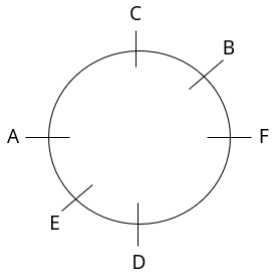
1. A, B, C, D, E and F are seated around a circular table facing the centre. B sits second to the right of D. A is the immediate neighbour of E and C. E sits second to the left of F. What is the position of F with respect to B?

(a) Exactly to the right
(b) Third to the right
(c) Exactly to the left
(d) Second to the left **[c]**

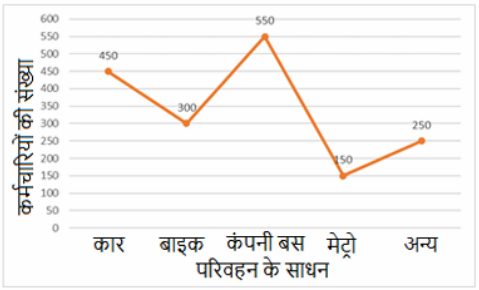
Explanation-



Hence, it is clear from the diagram that F is sitting immediate left with respect to B.

2. Study the given graph and answer the following question.

The following graph shows the number of employees who used different modes of transport in the year 2010.



What is the respective ratio between the number of employees who use bike and the number of employees who use metro?

(a) 2 : 1
(b) 4 : 5
(c) 5 : 2
(d) 3 : 2 **[a]**

Explanation-

Given-
Total number of employees using bike = 300
Total number of employees using metro = 150
Desired ratio = 300 : 150⇒ 2 : 1

3. Particles of matter are in constant motion due to:

(a) Kinetic energy
(b) Mechanical energy
(c) Nuclear energy
(d) Chemical energy **[a]**

Explanation-

Particles of matter are constantly in motion because of kinetic energy. All matter consists of molecules (particles) or atoms, and these particles are always in motion at temperatures above zero. The higher the temperature, the greater the speed of the particles (and their kinetic energy). When particles are in motion, it means they have kinetic energy.

This is why in solids, particles of matter vibrate (less kinetic energy), in liquids they slide around (a little more kinetic energy), and in gases they move around freely (more kinetic energy). So, the constant motion of particles of matter is due to kinetic energy.

4. 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 doing mathematical operations on 1 and 3 is not allowed.)

X : 346 : : 9 : Y

(a) X = 5, Y = 612
(b) X = 6, Y = 729
(c) X = 7, Y = 732
(d) X = 8, Y = 756 **[c]**

Explanation-

Just as
x : 346
$(7)^3 + 3 = 346$
in the same manner
9 : y
$(9)^3 + 3 = 732$
So, x = 7, y = 732.

5. 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 two numbers 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 doing mathematical operations on 1 and 3 is not allowed.)

X : 679 : : 864 : Y

(a) X = 812, Y = 756
(b) X = 825, Y = 718
(c) X = 834, Y = 704
(d) X = 898, Y = 649 **[b]**

Explanation-

Just as
x : 679
825 – 146 = 679
Similarly
864 : y
864 – 146 = 718
Therefore, x = 825, y = 718.

6. A car travels four successive distances of 3 km each at speeds of 10 km/h, 20 km/h, 30 km/h and 60 km/h respectively. What is the average speed of the car in this distance?

(a) 20 km/h
(b) 25 km/h
(c) 15 km/h
(d) 30 km/h **[a]**

Explanation-

Given-
The speed of a car is 10 km/hr, 20 km/hr, 30 km/hr and 60 km/hr respectively.
Total distance = (3 km) × 4 ⇒ 12 km

$$\text{total time} = \frac{3}{10}+\frac{3}{20}+\frac{3}{30}+\frac{3}{60}$$

according to formula,

$$\text{average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$\frac{12}{\frac{3}{10}+\frac{3}{20}+\frac{3}{30}+\frac{3}{60}} \Rightarrow \frac{12}{\frac{18+9+6+3}{60}}$$

$$= \frac{12}{36}\times 60 \Rightarrow 20 \text{ km/hr}$$

7. Which two numbers should be interchanged to make the given equation correct?

21 × 4 + (84 ÷ 7) × 2 – 15 × 5 + 42 = 105

(Note: Whole numbers should be interchanged and not the individual digits of the given numbers.)

(a) 4 and 5
(b) 7 and 21
(c) 4 and 2
(d) 84 and 42 **[d]**

Explanation-

21 × 4 + (84 ÷ 7) × 2 – 15 × 5 + 42 = 105
From option (d)
21 × 4 + (42 ÷ 7) × 2 – 15 × 5 + 84 = 105
84 + 6 × 2 – 75 + 84 = 105
84 + 12 – 75 +84 = 105
105 = 105
Therefore option (D) is correct.

8. Which of the following are the characteristics of striated muscles?

(a) Spindle, unbranched and uninucleated,
(b) Spindle, unbranched and multinucleated
(c) Cylindrical, unbranched and multinucleated
(d) Cylindrical, branched and multinucleated **[c]**

Explanation-

Striated muscles, also known as skeletal muscles, are those muscles of the body which are attached to the bones and can be controlled voluntarily. That is, they can be made to move and stopped as per our wish.
They help us in walking, running, holding and doing other physical activities.
Their main characteristics are:-
Cylindrical - The shape of these muscles is long and cylinder-like.
Unbranched - Striated muscles are straight, branches are not found in them.
Multinucleated - Every muscle fiber has many nuclei, which are located at the edges.
The striations are clearly visible in them.
They can suffer from fatigue because they work at a fast speed.

9. In which year Delhi High Court issued notice on a petition seeking 33% reservation for women lawyers in Bar Council elections?

(a) 2023
(b) 2022
(c) 2021
(d) 2024 **[d]**

Explanation-

The Delhi High Court issued notice on July 18, 2024 on a petition seeking 33% reservation for women lawyers in the Delhi High Court Bar Association (DHCBA), Delhi High Court Bar Council (BCD), and all District Bar Associations.

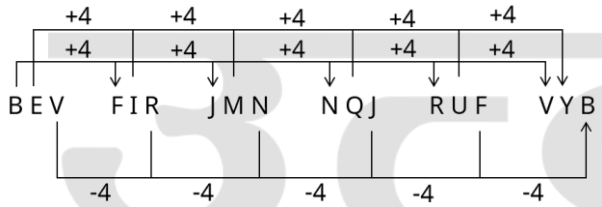
10. Based on the English alphabetical order, which of the following options should come in place of the question mark (?) in the given series?

BEV, FIR, JMN, NQJ, RUF, ?

