**

Out of the given statements, Statements II and III are correct.
The universal law of gravitation was propounded by Newton. According to this law, the magnitude of the force of attraction between any two objects is proportional to the product of the masses of those bodies and inversely proportional to the distance between them.

$$\left[F = G\frac{m_1 m_2}{r^2}\right]$$

Where,
F= force
$m_1$ = mass of first body
$m_2$ = mass of the second body
r = distance between the two bodies
G= Gravitational constant.

**40. If the refractive index of air, water and crown glass are $n_1$ , $n_2$ and $n_3$ respectively, then _____.**
(a) $N_1 < N_2 < N_3$
(b) $N_1 = N_2 < N_3$
(c) $N_1 > N_2 > N_3$
(d) $N_1 < N_2 = N_3$ **[a]**

**Explanation –**

Based on optical density, the order of refractive index of different media is usually as follows:
**Air:** The refractive index of air ($n_1$) is about 1.0003, which is closest to vacuum.
**Water:** The refractive index of water ($n_2$) is about 1.33.
**Crown Glass:** The refractive index of crown glass (n3) ranges from about 1.52 to 1.65.
Given these values, we can order:
$n_1$ (air) < n2 (water) < $n_3$ (crown glass)
i.e., 1.0003 < 1.33 < 1.52 (approx.)
Hence, the correct relation is: $N_1 < N_2 < N_3$

**41. In 2023, India imported crude oil from which country, paying in Indian Rupees (₹), as part of the Rupee-Dirham Trade Agreement?**
(a) Oman
(b) Qatar
(c) UAE
(d) Russia **[c]**

**व्याख्या–**

In 2023, India and the UAE signed a Rupee-Dirham Trade Agreement, under which India imported crude oil by paying in Indian Rupees (₹). This agreement was an important step towards strengthening trade relations between the two countries and trading in their respective currencies instead of the dollar. Through this agreement, India is getting crude oil supplies from the UAE without the hassle of foreign exchange, which further strengthens the economic relations between the two countries.

**42. Which two numbers should be interchanged to make the given equation correct?**
**63 – 45 + 14 + (81 ÷ 9) × 4 + 18 × 3 = 114**
**(Note: Whole numbers should be interchanged, not the individual digits of the given numbers.)**
(a) 63 and 81
(b) 4 and 3
(c) 45 and 81
(d) 14 and 18 **[d]**

**व्याख्या –**

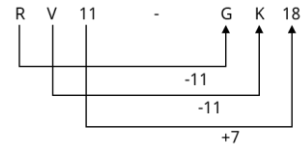
63 – 45 + 14 + (81÷9) × 4 + 18 × 3 = 114
Interchanging the numbers from option (d)
$63-45+18+(81\div 9)\times 4+14\times 3=114$
$63-45+18+9\times 4+42=114$
$63-45+18+36+42=114$
$159-45=114$
$114=114$

**43. RV11 is related to GK18 in a certain way. In the same way, DH29 is related to SW36. Following the same logic, PT22 is related to which of the following options?**

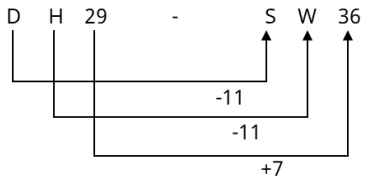
(a) E129
(b) F129
(c) FJ29
(d) EJ29 **[a]**

**व्याख्या –**

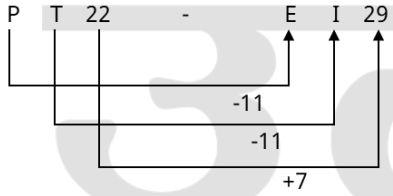
Just as




And




similarly




**44. Which of the following statements is incorrect?**

(a) Nowadays, Compressed Natural Gas (CNG) is used as fuel in vehicles.
(b) Oxygen cylinders given in hospitals contain compressed gas.
(c) The movement of particles in gaseous state is irregular and extremely rapid.
(d) Oxygen cylinders given in hospitals do not contain compressed gas**. [d]**

**Explanation –**

The full form of CNG is Compressed Natural Gas.

