1. Which of the following statements is correct about a suspension?

(a) Suspension is a heterogeneous mixture.
(b) The particles of a suspension are invisible to the eye.
(c) Suspension is a homogeneous mixture.
(d) A solid substance dispersed in a gas is called a suspension. **[a]**

Explanation -

Suspension: It is a heterogeneous mixture in which solid particles are dispersed in a liquid or gas and remain undissolved. These particles are so large that they can be seen with the naked eye.
Important characteristics of a suspension:
Heterogeneous nature: The components of a suspension are not uniformly mixed with each other, making it a heterogeneous mixture. You can see individual particles in it.
Size of particles: The size of the particles in a suspension is quite large (usually more than 100 nanometers), so they can be seen without any instruments.
Scattering of Light: The particles in a suspension are large enough to scatter a beam of light when it passes through them. This effect is called the Tyndall effect, which makes the path of light visible.
Stability: Suspensions are not stable. If they are left undisturbed for some time, the solid particles settle down due to gravity (sedimentation).
Filtration: The particles in a suspension can be easily separated from a mixture by filtration (e.g. using filter paper).
A solid dispersed in a gas is usually called an aerosol (e.g. smoke). However, it can be broadly classified as a suspension.

2. A concave mirror with a focal length of 20 cm forms a real image of an object placed 60 cm from the mirror. What is the image distance (in cm)?

(a) +30
(b) -30
(c) -15
(d) +15 **[b]**

Explanation -

For a concave mirror, the focal length (f) is negative. So, f=−20 cm.
The distance of the object (u) is also negative (as the object is placed in front of the mirror). So, u=−60 cm.
We have to find the distance of the image (v). We will use the mirror formula:

$$\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$$

Putting the values into the formula:

$$\frac{1}{-20}=\frac{1}{v}+\frac{1}{-60}$$
$$\frac{1}{v}=\frac{1}{-20}+\frac{1}{-60}$$
$$\frac{1}{v}=\frac{1}{-20}+\frac{1}{60}$$
$$\frac{1}{v}=\frac{-3+1}{60}$$
$$\frac{1}{v}=\frac{-2}{60}$$
$$\frac{1}{v}=\frac{-1}{30}$$
$$v=-30$$

3. What was the theme of 'Financial Literacy Week 2024' organized by the Reserve Bank of India from 26 February to 01 March 2024?

(a) Go Digital, Go Secure
(b) Make a Right Start: Become Financially Smart
(c) Good Financial Behaviour, Your Saviour
(d) Credit Discipline and Credit from Formal Institutions **[b]**

व्याख्या –

The theme of this year's Financial Literacy Week, to be observed from February 26 to March 01, 2024, is "Start Right: Be Financially Smart", with emphasis on "Power of Savings and Compound Interest", "Banking Essentials for Students" and "Digital and Cyber Hygiene", which aligns with the overall strategic objectives of the National Strategy for Financial Education: 2020-2025. This year's theme is targeted at young adults, primarily students. It aims to raise awareness about the benefits of inculcating discipline from an early age.

4. Identify the correct match between plant hormones and their functions.

(a) Cytokinins: Increases cell division
Abscissic acid: Inhibits growth
Gibberellins: Increases cell division
(b) Cytokinins: Helps in stem growth
Abscissic acid: Inhibits growth
Gibberellins: Inhibits growth
(c) Cytokinins: Increases cell division
Abscissic acid: Helps in stem growth
Gibberellins: Helps in stem growth
(d) Cytokinins: Inhibits growth
Abscissic acid: Increases cell division **[a]**

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Explanation -

Plant hormones (phytohormones) play an important role in controlling the growth, development and various physiological processes of plants.

Major Plant Hormones and their Functions:

1. Auxins: These help in cell elongation, apical dominance, root development and fruit development.
2. Gibberellins: These promote stem elongation, seed germination and flowering.
3. Cytokinins: These promote cell division and cell differentiation, and delay senescence.
4. Abscisic Acid (ABA): It is considered as a growth inhibitory hormone. It plays an important role in leaf abscission, dormancy and stomatal closure, especially under stress conditions.
5. Ethylene: It is involved in fruit ripening and senescence of leaves and flowers.

5. Mr. Hari spends 36% of his income on food items and 25% of the remaining amount on clothes, medical treatment and transport. He saves half of the remaining amount every month. If he saves ₹1,80,000 every year, find his monthly income.