(a) YVB
(b) TUS
(c) STU

(d) VYB **[d]**

Explanation-



Therefore option (d) is correct.

11. In case of reflection of light from a convex mirror, when a parallel ray of light is incident on the reflecting surface, the reflected light appears to be _____.

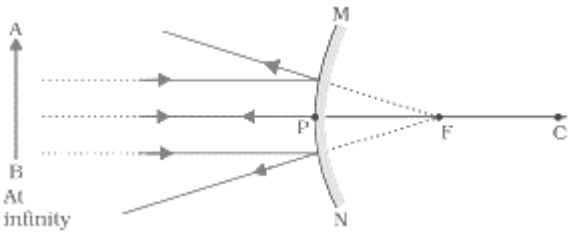
(a) Diverging from the centre of curvature
(b) Diverging from the principal focus
(c) Converging at the centre of curvature
(d) Converging at the principal focus **[b]**

Explanation-

A mirror is a reflecting surface that reflects incident light. This reflected light forms an image, which may be real or virtual, depending upon the type of mirror and lighting conditions.

A convex mirror is a curved or spherical mirror whose reflecting surface projects outwards.

The law of reflection of light with a convex mirror states that when a parallel ray of light is incident on a convex mirror, the reflected light appears to diverge from the principal focus. A convex mirror always diverges or spreads the light rays.



12. Find the compound interest on Rs 11,000 for 2 years at 4% annual interest, compounded annually.

(a) Rs 906.50
(b) Rs 875.80
(c) Rs 897.60
(d) Rs 786.60 **[c]**

Explanation-

Given,
Principal = Rs. 11000
Time = 2 years
Rate = 4% (annually)
According to the formula,
Compound interest =

$$\left[\text{Principal}\times\left(1+\frac{\text{Rate}}{100}\right)^{t}\right]-\text{Principal}$$

$$=\left[11000\times\left(1+\frac{4}{100}\right)^{2}\right]-11000$$

$$=\left[11000\times\frac{26}{25}\times\frac{26}{25}\right]-11000$$

$$=\left[\frac{7436000}{625}\right]-11000$$

= 11897.6 – 11000 = Rs 897.60

13. The cranial nerves emanating from the brain and the spinal nerves emanating from the spinal cord together form what?

(a) Peripheral nervous system
(b) Endocrine system
(c) Autonomous nervous system
(d) Central nervous system **[a]**

Explanation-

The cranial nerves originating from the brain and the spinal nerves originating from the spinal cord together form the peripheral nervous system.

The peripheral nervous system includes all the nerves that come out of the brain and spinal cord and transmit messages to various organs and nerves of the body.

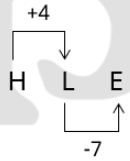
This nervous system connects the central nervous system (CNS) to the outer organs of the body and transmits messages from various parts of the body to the central nervous system.

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

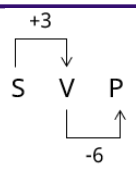
(a) HLE
(b) SVP
(c) FJC
(d) OSL **[b]**

Explanation-

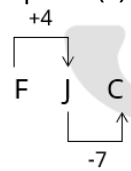
Option (a)



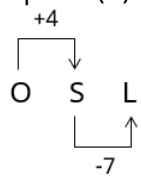
Option (b)



Option (c)



Option (d)



Hence option (b) is different from all other options.

15. If $x+\frac{1}{x}=5$, then $x^2+\frac{1}{x^2}=??$

(a) 23
(b) 25
(c) 26
(d) 24 **[a]**

Explanation-

It is given-

$$x+\frac{1}{x}=5$$

On simplifying,

$$x^2+\frac{1}{x^2}+2x\times\frac{1}{x}=(5)^2 \quad (\because \text{on squaring both sides})$$

$$x^2+\frac{1}{x^2}+2=25$$

$$x^2+\frac{1}{x^2}=23$$

16. The energy possessed by an object due to a change in its position or configuration is called _____.

(a) Nuclear energy
(b) Potential energy
(c) Kinetic energy
(d) Electromagnetic energy **[b]**

Explanation-

Potential Energy:- When energy is stored in an object due to a change in its position or configuration, it is called potential energy. For example, an object placed at a height above the earth has gravitational potential energy, or a stretched spring has elastic potential energy.

Kinetic Energy:- This energy is possessed by an object due to its motion. For example, a rolling ball, flowing air has kinetic energy.

Nuclear Energy:- This energy is present in the nucleus of the atom and is obtained by nuclear fission or fusion.

Electromagnetic Energy:- This energy is produced by the interaction between electric and magnetic fields. For example, light and radio waves are forms of electromagnetic energy.

17. If 9.6 : 16.8 :: 18 : x, then what is the value of x?

(a) 25.5
(b) 20.4
(c) 24.8
(d) 31.5 **[d]**

Explanation-

9.6 : 16.8 :: 18 : x

$$x=\frac{16.8\times 18}{9.6}$$

x = 31.5

18. 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 given conclusions logically follows from the given statement(s).

Statements:

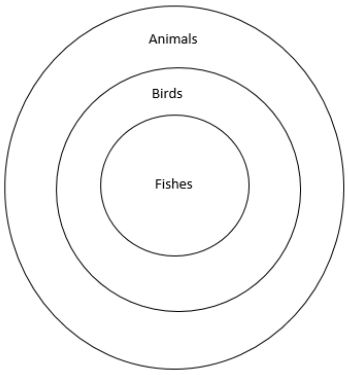
All fishes are birds.
All birds are animals.

Conclusions:

(I) All animals are fishes.
(II) Some birds are fishes.

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

Explanation-



It is clear from the diagram that some birds are fishes but all animals are not fishes.
So option (a) is correct.

19. In which organelle is ATP produced?
(a) Endoplasmic reticulum
(b) Chloroplasts
(c) Mitochondria
(d) Lysosome **[c]**

Explanation-
Mitochondria are called the "Powerhouse of the Cell" because this is the organelle where energy is produced for the cell.
The enzymes present in the mitochondria break down food molecules through various biochemical reactions to produce ATP (Adenosine Triphosphate), which is the energy currency of the body.
The endoplasmic reticulum helps in protein synthesis and transport of substances, chloroplasts function in photosynthesis and lysosomes help in storage and disposal of waste materials.

20. Twinkling of stars is related to the phenomenon of _____.
(a) Refraction of light
(b) Reflection of light
(c) Interference of light
(d) Dispersion of light **[a]**

Explanation-
Twinkling of stars is mainly related to the phenomenon of refraction of light.
When the light coming from the stars passes through atmospheric layers of different densities in the earth's atmosphere, the density keeps on refracting continuously. Due to the instability of the atmosphere and the change in temperature, these layers keep on changing continuously, which causes a slight change in the direction of the light rays. And the apparent position of the stars keeps on getting deviated. Due to this change, the stars appear to be twinkling.