**Uses: –**

- Nowadays, Compressed Natural Gas (CNG) is used as fuel in vehicles. CNG (Compressed Natural Gas) is a clean fuel. It is widely used in vehicles as an alternative to petrol and diesel.

The oxygen given to patients in hospitals is stored by compressing it in cylinders at high pressure so that more quantity of gas can be stored in less space.

There are very few intermolecular forces between the particles in gases, due to which they are far apart from each other and move continuously in all directions at very irregular and rapid speeds

**45. Why do covalently bonded compounds have low boiling point?**

(a) There is a strong covalent bond as well as a strong intermolecular force within the molecules.
(b) There is a strong covalent bond within the molecules, but the intermolecular force is weak.
(c) There is a weak covalent bond within the molecules, but the intermolecular force is weak.
(d) There is a strong intermolecular force within the molecules, but the covalent bond is weak. **[b]**

**Explanation –**

The main reason for covalently bonded compounds having low boiling point is the nature of their intermolecular forces. In covalent compounds, the covalent bonds that bind atoms together are very strong, but the intermolecular forces (such as van der Waals forces or hydrogen bonds) between the individual molecules are generally weak (especially compared to ionic or metallic bonds). During boiling, less energy is required to break these weak intermolecular forces, leading to lower boiling point.

**46. What is required for the synthesis of thyroxin hormones?**

(a) Bromine
(b) Chlorine
(c) Iodine
(d) Nickel **[c]**

**Explanation –**

Iodine is essential for the synthesis of thyroxin hormones.

It is secreted by the thyroid gland located in the neck.

The thyroid gland produces hormones called thyroxine ($T_4$) and triiodothyronine ($T_3$), which are important for the metabolism, growth and development of the body. Iodine is an essential micronutrient for the synthesis of these hormones. Iodine deficiency can reduce the production of thyroid hormones, leading to a condition called hypothyroidism, a common symptom of which is goiter. Deficiency of this hormone causes a disease called cretinism in children and myxoedema in adults.

**47. Which of the following is an example of a heterogeneous solution?**

(a) Tincture iodine
(b) Mixture of ethanol and water
(c) Mixture of oil and water
(d) Lemonade **[c]**

**Explanation –**

**Homogeneous mixture –** A mixture in which the components are completely dissolved in each other and have a uniform composition and properties throughout the mixture. Examples – Tincture iodine (mixture of iodine and alcohol), mixture of ethanol and water, lemonade (mixture of lemon juice, sugar and water) etc.

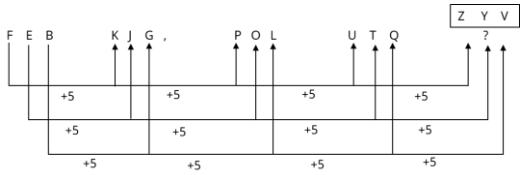
**Heterogeneous mixture –** A mixture in which the components are not mixed uniformly, and you can see them in different layers or phases. Their properties differ throughout the mixture. Examples – Mixture of sand and water, salt and iron filings, mixture of oil and water This is a classic example of a heterogeneous mixture. A mixture of oil and water are insoluble in each other. When mixed, the oil droplets float or remain suspended in water, and eventually the oil forms a separate layer on top of the water because the density of oil is less than that of water.