(a) ₹54,170
(b) ₹7,50,000
(c) ₹6,50,040
(d) ₹62,500 **[d]**

व्याख्या:-

Given
Mr. Hari saves ₹1,80,000 every year.
His monthly savings will be = ₹1,80,000 / 12 = ₹15,000
Suppose Mr. Hari's monthly income is X.
He spends 36% of his income on food items.
Expenditure on food items = 0.36X
Remaining amount = X−0.36X=0.64X
He spends 25% of the remaining amount on these items.
Expenditure on clothes, medical and transport = 0.25×0.64X=0.16X
Total expenditure = 0.36X + 0.16X = 0.52X
Remaining amount after all expenses = X−0.52X=0.48X
We are told that he saves half of the remaining amount.
So, savings = 0.48X/2=0.24X
We know that his monthly savings are ₹15,000.
0.24X=15,000
X=15,000/0.24
X=15,000/(24/100)
X=(15,000×100)/24
X=1,500,000/24
X=62,500
Mr. Hari's monthly income is ₹62,500.

6. Who among the following won the Purple Cap in the 17th edition of the Indian Premier League in 2024?

(a) Kuldeep Yadav
(b) T. Natarajan
(c) Jasprit Bumrah
(d) Harshal Patel **[d]**

व्याख्या –

Harshal Patel, the Punjab Kings (PBKS) fast bowler, won the Purple Cap in the 17th edition of the Indian Premier League (IPL) 2024. He achieved the feat by taking 24 wickets in 14 matches, averaging 19.87 and having an economy rate of 9.73.

This is Harshal Patel's second Purple Cap; he had earlier won the honour in 2021 by taking 32 wickets for Royal Challengers Bangalore (RCB).

This season, Varun Chakravarthy of Kolkata Knight Riders (KKR) finished second with 21 wickets in 15 matches, while Jasprit Bumrah of Mumbai Indians finished third with 20 wickets in 13 matches.

7. Nadi Utsav 2024 was inaugurated in _____.

(a) India Habitat Centre
(b) Indira Gandhi National Centre for the Arts (IGNCA)
(c) Lalit Kala Academy
(d) National Museum **[b]**

व्याख्या –

Nadi Utsav 2024 was inaugurated on 19 September 2024 at Indira Gandhi National Centre for the Arts (IGNCA), New Delhi. The festival was organised with the aim to highlight the ecological and cultural significance of rivers. The theme for this year was: "Rivers in Reverse: Making of a Lifeline".

Main attractions:

Exhibitions: Photography exhibition based on Kansabati river, boat exhibition, and painting exhibition made by school students.

Cultural events: Himachali folk music performances and other cultural activities.

Aim of the festival: To inculcate reverence, enthusiasm and awareness towards rivers.

The festival was organised at IGNCA from 19 to 21 September 2024.

8. If the mean of 22, 25, 27, 24 and x is 26, then what is the value of x?

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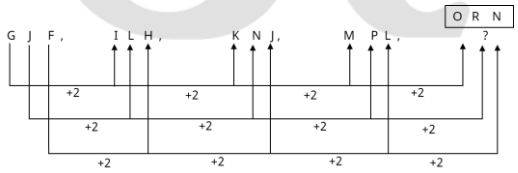
(a) 28
(b) 41
(c) 35
(d) 32 **[d]**

व्याख्या:-

The formula for mean is:
Mean = (Sum of all numbers) / (Total number of numbers)
Numbers = 22, 25, 27, 24, x
Total number of numbers = 5
Mean = 26
According to the formula,
26 = (22 + 25 + 27 + 24 + x) / 5
26×5 = 22 + 25 + 27 + 24 + x
130 = 98 + x
x = 130 - 98
x = 32
Therefore, the value of x is 32.

9. Which of the following options should come in place of the question mark)?) in the given series based on English alphabetical order?
GJF, ILH, KNJ, MPL, ?
(a) RNO
(b) ORN
(c) RON
(d) ONR **[b]**

व्याख्या –



? = ORN

10. Pollen grains need to be transferred from the stamen to the stigma. If this transfer of pollen grains occurs on the stigma of the same flower, it is called _____. On the other hand, if the pollen grains are transferred from one flower to another, it is called _____.
(a) Mutation, Transfer
(b) Transfer, Mutation
(c) Self-pollination, Cross-pollination
(d) Cross-pollination, Self-pollination **[c]**

Explanation –

The transfer of pollen grains from the stamen to the stigma is called Pollination.
Pollination is of two main types –
Self-pollination: If the transfer of pollen grains occurs on the stigma of the same flower, it is called self-pollination. In this, pollen grains from the stamen of the same flower fall on the stigma of the same flower. Cross-pollination: If the pollens are transferred from one flower to another, it is called cross-pollination. In this, the pollens are transferred from the flower of one plant to the flower of another plant or sometimes between two different flowers of the same plant.