21. A man loses 20% of his money. After spending 25% of the remaining money, he is left with Rs 480. How much money did he have originally?
(a) Rs 800
(b) Rs 600
(c) Rs 720
(d) Rs 840 **[a]**

Explanation-
Let the total amount of money of the person be 100x.
If he loses 20% of the money then the remaining amount $= 100x \times \frac{80}{100} = 80x$
After deducting 25% of the remaining amount, if Rs 480 remains then the total income of the person $\Rightarrow 80x \times \frac{75}{100} = 480 \times 100x$
$60x = 480 \times 100x$
x = Rs,800

22. Who among the following is the author of the book 'The Miracle Makers: Indian Cricket's Greatest Epic'?
(a) Hrishikesh Kanitkar
(b) Shiv Sunder Das
(c) Bharat Sundaresan
(d) Sunil Joshi **[c]**

Explanation-
Renowned cricket journalist and author Bharat Sundaresan has written a book titled "The Miracle Makers: Indian Cricket's Greatest Epic".
The book details India's stunning Test series win against Australia in the 2020-2021 Border-Gavaskar Trophy, focusing on the team's resilience and the historic win at the Gabba.
Key Features of the Book:-
Accounts India's stunning comeback after losing the first Test in Adelaide.
Highlights the team's ability to overcome injuries and challenges.
Provides insight into the mindset of the players and their remarkable performances.

23. The Government of India has introduced a new set of national awards in the field of science, technology and innovation, known as 'National Science Awards'. The awards will be given in how many categories?
(a) Two
(b) Three
(c) Five
(d) Four **[d]**

Explanation-
The Government of India has introduced a new set of National Awards in the field of Science, Technology and Innovation, known as 'National Science Awards'.
This award will be awarded in 4 categories
1. Vigyan Ratna (VR):-
A maximum of three awards will be awarded to recognize lifetime achievements and contributions in the field of science and technology.
2. Vigyan Shri (VS):-

A maximum of 25 awards will be awarded to recognize distinguished contributions in the field of science and technology.

3. Vigyan Yuva-Shanti Swarup Bhatnagar (VY-SSB):-

This award will be awarded to young scientists (maximum age 45 years) who have made exceptional contributions in any field of science and technology.

4. Science Team:-

This award will be awarded to a team of 3 or more scientists making outstanding research contributions in any field of science and technology.

24. Which of the following devices does not use the magnetic effect of electric current?

(a) Microphone
(b) Electric generator
(c) Magnetic compass
(d) Electric motor **[c]**

Explanation-

The magnetic effect of electric current is used by those devices in which a magnetic field is generated when electric current flows, such as:

Microphone:- Uses the magnetic effect of electric current to convert sound into electrical signals.

Electric Generator:-

Produces electric current by rotating a conductor in a magnetic field.

Electric Motor:- Uses the magnetic effect of electric current to produce torque.

But a magnetic compass works only with the effect of the natural magnetic field of the earth. No electric current flows in it nor is it based on the magnetic effect of electric current. It only uses a magnetic needle to indicate the north-south magnetic poles of the earth.

25. In the Union Budget 2024, the Finance Minister announced which initiative to increase productivity in agriculture?

(a) A new subsidy programme for farmers
(b) A comprehensive review of the agricultural research setup
(c) Expansion of irrigation facilities across the country
(d) Introduction of genetically modified crops **[b]**

Explanation-

In the Union Budget 2024, Finance Minister Nirmala Sitharaman announced several important initiatives to increase productivity in the agriculture sector. The major initiatives among these are as follows:-

1. National High Yielding Seeds Mission: Under this mission, 109 new high-yielding and climate-resilient varieties will be developed for 32 types of crops.

2. Pradhan Mantri Dhan-Dhanya Krishi Yojana: This scheme will be implemented in 100 low-productivity districts to increase agricultural productivity, including crop diversification, improvement of irrigation facilities, and development of storage facilities.

3. Promotion of Natural Farming:- It is planned to motivate 1 crore farmers towards natural farming in the next two years.

4. Development of Digital Public Infrastructure:- To promote digital infrastructure in the agriculture sector, it is planned to conduct a digital survey of farmers and their land in three years.

26. Electrical appliances like laundry iron, electric toaster, electric oven, electric kettle and electric heater are based on which effect of electric current?

(a) Thermal effect
(b) Functional effect
(c) Chemical effect
(d) Magnetic effect **[a]**

Explanation-

When electric current flows through a conductor (such as wire or metal), heat is generated in it. This phenomenon is called the heating effect of electric current.

This principle is used in the following devices -

Laundry Iron:- Produces heat to press clothes.
Electric Toaster:- Produces heat to bake bread.
Electric Oven:- Provides heat for cooking food.
Electric Kettle:- Works to heat water.
Electric Heater:- Provides heat to heat the room or water.

27. Look at the following series of numbers and symbols and answer the question given below. Numbers and symbols should be counted from left to right only.

(left) 2 & % 4 6 @ & 3 Ω 9 # 1 * 8 £ 6 1 7 # (right)

How many such symbols are there in the above series, each of which is immediately preceded by an even number, and also immediately followed by an even number?

(a) One
(b) Two
(c) More than two
(d) None **[a]**

Explanation-

2 & % 4 6 @ & 3 9 # 1 * 8 £ 6 17 #

There is only one symbol in the given series. It is immediately preceded by an even number and immediately followed by an even number (8£6).

So option (a) is correct.

28. The sum of two numbers is 36. Five times one number is equal to four times the other. Which is the larger of the two numbers?

(a) 20
(b) 16
(c) 12
(d) 15 **[a]**

Explanation-

Let the numbers be x and y respectively.

$x + y = 36$

$x \times 5 = y \times 4$

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

$y = \frac{36}{9} \times 5 = 20$

Hence the largest number is 20.

29. Which of the following numbers is divisible by 11?

(a) 9248164
(b) 7247564
(c) 8245964
(d) 9246864 **[d]**

Explanation-

Option (A) 9248164

(9 + 4 + 1 + 4) – (2 + 8 + 6)

(18 - 16) = 2

Hence option (A) is not divisible by 11.

Option (B) 7247564

(7 + 4 + 5 + 4) – (2 + 7 + 6)

20 – 15 = 5

Hence option (B) is not divisible by 11.

Option (C) 8245964

(8 + 4 + 9 + 4) – (2 + 5 + 6)

25 – 13 = 12

Hence option (c) is not divisible by 11.