**48. Which of the following options should come in place of the question mark (?) in the given series based on the English alphabetical order?**

**FEB, KJG, POL, UTQ, ?**

(a) ZVU
(b) YZU
(c) ZXS
(d) ZYV **[d]**

**व्याख्या –**




? = ZYV

**49. Simplify the following expression.**

$$\frac{4.32 \times 4.32 - 2.64 \times 2.64}{1.68}$$

(a) 6.56
(b) 6.96
(c) 6.94
(d) 6.99 **[b]**

**व्याख्या-**

$$= \frac{4.32 \times 4.32 - 2.64 \times 2.64}{1.68}$$

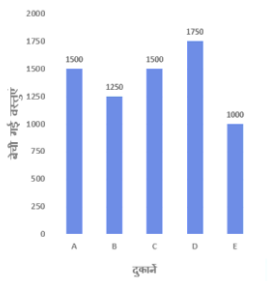
$$= \frac{18.6624 - 6.9696}{1.68}$$

$$= \frac{11.6928}{1.68}$$

$$= 6.96$$

**50. Study the following graph and answer the given question.**

**The graph shows the number of items sold by different shops in a week.**




**What percent more items were sold by shop C than shop B?**

(a) 30%
(b) 50%
(c) 20%
(d) 40% **[c]**

**व्याख्या-**

Items sold by shop B = 1250
Items sold by shop C = 1500
More items = Items sold by shop C - Items sold by shop B
More items = 1500 - 1250 = 250

$$\text{percentage increase} = \frac{\text{More Items}}{\text{Shop B Items sold by}} \times 100$$

$$\text{percentage increase} = \frac{250}{1250} \times 100$$

$$\text{percentage increase} = \frac{25}{125} \times 100$$

$$\text{percentage increase} = \frac{1}{5} \times 100$$

$$\text{percentage increase} = 20\%$$

**51. $\frac{\cos 45^\circ}{\tan 30^\circ + \cot 60^\circ}$ is equivalent to which of the following options?**

(a) $\frac{\sqrt{3}}{\sqrt{2}\left(1-\sqrt{3}\right)}$
(b) $\frac{\sqrt{3}}{2\sqrt{2}}$
(c) $\frac{\sqrt{3}}{\sqrt{2}\left(1+\sqrt{3}\right)}$
(d) $\frac{\sqrt{3}}{\sqrt{2}}$ **[b]**

**व्याख्या-**

$\cos 45^\circ = \frac{\sqrt{2}}{2}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$

$\cot 60^\circ = \frac{1}{\tan 60^\circ} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$

$$\frac{\cos 45^\circ}{\tan 30^\circ + \cot 60^\circ} = \frac{\frac{\sqrt{2}}{2}}{\frac{2}{\sqrt{3}}} = \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{6}}{4}$$

**52. Which of the following compounds is obtained on heating gypsum at 373 K?**

(a) $CaSO_4.2H_2O$
(b) $CaSO_4.5H_2O$
(c) $CaSO_4.(1/2\ H_2O)$
(d) CaO **[c]**

**Explanation –**

Gypsum ($CaSO_4.2H_2O$) is heated at 373 – 393 K and its partial dehydration gives "Plaster of Paris" $CaSO_4.(1/2\ H_2O)$ .

Plaster of Paris (Calcium Sulphate) is made from partial dehydration of gypsum. It is used for plastering in surgery, making moulds and models, making statues and toys etc.

$$2(casSo_4.2H_2O) \xrightarrow{120-130^\circ C} (Ca2SO_4).1/2\,H_2O + 3H_2O$$

(Gypsum) (plaster of Paris) (Water)

**53. If x : y = 8 : 3, then (x + y) : (x - y) = ?**

(a) 5 : 11
(b) 5 : 2
(c) 11 : 5
(d) 2 : 5 **[c]**

**व्याख्या-**

x : y = 8 : 3

Let the two be 8x, 3x respectively

= (x + y) : (x - y)

= (8x + 3x) : (8x - 3x)

= 11x : 5x

= 11 : 5

**54. On which date did the Department of Posts launch the Philately Scholarship Scheme in 2024?**

(a) 24 August 2024
(b) 5 September 2024
(c) 20 July 2024
(d) 15 August 2024 **[a]**