11. If A means +, B means -, C means ×, and D means ÷, then what will come in place of question mark (?) in the following equation?
18 D 2 A 4 C 5 B 15 = ?
(a) 14
(b) 16
(c) 18
(d) 12 **[a]**

व्याख्या –

18 D 2 A 4 E 5 B 15 = ?
According to question :-
$18 \div 2 + 4 \times 5 - 15 = ?$
$9 + 20 - 15 = ?$
$14 = ?$

12. What is the purpose of urine formation in the human body?
(a) To clean the impure blood coming to the heart
(b) To empty the urinary bladder
(c) To remove CO_2 from the blood in the lungs
(d) Filtration of waste products from the blood **[d]**

Explanation -

The main purpose of urine formation in the human body is to filter the waste products and excess substances from the blood and remove them out of the body.
Filtration of waste products from the blood: This is the primary and most important purpose of urine formation. The kidneys filter the blood, removing metabolic waste products such as urea, uric acid, creatinine, excess salts and excess water. These waste products are eliminated from the body in the form of urine, thereby maintaining the internal balance (homeostasis) of the body and preventing accumulation of harmful substances.

13. In September 2024, where was the indigenously developed PARAM Rudra supercomputer installed?
(a) Pune, Bengaluru and Kolkata
(b) Pune, Delhi and Kolkata
(c) Mumbai, Bengaluru and Kolkata
(d) Bengaluru, Delhi and Mumbai **[b]**

व्याख्या –

Prime Minister Narendra Modi inaugurated three indigenously developed 'Param Rudra' supercomputers on 26 September 2024. These supercomputers have been developed under the

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National Supercomputing Mission (NSM) and are aimed at enhancing high-performance computing capabilities in India.

The three supercomputers have been installed at the following locations:

Pune – at the Giant Meter Wave Radio Telescope (GMRT), where it will study astronomy and cosmic phenomena.

Delhi – at the Inter-University Accelerator Centre (IUAC), which will promote research in materials science and nuclear physics.

Kolkata – at the S.N. Bose National Centre for Basic Sciences, where it will conduct advanced studies in physics, cosmology and earth sciences.

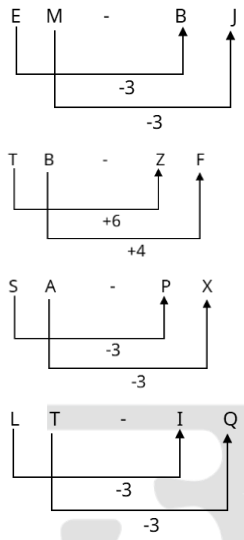
These supercomputers are aimed at empowering research in meteorology, climate change, physics, astronomy and other scientific fields.

14. 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 is the one that 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) EM - BJ
(b) TB-ZF
(c) SA-PX
(d) LT-IQ **[b]**

व्याख्या –



Hence, 'TB – ZF' is different from the rest.

15. Which one of the following statements is correct regarding the continuous motion of particles of matter?

(a) If we decrease the temperature, the kinetic energy of the particles increases.
(b) Change in temperature has no effect on the kinetic energy of particles.
(c) If we increase the temperature, the kinetic energy of the particles decreases.
(d) If we increase the temperature, the kinetic energy of the particles increases. **[d]**

Explanation -

Kinetic energy is the energy possessed by an object due to its motion. Particles of matter (such as molecules and atoms) are never stationary; They are constantly vibrating, moving in place or colliding with each other. Because of this constant motion, they have kinetic energy.

Relation between Temperature and Kinetic Energy

Temperature is a measure of the average kinetic energy of the particles of a substance. This means:

- If we increase the temperature, the average kinetic energy of the particles increases. At higher temperatures, the particles move more quickly, collide more often, and vibrate with more energy.
- If we decrease the temperature, the average kinetic energy of the particles decreases. At lower temperatures, the particles move slower and have less energy.

16. Which one of the following is a saturated carbon compound?

(a) Alkene
(b) Alkane
(c) Ethylene
(d) Alkyne **[b]**

Explanation -

Saturated carbon compounds are those which have only single bonds between carbon atoms, due to which all the valencies of carbon are completely saturated with hydrogen or other atoms. Unsaturated carbon compounds have double or triple bonds between carbon-carbon.

Alkanes have only single bonds between carbon atoms. This is also evident from their general formula C_nH_{2n+2}, which indicates maximum number of hydrogen atoms. Hence, it is a saturated carbon compound.