Option (D) 9246864

(9 + 4 + 8 + 4) – 2 + 6 + 6

25 – 14 = 11

Hence option (D) is divisible by 11.

30. At a particular time of the day, due to the position of the sun, a person 6 feet tall casts a shadow of 4 feet, while a pole next to that person casts a shadow of 36 feet. What is the height of the pole?

(a) 56 feet
(b) 54 feet
(c) 63 feet
(d) 60 feet **[b]**

Explanation-

Given-

The length of the shadow of the pole is 36 feet.

Due to the position of the sun at a particular time, the shadow of a 6 feet tall person is 4 feet.

So the ratio of the height of the person and the length of the shadow of the person

$= 6 : 4 \Rightarrow 3 : 2$

So the length of the pole $\Rightarrow \frac{36}{2} \times 3 \Rightarrow 54$ feet

31. A 3-digit number is such that the unit digit, tens digit and hundreds digit are in the ratio 2 : 3 : 4. The sum of this number and the number obtained by reversing it is 1332. Find the positive difference between the 3-digit number and the number obtained by reversing its digits.

(a) 594
(b) 396
(c) 414
(d) 323 **[b]**

Explanation-

First, let us understand the digits of a 3-digit number.

Suppose the units digit, tens digit and hundreds digit are U, T and H respectively.

According to the question, these digits are in the ratio 2 : 3 : 4. So we can write them as:

U=2k,T=3k,H=4k

Where k is any integer.

Since H,T,U are digits, they must be between 0 to 9.

If k=1, then H=4,T=3,U=2. This gives a valid 3-digit number 432.

If k=2, then H=8,T=6,U=4. This gives a valid 3-digit number 864.

If k=3, then H=12, which is not a digit. So the value of k can be either 1 or 2.

The number obtained by reversing this number will be 468.

Sum of these two numbers = 864+468=1332

This matches the condition given in the question.

So, the 3-digit number is 864 and the number obtained by reversing it is 468.

Now we have to find the positive difference between the 3-digit number and the number obtained by reversing its digits.

Positive difference = |864−468|

Positive difference = 396

32. The amount of force required to accelerate a 10 kg mass at 2.5 m/s² is _____.

(a) 7.5 N
(b) 4N
(c) 25 N
(d) 12.5 N **[c]**

Explanation-

Force = Mass × Acceleration
Mass (m) = 10kg
Acceleration (a) = 2.5m/s^2
Then the force will be:
F = m × a
F = 10 × 2.5
F = 25N

33. Seven boxes A, B, C, D, E, F and G are placed one above the other but not necessarily in the same order. D is placed third from the bottom. Only one box is placed between F and A. Only three boxes are placed between G and E. B is placed just above F. E is placed one of the places above D.
How many boxes are placed between E and C?
(a) None
(b) Three
(c) One
(d) Two **[d]**

Explanation-

1 – B
2 – F
3 – E
4 – A
5 – D
6 – C
7 – G
It is clear from the diagram that two boxes A and D are placed below E and C.
Hence option (d) is correct.

34. If the HCF and LCM of two numbers are 7 and 245 respectively, then find their product.
(a) 1751
(b) 1175
(c) 1517
(d) 1715 **[d]**

Explanation-

It is given-
LCM = 245
HCF = 7
I × II = LCM × HCF
I × II = 7 × 245 = 1715
Hence the product of the two numbers is 1715.

35. A person bought the same number of oranges at the rate of 3 for a rupee and 2 for a rupee. At what price per dozen should he sell them to earn a profit of 20%?
(a) Rs. 6
(b) Rs. 5
(c) Rs. 7
(d) Rs. 4 **[a]**

Explanation-

According to the question
When a person buys 3 oranges for 1 rupee.
The price of one orange = $\frac{1}{3}$
the value of a dozen oranges = $\frac{1}{3}\times 12 = \text{Rs.}4$
When a person buys 2 oranges for Rs. 1.
The cost of a dozen oranges = $\frac{1}{2}\times 12 = \text{Rs.}6$
Cost price of 2 dozen oranges = 4 + 6 = Rs. 10
Cost price of 1 dozen = $\frac{10}{2} = \text{Rs.}5$
Selling price after 20% profit = $5\times\frac{120}{100}\Rightarrow \text{Rs.}6$

36. A series of compounds in which hydrogen atom located in carbon chain is replaced by same type of functional group is called _____.
(a) Homologous series
(b) Isomers
(c) Heterologous series
(d) Catenation **[a]**

Explanation-

When hydrogen atom located in carbon chain in a series of compounds is replaced by same type of functional group, then such series of compounds is called Homologous Series.
The physical properties of compounds of this series change regularly, while chemical properties remain almost same.
Each next member differs from the previous member by –
It is different from - CH_2 (methylene group).
Example:
Alkane series: CH_4 ,C_2H_6,C_3H_8 ,C_4H_{10} etc.

37. Anil spends 40% of his income on rent and 40% of the remaining income on medicines. If he saves Rs 7,200 every month, what is his monthly income?
(a) Rs 25,000
(b) Rs 36,000
(c) Rs 22,000
(d) Rs 20,000 **[d]**

Explanation-

Let Anil's income be Rs.
After paying 40% of his income as rent, Anil spent the remaining income on

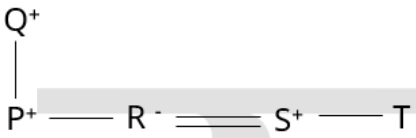
$= 100x \times \frac{60}{100} = \text{Rs}, 60x$

If he spends 40% of the remaining on medicines, then the remaining income = $60x \times \frac{60}{100} = 36x$

Hence, total income = $\frac{7200}{36x} \times 100x = \text{Rs}, 20,000$

38. In a certain code language,
A + B means 'A is the brother of B',
A - B means 'A is the son of B',
A × B means 'A is the wife of B' and
A ÷ B means 'A is the father of B'.
Based on the above, if 'P – Q ÷ R × S + T' then how is Q related to S?
(a) Wife's brother
(b) Husband's brother
(c) Wife's father
(d) Father **[c]**

Explanation-



It is clear from the diagram that Q is the father of S's wife.
Hence option (c) is correct.

39. Which of the following is obtained when hydrochloric acid reacts with water?
(a) HO^- and Cl^-
(b) Only Cl^-
(c) Both H_3O^+ and Cl^-
(d) Only H_3O^+ **[c]**

Explanation-

When hydrochloric acid (HCl) is added to water (H_2O), it completely dissociates into ions.
The equation for the reaction of HCl with water is:
In this:

$HCl + H_2O \longrightarrow H_3O^+ + Cl^-$

This reaction shows that hydrochloric acid dissolves in water to produce hydroxonium ions (H_3O^+, which is what causes the acidity of water) and chloride ions (Cl^-). Therefore, both H_3O^+ and Cl^- are produced when HCl reacts with water.