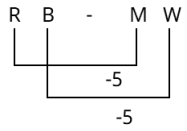
**व्याख्या–**

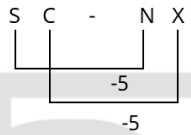
The Indian Postal Department launched the Philately Scholarship Scheme under the Deen Dayal Sparsh Scholarship Scheme on 24 August 2024. The objective of this scheme is to increase the interest of students from class 6 to 9 in philately and provide them an annual scholarship of ₹ 6,000. In this, 10-10 students are selected from each class. To participate in the scheme, students must be members of an active philately club in the respective school, or have an active philately deposit account in a post office.

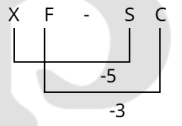
**55. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which of the following pairs does not belong to that group? (Note: The odd letter-cluster is not based on the number of consonants/vowels or their position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

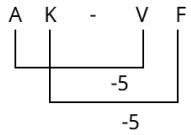
(a) RB-MW
(b) SC-NX
(c) XF-SC
(d) AK-VF **[c]**

**व्याख्या-**



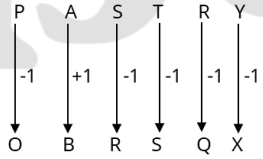




Hence, (XF – SC) is different from others.

**56. If each consonant of the word PASTRY is replaced by the letter immediately preceding it in the English alphabetical order, and each vowel is replaced by the letter immediately following it in the English alphabetical order, then how many vowels will be present in the new group of letters thus formed?**

(a) two
(b) three
(c) one
(d) none **[c]**

**व्याख्या –**




Number of vowels in the new letter group = 1

**57. Who among the following has been appointed as the brand ambassador of the Ministry of Ports, Shipping and Waterways, Government of India?**

(a) Manu Bhaker
(b) P R Sreejesh
(c) Neeraj Chopra
(d) Sarabjot Singh **[a]**

**व्याख्या–**

The Ministry of Ports, Shipping and Waterways, Government of India has appointed Manu Bhaker as its brand ambassador. The announcement was made at an event held in Chennai, Tamil Nadu on 17 September 2024. Manu Bhaker, who is the daughter of a marine engineer, won a bronze medal in the 10m air pistol event and a bronze medal in the mixed team event at the 2024 Paris Olympics. Keeping in mind her achievements, the ministry has chosen her for the post. Union Minister Sarbananda Sonowal announced the appointment and called it a proud moment for the Indian maritime sector. The appointment will help promote the schemes and initiatives of the ministry.

**58. If one cubic centimeter of marble weighs 25 grams, a block of marble 28 cm wide and 5 cm thick weighs 112 kg. What is the length of the block?**

(a) 36 cm
(b) 37.5 cm
(c) 26.5 cm
(d) 32 cm **[d]**

**व्याख्या-**

Weight of cubic centimetre of marble = 25 grams
Width of block = 28 cm
Thickness of block = 5 cm
Total weight of block = 112 kg = 112,000 grams
Volume of block = Length × Breadth × Thickness
Let length =L cm
Volume = L×28×5 =140L cubic centimetre
Since 1 cubic centimetre weighs 25 grams,
Total weight = Volume × 25 grams

$$140L \times 25 = 112,000$$

$$3500L = 112,000$$

$$L = \frac{112,000}{3500} = 32$$

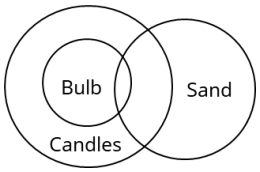
The length of the block is 32 cm.

**59. Read the statements and conclusions given below carefully. You have to assume that the given statements are true even if they seem to be at variance from commonly known facts and decide which of the conclusions logically follows from the given statement(s).**

**Statements:**
**Some bulbs are sand.**
**All bulbs are candles.**
**Conclusions:**
**(I) Some candles are bulbs.**
**(II) No candle is sand.**

(a) Only conclusion I follows from the statements
(b) Neither conclusion I nor II follows from the statements
(c) Both conclusion I and II follow from the statements
(d) Only conclusion I follows from the statements

**व्याख्या –**




Hence, it is clear from the Venn diagram that only conclusion I follows.