17. What is the smallest natural number that must be added to 1212 to make it a perfect square?

(a) 13
(b) 24
(c) 27
(d) 18 **[a]**

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व्याख्या:-

Given:

Number = 1212

	35
3	1212
3	-9
65	312
5	-325
	-13

From the above calculation, we got (-13) as remainder, if this number is added to 1212 we can get a perfect square number.

So the perfect square number of 352 must be 1225.

The smallest natural number to be added is 1225 -1212 = 13.

So, the smallest number required is 13, it is added to 1212 to make it a perfect square.

18. What is used to remove permanent hardness of water?

(a) Washing soda

(b) Bleaching powder

(c) Baking soda

(d) Sodium hydroxide **[a]**

Explanation –

Washing soda is used to remove permanent hardness of water.

Permanent hardness of water is caused by sulphate, chloride and nitrate salts of calcium (Ca^{2+}) and magnesium (Mg^{2+}). These cannot be removed by boiling.

The chemical name of washing soda is sodium carbonate (Na_2CO_3).

When washing soda is added to hard water, it reacts with calcium and magnesium ions to form insoluble calcium carbonate ($CaCO_3$) and magnesium carbonate ($MgCO_3$), which separate as a precipitate.

$CaSO_4$ (aq) + Na_2CO_3 (aq) → $CaCO_3$ (s) + Na_2SO_4 (aq)

- $MgSO_4$ (aq) + Na_2CO_3 (aq) → $MgCO_3$ (s) + Na_2SO_4 (aq)

This process removes hardness ions from water, making it soft.

19. In triangle ABC,, $\overline{AB} = 6m, \overline{BC} = 8m,$ and $\overline{AC} = 10m$. In triangle PRQ, , $\overline{PR} = 8m, \overline{PQ} = 10m,$ and $\overline{RQ} = 6m$ Which of the following is the correct order of congruence?

(a) ΔBAC is congruent to ΔRPQ

(b) ΔCBA is congruent to ΔRPQ

(c) ΔBCA is congruent to ΔRPQ

(d) ΔABC is congruent to ΔRPQ **[c]**

व्याख्या:-

This is a question of congruence of two triangles.

Match the lengths of the given sides:

$AB = 6m \Rightarrow RQ = 6m$

$BC = 8m \Rightarrow PR = 8m$

$AC = 10m \Rightarrow PQ = 10m$

Now match the corresponding vertices :

$A \leftrightarrow Q$

$B \leftrightarrow R$

$C \leftrightarrow P$

So, $\Delta ABC \cong \Delta QRP$

Now choose the correct sequence from the given options :

Option (c) Δ BCA is congruent to ΔRPQ:

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

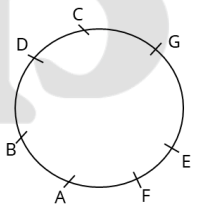
(a) Immediate right

(b) Immediate left

(c) Second to the left

(d) Second to the right **[b]**

व्याख्या –



It is clear from the diagram that D is immediate left of B with respect to B.

21. Find the value of the given expression.

42 ÷ 7 × 2

(a) 12

(b) 8

(c) 3

(d) 10 **[a]**

व्याख्या:-

42 ÷ 7 × 2 = 6×2= 12

22. Which of the following phenomena is a result of atmospheric refraction?

(a) Advance sunrise and delayed sunset

(b) Shaving mirrors to form a larger image of the face

(c) Image formation by plane mirrors

(d) Formation of rainbow **[a]**

Explanation -

Atmospheric refraction is a phenomenon where the rays of light bend as they enter the earth's atmosphere. This happens because the density

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(and thus refractive index) of air in the atmosphere varies with altitude.

Advance sunrise and delayed sunset: This is a direct result of atmospheric refraction. When the sun is just below the horizon, its rays enter the earth's atmosphere. Layers of atmosphere with different densities continuously bend these rays, making the sun appear slightly elevated from its actual position. This is the reason why we see sunrise about 2 minutes before the actual time and sunset about 2 minutes after the actual time.

23. If $\frac{155}{0.155} = \frac{15.5}{K}$, then what is the value of K?

(a) 15.51
(b) 155
(c) 1.55
(d) 0.0155 **[d]**

व्याख्या:-

$$\Rightarrow \frac{155}{0.155} = \frac{15.5}{K}$$

$$\Rightarrow \frac{155000}{155} = \frac{155}{10K}$$

$$10000K = 155$$

$$K = \frac{155}{10000} = 0.0155$$

24. Two circular coils A and B, having the same radius R, carry the same electric current but have 50 and 100 turns respectively. The magnetic field produced by A and B will be represented by which of the following options?