40. What is the value of the given expression?
$\mathbf{2^3 \times (-9)^0 \times 3^3}$
(a) 9
(b) 36
(c) 81
(d) 216 **[d]**

Explanation-

$\Rightarrow 2^3 \times (-9)^\circ \times 3^3$

$\Rightarrow 8 \times \left(\frac{1}{9}\right)^\circ \times 27$

$\Rightarrow 8 \times 1 \times 27 \Rightarrow 216$

41. In case of jelly, which of the following is the dispersed phase?
(a) Gas phase
(b) Liquid phase
(c) Solid phase
(d) Both solid and liquid phase **[b]**

Explanation-

Jelly is a colloid,
where solid in the jelly (e.g. gelatin) = dispersion medium.
and liquid (e.g. water) spread in it = dispersed phase.
In colloidal system, there are two phases:
1. Dispersed Phase:
It is the phase which is spread in the form of small particles.
We can also call it dispersed phase.
In simple words, the thing which is spread in the form of small particles is the dispersed phase.
2. Dispersion Medium:
It is the phase in which dispersed particles are spread. We can also call it the basic/base medium.

42. Select the correct balanced reaction for
$CuO + NH_3 \rightarrow Cu + N_2 + H_2O$
(a) $3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 4H_2O$
(b) $3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 3H_2O$
(c) $2CuO + 3NH_3 \rightarrow 3Cu + N_2 + 3H_2O$
(d) $3CuO + 2NH_3 \rightarrow 3Cu + 2N_2 + 3H_2O$ **[b]**

Explanation-

Now let us balance this reaction one by one:
The given unbalanced reaction is:
$CuO + NH_3 \rightarrow Cu + N_2 + H_2O$
Now let's balance the elements:
1. **Balance Nitrogen (N) -**
There is 1 N in NH_3 on the left.
There are 2 N in N_2 on the right side.
So, we put 2 before NH_3:
$CuO + 2NH_3 \rightarrow Cu + N_2 + H_2O$
2. **Balance the hydrogen (H) and oxygen (O) -**
There are a total of 6 H from 2 NH_3 on the left side.
2 H_2O on the right side gives 2 H.
So, 3 H_2O must be written on the right side:
$CuO + 2NH_3 \rightarrow Cu + N_2 + 3H_2O$
3. Balance copper (Cu) -
On the left side there is 1 Cu in CuO, on the right side there is Cu.

Put a 3 in front of Cu to balance:
$3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 3H_2O$

4. **Check Oxygen (O) -**

On the left side there are 3 O from 3 CuO.
On the right side there are also 3 O in 3 H_2O.
Oxygen is also balanced.
The balanced reaction is -
$3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 3H_2O$

43. If the force of attraction between an apple placed at a distance 'x' from the earth is 'F', then how much force will be applied when the same apple is placed at a distance of '2x'?

(a) F/4
(b) 4F
(c) F/2
(d) 2F **[a]**

Explanation-

We know that the gravitational force between two objects is according to Newton's law of gravitation:

$$F = G\frac{m_1 m_2}{r^2}$$

Where,
F = force of attraction,
G = Universal Gravitational Constant,
m_1,m_2 = masses of both objects,
r = distance between objects.
r = 2x

$$F' = G\frac{m_1 m_2}{(2x)^2}$$

$$F' = G\frac{m_1 m_2}{4x^2}$$

$$F' = \frac{F}{4}$$

44. In a certain code language, 'FROM' is written as '4935', and 'MORE' is written as '3154'. How will 'E' be written in that code language?

(a) 5
(b) 3
(c) 9
(d) 1 **[d]**

Explanation-

Just as

F [R O M] - [4 9 3 5]

[M O R] E - [3 1 5 4]

Similarly
E = 1
So option (d) is correct.

45. ZX is related to AC in a certain way. In the same way, US is related to FH. Following the same logic, PN is related to which of the following options?

(a) KM
(b) KO
(c) ML
(d) LM **[a]**

Explanation-

Just as

Opposite Letter [Z X / A C]

Opposite Letter [U S / F H]

In the same manner

Opposite Letter [P N / K M]

Therefore option (a) is correct.

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

DFH, KMO, RTV, YAC, ?

(a) FIL
(b) EGI
(c) FHJ
(d) EGK **[c]**

Explanation-

D $\xrightarrow{+7}$ K $\xrightarrow{+7}$ R $\xrightarrow{+7}$ Y $\xrightarrow{+7}$ F

F $\xrightarrow{+7}$ M $\xrightarrow{+7}$ T $\xrightarrow{+7}$ A $\xrightarrow{+7}$ H

H $\xrightarrow{+7}$ O $\xrightarrow{+7}$ V $\xrightarrow{+7}$ C $\xrightarrow{+7}$ J

Therefore option (c) is correct.

47. Which natural disaster caused storm surge, flash floods and landslides in the northeastern states of India in 2024?

(a) Cyclone Amphan
(b) Cyclone Ramal
(c) Cyclone Yaas
(d) Cyclone Fani **[b]**

Explanation-

In 2024, cyclone 'Remal' caused storm surge, flash floods and landslides in the northeastern states of India, especially in Mizoram, Assam and Meghalaya.

Cyclone Remal made landfall in the Sundarban delta region of Bengal and Bangladesh on May 26, and then moved towards the northeastern states. The storm caused widespread destruction with heavy rains, strong winds and cyclonic rainfall.
Landslides killed 27 people in Mizoram, while Bengal, Assam and Meghalaya also suffered loss of life and property.
Cyclone Remal also damaged infrastructure, disrupting power and water supply.

48. Water is filled into a tank of dimensions 200 m × 150 m through a rectangular pipe of dimensions 1.5 m × 1.25 m at a speed of 20 km/h. In how much time (in minutes) will the water level rise by 2 m?

(a) 540
(b) 96
(c) 234
(d) 72 **[b]**

Explanation-

Dimensions of pipe (length×width = 1.5 m×1.25 m)
Dimensions of tank (length×width = 200m×150m)
Speed of water = 20 km/hr
Area of pipe = 1.5 × 1.25 = 1.875 m^2
Area of tank = 200 × 150 = 30000 m^2
Volume of water required to raise the water level by 2 m = 30000 × 2 = 60000 m^3
∵ On converting speed from km/hr to metre per minute

$= 20 \times \frac{1000}{60} = \frac{20,000}{60} = \frac{1000}{3}$ meter/minute

Volume of water flowing through the pipe per minute $= 1.875 \times \frac{1000}{3} = 625$ m^3/minute

Total time taken to fill the tank $= \frac{60000}{625} = 96$ minute

49. Seven persons, B, C, D, E, F, G and K are sitting in a straight row facing north. Only three persons are sitting to the left of B. Only K is sitting to the right of G. Only three persons are sitting between G and D. C is sitting somewhere to the left of F but somewhere to the right of E.
How many persons are sitting between E and F?