**60. Which of the following is the molecular mass of $HNO_3$?**

(a) 60 u
(b) 67 u
(c) 64 u
(d) 63 u **[d]**

**Explanation –**

To find the molecular mass of $HNO_3$ (nitric acid), we have to add the atomic masses of each atom present in it:
Atomic mass of H (hydrogen) = 1 u
Atomic mass of N (nitrogen) = 14 u
Atomic mass of O (oxygen) = 16 u
A molecule of $HNO_3$ contains 1 hydrogen atom, 1 nitrogen atom and 3 oxygen atoms.
Hence, molecular mass of $HNO_3$
= (1 × atomic mass of H) + (1 × atomic mass of N) + (3 × atomic mass of O)
Molecular mass = (1 × 1 u) + (1 × 14 u) + (3 × 16 u)
Molecular mass = 1 u + 14 u + 48 u
Molecular mass = 63 u
Therefore, molecular mass of $HNO_3$ is 63 u.

**61. Which of the following metals is more reactive towards dilute hydrochloric acid?**

(a) Zn
(b) Mg
(c) Al
(d) Fe **[b]**

**Explanation –**

Reactivity Series of Metals helps us to know which metals are more reactive. In this series, the metals which are higher are more reactive than hydrogen and can displace hydrogen gas from dilute acids (such as hydrochloric acid). The metals which are lower in the series are less reactive.

The general reactivity series (from high to low reactivity) is as follows:

K > Na > Ca > Mg > Al > Zn > Fe > Pb > H > Cu > Ag > Au > Pt

According to this series, magnesium (Mg) is above aluminium (Al), zinc (Zn), and iron (Fe). This means that magnesium is the most reactive metal which will react fastest with dilute hydrochloric acid.

So, magnesium (Mg) is more reactive towards dilute hydrochloric acid.

**62. The distance between the centre of curvature and pole of a convex mirror of focal length 1m is _____.**

(a) 1.5 m
(b) 0.5 m
(c) 1 m
(d) 2 m **[d]**

**Explanation –**

For spherical mirrors, there is a direct relationship between radius of curvature (R) and focal length (f). Radius of curvature is twice the focal length.

**Formula –**

R = 2f

Here,

f is given as focal length of convex mirror = 1 meter (m).

R = Radius of curvature

Radius of curvature (R) is the distance between the centre of curvature and the pole.

R = 2× 1

R = 2 m

**63. A person saves 30% of his monthly income. If his monthly income increases by 20%, he saves 20% more than his previous savings. The percentage increase in his expenditure is _____.**

(a) 16%
(b) 20%
(c) 30%
(d) 25% **[b]**

**व्याख्या-**

Income = Savings + Expenditure

Let his income is 100 initially,

So, Savings = 30 and Expenditure = 70

Income after 20% increase in income

$= 100 \times \frac{120}{100} = 120$

After 20% increase, the saving = $30 \times \frac{120}{100} = 36$

Final Expenses = 120 - 36 = 84

Increase in expenditure = $\frac{84-70}{70} \times 100 = 20\%$

**64. Which one of the following statements about magnetic field is correct?**

(a) It is a scalar quantity.
(b) It lies only outside the magnet.
(c) Its direction at any point is measured by a magnetic compass.
(d) It is always in the form of straight lines. **[c]**

**Explanation –**

- Magnetic field is a vector quantity. It has both magnitude and direction.
- Magnetic field exists both outside and inside a magnet. Inside a magnet the magnetic field lines go from south pole to north pole, while outside they go from north pole to south pole, forming a closed curve/loop.
- The north pole of the needle of a magnetic compass points in the direction of the magnetic field. This is a common way of determining the direction of magnetic field lines.

**65. What is the recent decision taken by the Union Cabinet regarding Ayushman Bharat PM-JAY scheme on 11th September 2024?**

(a) Limiting coverage to low-income families only
(b) Increasing the coverage amount for all citizens
(c) Extending benefits to all citizens aged 70 years and above
(d) Discontinuing the scheme

**[c]**

**व्याख्या–**

On 11th September 2024, the Union Cabinet of the Government of India took an important decision under the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY). As per this decision, now all citizens aged 70 years and above, irrespective of their income, will be provided free health insurance cover of up to ₹5 lakh. This move clarifies the efforts of the government, in which it is trying to provide better healthcare services and financial security to senior citizens.

This decision will benefit about 6 crore senior citizens. Senior citizens of families already benefiting under PM-JAY will get an additional

cover of ₹5 lakh. This new benefit will be given only on the basis of age, not income.

This scheme will give senior citizens the option to get treatment in private hospitals as well, and they will receive better treatment than government hospitals. This decision is an important step towards ensuring equality in health care and a way to promote the public welfare schemes of the government.

**66. 48 men can do a piece of work in 5 days while 40 women can do the same work in 9 days. In how many days can 4 men and 6 women together complete the same work?**

**(a) 24 days**
**(b) 48 days**
**(c) 30 days**
**(d) 42 days** **[c]**

**व्याख्या-**

Given:

48 men can complete a work in 5 days.

40 women can complete the same work in 9 days.

Efficiency of individuals = $\frac{1}{(48\times5)}=\frac{1}{240}$

The efficiency of women = $\frac{1}{(40\times9)}=\frac{1}{360}$

How much time will 4 men and 6 women take to do the same work

$\frac{4x}{240}+\frac{6x}{360}=1$

$\frac{12x+12x}{720}=1$

$24x=720$

$x=30$

Therefore, 4 men and 6 women together can complete the same work in 30 days.

**67. If a man lifts a load of 1 kg to a height of 2.5 m from the ground, then assuming gravitational acceleration to be 10 m/sec², the magnitude of work done by the man is _____.**

(a) 25 joules
(b) 2.5 joules
(c) 4 joules
(d) 0.25 joules **[a]**

**Explanation –**

When a person lifts an object above the ground, he does work against the force of gravity. In this case, the work done is equal to the increase in the gravitational potential energy of the object.

The formula for gravitational potential energy is:

W = mgh

Where:

W = Work done

Mass of the object (m , mass) = 1 kg

Gravitational acceleration (g) = 10 m/s²

Height (h) = 2.5 m

Putting the given values in the formula:

W =1 × 10 × 2.5

W =10 ×2.5

W =25 J

Therefore, the magnitude of work done by the man is 25 joules.

**68. What is the value of $(36)^{1/6}$?**

(a) 1
(b) $(6)^{1/3}$
(c) $\sqrt{36}$
(d) 2 **[b]**

**व्याख्या-**

We can write 36 as $6^2$.

$(36)^{1/6}=(6^2)^{1/6}$

$(a^m)^n=a^{m\times n}$

$(6^2)^{1/6}=6^{2\times(1/6)}$

$=6^{1/3}$

**69. The LCM of two numbers is 84. If the numbers are in the ratio 2 : 3, find the sum of the numbers.**

(a) 40
(b) 25
(c) 60
(d) 70 **[d]**

**व्याख्या-**

LCM of two numbers = 84

Ratio of numbers = 2 : 3

Let the two numbers be 2x, 3x respectively

LCM = 6x = 84

x = 14

Number = 28, 42

sum = 28 + 42 = 70

**70. Which of the following physical quantities is equal to the total path length covered by a moving body?**

(a) Distance
(b) Velocity
(c) Speed
(d) Displacement **[a]**

**Explanation –**

**Distance:** It is a scalar quantity which represents the actual length of the total path covered by a moving body, however curved or irregular the path may be. It is always positive.