(a) Four
(b) One
(c) Two
(d) Three **[d]**

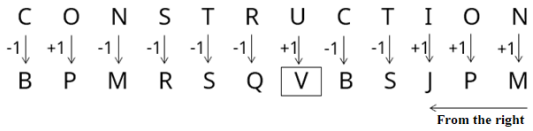
Explanation-

It is clear from the diagram that three persons (D, C, B) are sitting between E and F.
So option (d) is correct.

50. If each vowel of the word CONSTRUCTION is replaced by its next letter in the English alphabetical order and each consonant is replaced by its next letter in the English alphabetical order, then which of the following letters will be 6th from the right end in the group of letters thus formed?

(a) V
(b) S
(c) B
(d) Q **[a]**

Explanation-



It is clear from the diagram that the sixth letter from the right will be (V). Hence option (A) is correct.

51. Which Indian actress played the lead role in the film Sister Midnight, screened at the Cannes Film Festival in 2024?

(a) Radhika Apte
(b) Aditi Rao Hydari
(c) Taapsee Pannu
(d) Kriti Sanon **[a]**

Explanation-

• Indian actress Radhika Apte plays the lead role in the film "Sister Midnight", which will be screened at the Cannes Film Festival in 2024.
• Radhika Apte plays the role of a newly married bride in the film "Sister Midnight".
• The film was screened at the Directors' Fortnight at the 77th Cannes Film Festival.
• According to Film Companion, "Sister Midnight" was a "sandbox" for Radhika.
• With the film "All We Imagine as Light", Radhika made her presence felt at Cannes.
• According to The Hindu, "All We Imagine as Light" was directed by Payal Kapadia and was one of the most spectacular Indian films at Cannes

52. The atomic number of an atom is equal to:

(a) Sum of the number of electrons and neutrons
(b) Half the number of electrons present in the nucleus of an atom
(c) Sum of the number of protons and neutrons

(d) Total number of protons present in the nucleus of an atom **[d]**

Explanation:

Atomic number is the total number of protons present in the nucleus of an atom of an element.

Both protons and neutrons are present in the nucleus of an atom, but atomic number is determined only by the number of protons.

For example, the atomic number of hydrogen (H) is 1 because there is 1 proton present in its nucleus.

The atomic number of carbon (C) is 6 because there are 6 protons in its nucleus.

The sum of protons + neutrons = is called mass number

53. Gingee Fort, which was recently nominated for UNESCO World Heritage status, is located in which state?

(a) Gujarat
(b) Tamil Nadu
(c) Karnataka
(d) Rajasthan **[b]**

Explanation-

• Gingee or Senji Fort, located in Villupuram district of Tamil Nadu, is one of the most impregnable forts in peninsular India.

• It was given the title of "Troy of the East" by the British due to its strength and impregnable nature.

54. A alone can do a piece of work in 6 days and B alone in 8 days. A and B decide to do the work for Rs. 3,200. With the help of C, they finish the work in 3 days. How much must C be paid?

(a) Rs. 400
(b) Rs. 800
(c) Rs. 375
(d) Rs. 600 **[a]**

Explanation-

Given-

A alone can do the work in 6 days.

B alone can do the same work in 8 days.

(A+B+C) can complete this work in 3 days.

A and B decide to do the whole work in Rs. 3200.

Work done by A in one day = $\frac{1}{6}$ Unit

Work done by B in one day = $\frac{1}{3}$ Unit

Work done by A + B + C in one day = $\frac{1}{8}$ Unit

Total work = 24 (LCM of 6, 8, 3)

Efficiency of C = $\frac{1}{3}-\left(\frac{1}{6}+\frac{1}{8}\right)\Rightarrow\frac{8-(4+3)}{24}=\frac{1}{24}$

Total payment made to C = $\frac{3200}{\left(\frac{1}{6}+\frac{1}{8}+\frac{1}{24}\right)}\times\frac{1}{24}$

$=\frac{3200}{\frac{8}{24}}\times\frac{1}{24}=\frac{3200\times24}{8\times24}=\text{Rs.}400$

55. If each vowel of the word REALISM is replaced by its next letter in the English alphabetical order and each consonant is replaced by its next letter in the English alphabetical order and then arranged in the reverse English alphabetical order, then which of the following letter will be fourth from the left in the letter group thus formed?

(a) N
(b) J
(c) F
(d) M **[d]**

Explanation-

R E A L I S M
+1 +1 +1 +1 +1 +1 +1
S F B M J T N

When the letters of the English alphabet are arranged in reverse order-

T S N M J F B

From the left

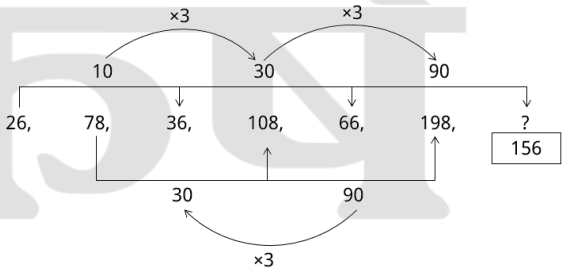
It is clear from the diagram that M is fourth from the left. Hence option (d) is correct.

56. Select the number from the given options that can replace the question mark (?) in the following series.

26 78 36 108 66 198 ?

(a) 142
(b) 128
(c) 164
(d) 156 **[d]**

Explanation-



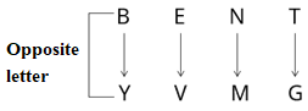
Hence, it is clear from the diagram that option (d) is correct.

57. Traits can be influenced by which of the following?
(a) Only maternal DNA
(b) Only paternal DNA
(c) Only maternal DNA
(d) Both paternal DNA and maternal DNA **[d]**

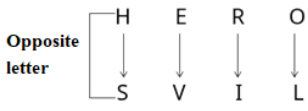
Explanation-
Traits are the specific characteristics of the body of an organism, which differentiate it from other organisms, such as - skin color, eye color, height, hair texture, etc.
These characteristics are controlled by genes located in the DNA present in the body.
An offspring receives half DNA from the father (paternal DNA) and half DNA from the mother (maternal DNA).
Therefore, the traits of the offspring are influenced by the genes of both the mother and the father.
Due to this genetic mixing, sometimes the traits of the father are seen dominant in the offspring and sometimes the traits of the mother are seen dominant.