**Velocity:** It is a vector quantity which represents the rate of change of displacement. It has both magnitude (speed) and direction.

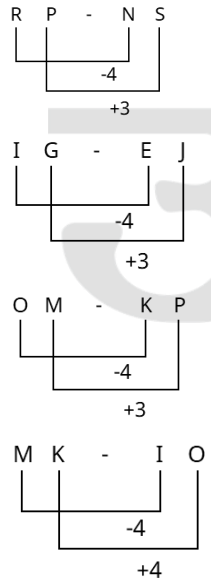
**Speed:** It is a scalar quantity which represents the rate of change of distance covered. It refers only to magnitude and does not include direction.

**Displacement:** It is a vector quantity which represents the shortest straight line distance between the initial point and the final point. It has direction and can be positive, negative or zero.

**71. 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 pair does not belong to that group?**
**(Note: The odd letter-cluster is not based on the number of consonants/vowels or their position in that letter-cluster.)**

(a) RP-NS
(b) IG-EJ
(c) OM-KP
(d) MK-IO **[d]**

**व्याख्या-**




Hence, [MK – IO] is different from the rest.

**72. Which of the following options represents the product of the reaction given below?**
**$MnO_2 + 4HCl \rightarrow$**

(a) Only $MnCl_2$
(b) $MnCl_2$, $Cl_2$ and $2H_2O$
(c) Only $CI_2$
(d) Only $H_2O$ **[b]**

**Explanation –**

Manganese dioxide ($MnO_2$) reacts with hydrochloric acid (HCl) to form manganese (II) chloride ($MnCl_2$), chlorine gas ($Cl_2$), and water ($H_2O$). This is a redox (oxidation-reduction) reaction.

The balanced chemical reaction is as follows:
$MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

In this reaction:
$MnO_2$ is reduced because the oxidation state of manganese changes from +4 to +2.
HCl is oxidised because the oxidation state of chlorine changes from -1 to 0 (free chlorine).
Therefore, the products of the reaction are $MnCl_2$, $Cl_2$ and $2H_2O$.

**73. If a retailer had sold an item at its marked price, he would have made a profit of 18%. If the marked price of the item is ₹ 826, what is the purchase price of the item?**

(a) ₹700
(b) ₹800
(c) ₹750
(d) ₹650 **[a]**

**व्याख्या-**

Marked price = ₹826
Profit = 18%

So, 826 = Cost price $\times \frac{118}{100}$

purchase price = $826 \times \frac{100}{118} = 700$

purchase price of the item ₹700 .

**74. All 36 students in a class are standing in a row facing north. Preeti is 12th from the right end, while Alisha is 22nd from the left end. How many students are standing between Preeti and Alisha?**

(a) 3
(b) 2
(c) 5
(d) 1 **[b]**

**व्याख्या –**


Number of students between Alisha and Preeti = Total students – (Alisha's position + Preeti's position)
= 36 – (22 + 12)
= 36 – 34 = 2
Therefore option (b) is correct.

**75. The surface area of a sphere is 256 m². Find its diameter.**

(a) 16 m
(b) 4 m
(c) 12 m
(d) 8 m **[a]**

**व्याख्या-**

**We know that the formula for the surface area of a sphere is: $A = 4\pi r^2$, where r is the radius of the sphere.**
**Putting the given values in the formula:**

**$256\pi = 4\pi r^2$**

**On cancelling $\pi$ on both sides:**

$256 = 4r^2$

$r^2 = \frac{256}{4}$

$r^2 = 64$

$r = \sqrt{64}$

$r = 8m$

**Now, to find the diameter (d) we know that the diameter is twice the radius:**

**d = 2r**

**d = 2 × 8**

**d = 16 m**

**Therefore, the diameter of the sphere is 16m.**