58. Select the pair from the given options which follows the same pattern as followed by the two pairs given below. Both the pairs follow the same pattern.
FIND : URMW
BENT : YVMG
(a) SAID : HZRV
(b) HERO : SVIL
(c) BEAD : YVYW
(d) FILE : VROV **[b]**

Explanation-
Just as



In the same manner



Therefore, according to the diagram, option (b) is correct.

59. Dr. Shankarbaba Pundlikrao Papalkar is known for his dedication towards improving the lives of _____.
(a) Divyang and destitute children
(b) Those pursuing education
(c) Farmers
(d) Senior citizens **[a]**

Explanation-
Dr. Shankarbaba Pundlikrao Papalkar has dedicated his life to the welfare and rehabilitation of disabled and destitute children.
Shankarbaba Pundlikrao Papalkar:-
Shankarbaba Pundlikrao Papalkar, a resident of Amravati district of Maharashtra, famous as a social worker and father of orphans, has been awarded Padmashree.
Shankarbaba Papalkar is a big and senior social worker of Vidarbha. Papalkar is known as the Nath i.e. father of orphans.
Papalkar is the father of not one or two but 123 orphan children.

60. A shopkeeper offers successive discounts of 5% and 4%, which are equivalent to a single discount of _____.
(a) 8%
(b) 9.2%
(c) 8.8%
(d) 9% **[c]**

Explanation-
Single discount of 5% and 4% = $x + y - \frac{xy}{100}$
$= 5 + 4 - \frac{5 \times 4}{100} = 8.8\%$

61. Which of the following options represents metals that do not react with cold water?
(a) Sodium, iron and potassium
(b) Sodium, calcium and zinc
(c) Sodium, calcium and potassium
(d) Aluminium, iron and zinc **[d]**

Explanation-
Some metals like sodium (Na), potassium (K) and calcium (Ca) react vigorously with cold water and release hydrogen gas.
While aluminium (Al), iron (Fe) and zinc (Zn) do not react with cold water under normal conditions or react very slowly.
Aluminium (Al) - does not react with water due to the formation of an oxide layer on its surface.
Iron (Fe) - reacts very slowly with cold water.
Zinc (Zn) - almost does not react with cold water, can react to some extent with hot water or steam.

62. Who has been appointed as the Director General of the Sashastra Seema Bal (SSB) in September 2024?
(a) Rakesh Asthana
(b) Subodh Kumar Jaiswal

(c) Kuldeep Singh
(d) Amrit Mohan Prasad **[d]**

Explanation-

• In September 2024, Amrit Mohan Prasad, a senior Indian Police Service (IPS) officer of 1989 Odisha cadre, was appointed Director General (DG) of the Sashastra Seema Bal (SSB).

• Sashastra Seema Bal (SSB):- A central armed police force under the Ministry of Home Affairs in India. It is responsible for guarding India's borders with Nepal and Bhutan.

• The force was originally established as the Special Service Bureau in 1963 after the Indo-China War to strengthen India's border areas against enemy actions.

63. Which of the following statements is/are related to ecosystem?

(i) It consists of biological components consisting of living organisms.

(ii) All green plants and some bacteria are producers.

(iii) Decomposers break down complex organic matter into simple organic matter.

(a) Only (i) and (iii)
(b) (i), (ii) and (iii)
(c) Only (i)
(d) Only (i) and (ii) **[b]**

Explanation-

Ecosystem:-

It is a system made up of a community of organisms (plants, animals, microorganisms) and their physical environment, which is interrelated.

(i) It includes biological components consisting of living beings.

The ecosystem consists of biological components (such as plants, animals, microorganisms) as well as abiotic components (such as soil, water, air).

(ii) All green plants and some bacteria are producers.

Green plants and some bacteria (such as blue-green algae) make food through photosynthesis, so they are called producers.

(iii) Decomposers break down complex organic matter into simple organic matter.

Decomposers such as bacteria and fungi break down complex organic matter of dead organisms into simple organic and inorganic matter,

which returns nutrients to the soil.

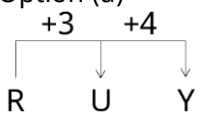
64. Three of the following four letter-clusters are alike in a certain way based on the English alphabetical order and thus form a group. Which of the following letter-cluster does not belong to that group?

(Note: Odd letter-cluster is not based on the number of consonants/vowels or their position in the letter-cluster.

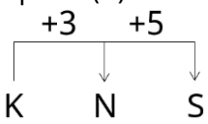
(a) RUY
(b) KNS
(c) EHM
(d) JMR **[a]**

Explanation-

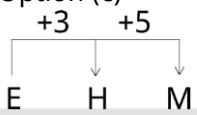
Option (a)



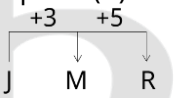
Option (b)



Option (c)



Option (d)



Hence option (a) is different from other options.

65. The lengths of the sides of a triangle are 5cm, 7cm and 10 cm. Find the area (in cm²) of the triangle.

(a) $2\sqrt{66}$
(b) 350
(c) 25
(d) $7\sqrt{10}$ **[a]**

Explanation-

Given-

The length of the triangle is 5 cm, 7 cm, 10 cm respectively

So, if the three sides of the triangle are unequal then this triangle is a scalene triangle.

As per the question:-

Half perimeter = $\frac{5+7+10}{2}=11$

$\Rightarrow \sqrt{S(S-a)\times(S-b)\times(S-c)}$ $(S=$ त्रिभुज का अर्द्धपरिमाप$)$

$\Rightarrow \sqrt{11(11-5)\times(11-7)\times(11-10)}$

$\Rightarrow \sqrt{11\times6\times4\times1}$

$\Rightarrow 2\sqrt{66}$

66. The average height of 50 students in a class is 150 cm. Five of them, whose average height is 146 cm, leave the class, and five others whose average height is 156 cm, join the class. The

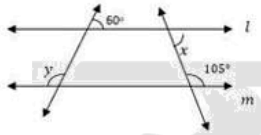
new average height (in cm) of the students of the class is ____.

(a) 149
(b) 151
(c) 152
(d) 153 **[b]**

Explanation-

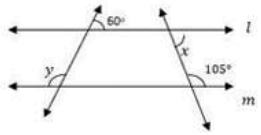
The average height of 50 students in a class is 150 cm.
Out of these, five students whose average height is 146 cm.
Leave the class.
Apart from these, five new students join whose average height is 156 cm.
Total increase in height = (156 - 146) × 5 = 50 cm
Total increase in average in the class = $150+\frac{50}{50}=151\text{cm}$

67. In the attached figure, line *l* is parallel to line m. What is the value of x + 2y?



(a) 315°
(b) 340°
(c) 270°
(d) 225° **[a]**

Explanation-



angle (x) = 180° - 105° = 75°
angle (y) = 180° - 60° = 120°
So, angle x + 2y = 75° + 2×120° = 315°

68. If '.' means '+','J' means '×', 'K' means '÷' and 'L' means '-', then what will come in place of question mark '?' in the following equation?
38 I (3 J 4) L (16 K 2) I 11 = ?

(a) 34
(b) 47
(c) 53
(d) 61 **[c]**

Explanation-

I means = +
J means = ×
K means = ÷
L means = -
38 I (3 J 4) L (16 K 2) I 11 = ?
38 + (3 × 4) – (16 ÷ 2) + 11 = ?
38 + 12 – 8 + 11 = ?
61 – 8 = ?
53 = ?
Therefore option (c) is correct.

69. Match the following.

(i)	The swollen part of the pistil is _____	**a**	Stigma
(ii)	The middle long part of the pistil is _____	**b**	Ovule
(iii)	The top part of the pistil is _____	**c**	Ovary
(iv)	The ovary contains _____	**d**	Style

(a) (i)–(b), (ii)–(c), (iii)–(a), (iv)–(d)
(b) (i)–(a), (ii)–(d), (iii)–(c), (iv)–(b)
(c) (i)–(c), (ii)–(b), (iii)–(a), (iv)–(d)
(d) (i)–(c), (ii)–(d), (iii)–(a), (iv)–(b) **[d]**

Explanation-

(d) (i)–(c), (ii)–(d), (iii)–(a), (iv)–(b)

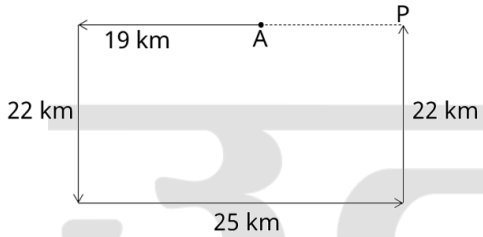
(i)	The swollen part of the pistil is _____	c	Ovary
(ii)	The middle long part of the pistil is _____	d	Style
(iii)	The top part of the pistil is _____	a	Stigma
(iv)	The ovary contains _____	b	Ovum

Stigma - It is the swollen part at the top of the pistil where pollen grains stick.
Style - It is the long tube-like part that connects the stigma to the ovary.
Ovary - It is the lower swollen part of the pistil in which ovules are present.
Ovule - The structure located inside the ovary from which seeds are formed after fertilization.

70. Brinda starts from point A and travels 19 km towards west. Then she takes a left turn, travels 22 km, turns left again and travels 25 km. She takes a last left turn, travels 22 km and stops at point P. How much distance (shortest distance) and in which direction should she drive to reach point A again? (Unless specified, all turns are 90 degree turns.)

(a) 6km towards east
(b) 7km towards west
(c) 6km towards west
(d) 7km towards south **[c]**

Explanation-



It is clear from the diagram that Brinda will walk 6 km towards west to reach point A.
Hence option (c) is correct.

71. What is the average of the first 25 multiples of 3?
(a) 25
(b) 30
(c) 36
(d) 39 **[d]**

Explanation-
3 first 25 multiples = (3, 6, 9, 12, 15, 18....., 75)
Total Sum =3(1 + 2 + 3 + 4 + 5 + 6 + ...+ 25)
$= 3\left(\frac{25\times 26}{2}\right)$
= 25 × 13 × 3
= 975
Overall average of 25 factors = $\frac{975}{25} = 39$

72. In a certain code language, 'NUMB' is written as '4618' and 'BUNT' is written as '6438'. How will 'T' be written in that code language?
(a) 8
(b) 3
(c) 6
(d) 4 **[b]**

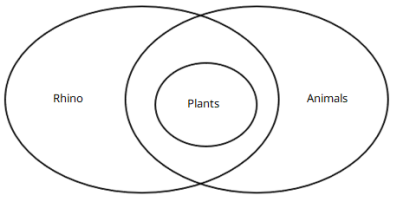
Explanation-
Just as

N	U	M	B	=	4	6	1	8
B	U	N	T	=	6	4	3	8

Similarly
T = 3
So option (b) is correct.

73. 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 given conclusions logically follows from the given statement(s) ?
Statements:
All plants are rhinoceroses.
All plants are animals.
Conclusions:
(I) All rhinoceroses are plants.
(II) Some animals are rhinoceroses.
(a) Only conclusion I follows from the statements
(b) Both conclusion I and II follow from the statements
(c) Only conclusion II follows from the statements
(d) Neither conclusion I nor II follows from the statements **[c]**

Explanation-



It is clear from the diagram that some animals are rhinoceroses. But all rhinoceroses are not plants.
So option (c) is correct.

74. A statement is given below followed by two possible causes numbered I and II. Read the statement carefully and decide which of the two causes explains the event/observation/information given in the statement?
Statement - Long queues were seen outside electricity bill payment counters in city X on 14th June 2023.
Reasons:
(I) The last date for payment of electricity bills in city X is 15th of every month.
(II) Many people were not able to pay electricity bill online due to server failure in June 2023.
(a) Both I and II are possible causes.
(b) Only I is a possible cause.
(c) Neither I nor II is a possible cause.
(d) Only II is a possible cause. **[a]**

Explanation-
Reason – I – The last date for payment of electricity bills in city x is 15th of every month.
14th June is just one day before 15th June. Many people wait to pay their bills near the last date so that they can pay till the last moment. So this is a possible reason for long queues at electricity bill payment counters from 14th June.
Reason – II – Due to server failure in June 2023, many people were not able to pay electricity bill online.
If there was a server failure, then those who paid online would also be forced to pay at physical counters. This would increase the crowd at the counters and lead to long queues. So this is also a possible reason.

So both I and II are possible reasons.

75. Who among the following created a record by finishing the boys' 1500m race in 3:51.12 minutes in the sixth edition of Khelo India Youth Games?

(a) Rahul Iyer

(b) Rahul Sarnaliya

(c) Aadi Sharma

(d) Jai Kumar Verma [b]

Explanation-

At the 6th Khelo India Youth Games held in January 2024, Rahul Sarnaliya of Uttarakhand set a new meet record in the boys' 1500m event by finishing the race in 3:51.12 minutes.

This performance surpassed the previous record of 3:51.57 minutes set by Arjun Vaskale in 2022.

Khelo India Youth Games 2024:-

Khelo India Youth Games 2024 was held in Tamil Nadu, with over 5,500 athletes participating in 26 sports.

The event ran from January 19 to January 31, 2024, and Maharashtra topped the list with 158 medals.