(a) Magnetic field produced by A > Magnetic field produced by B
(b) Magnetic field produced by A and magnetic field produced by B are unknown
(c) Magnetic field produced by B > Magnetic field produced by A
(d) Magnetic field produced by A = Magnetic field produced by B **[c]**

Explanation –

To compare the magnetic fields for two circular coils A and B, we need to know the formula for magnetic field at the centre of the circular coil

$$B = \frac{\mu_0 NI}{2R}$$

Where:
B = Magnetic field
μ_0 = Permeability of vacuum (a constant)
N = Number of turns
I = Electric current
R = Radius of the coil

According to the given question:

The radius (R) of both the coils is the same.
The same electric current (I) flows through both the coils.
Number of turns (N_A) in coil A = 50
Number of turns (N_B) in coil B = 100
Since magnetic field (B) is directly proportional to number of turns (N) (all other factors being same), the coil having more number of turns will produce more magnetic field.
Here, N_B (100) > N_A (50).
So, the magnetic field produced by coil B will be more than that produced by coil A.

25. The purchase price of a toy is ₹ 210. What should be its marked price so that after a discount of 5% the shopkeeper makes a profit of 90%?

(a) ₹450
(b) ₹420
(c) ₹400
(d) ₹480 **[b]**

व्याख्या:-

Given:
Cost price = Rs.210
Discount = 5%
Profit = 90%

$$\frac{CP}{MP} = \frac{100 - D}{100 + G}$$

Calculation:
According to the source

$$\Rightarrow \frac{CP}{MP} = \frac{100 - 5}{100 + 90}$$

$$\Rightarrow \frac{CP}{MP} = \frac{95}{190}$$

Here the cost price is 95.
The marked price is 190
But the cost price given in the question is Rs 210.
$\Rightarrow$ 95 u = 210
$\Rightarrow$ 1u = 210/95
Hence,

$$\Rightarrow \text{Face value} = \frac{210}{95} \times 190 = 420$$

$\Rightarrow$ Therefore, the marked price of the article is Rs 420.

26. The kinetic energy of a moving object depends on which of the following quantities:

(i) Mass of the body
(ii) Square of velocity
(iii) Pressure
(a) Both (i) and (ii)
(b) Both (ii) and (iii)
(c) Only (i)
(d) Only (iii) **[a]**

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Explanation -

The kinetic energy of a moving object is given by the following formula:

$KE = \frac{1}{2} mv^2$

Where:

- KE = kinetic energy
- m = mass of the object
- v = velocity of the object

It is clear from this formula that kinetic energy depends on the following:

Mass of the body (m) - Kinetic energy is directly proportional to the mass. The greater the mass, the greater the kinetic energy (if the velocity is same).

Square of velocity (v^2) - Kinetic energy is directly proportional to the square of the velocity. This means that if the velocity is doubled, the kinetic energy becomes four times.

Pressure is not directly related to kinetic energy, because kinetic energy is related to the speed and mass of the object, not the external pressure acting on it.

So, the kinetic energy of a moving object depends on the mass of the body and the square of the velocity.

27. If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same work in 2 days, then how much time will 10 men and 20 boys take to complete the same work?

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

व्याख्या:-

(6M + 8B) × 10 = (26M + 48B) × 2
60M + 80B = 52M + 96B
8M = 16B
1M = 2B (i.e., one man does the same work as 2 boys.)
Total work (in terms of boys) :
from the first group: (6M + 8B) × 10 = (6 × 2B + 8B) × 10 = (12B + 8B) × 10 = 20B
10 = 200B
Now the combined capacity of 10 men and 20 boys is:
10M + 20B = (10 × 2B) + 20B = 20B + 20B = 40B
Time = Total work / Efficiency
Time = 200B / 40B = 5 days
Hence, it will take 5 days for 10 men and 20 boys to complete the work.

28. 8 men and 12 women can build a wall in 10 days. 6 men and 8 women can build the same wall in 14 days. How long will a woman alone take to build it?

(a) 140 days
(b) 700 days
(c) 350 days
(d) 280 days **[d]**

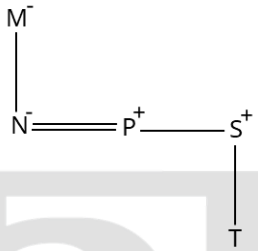
व्याख्या:-

Action potential relation:
(8M + 12W) × 10 = (6M + 8W) × 14
80M + 120W = 84M + 112W
8W = 4M
1M = 2W (The capacity of 1 man is equal to that of 2 women)
Total work (in terms of women):
from the first group: (8M + 12W) × 10 = (8 × 2W + 12W) × 10 = (16W + 12W) × 10 = 28W × 10 = 280W
Time taken by a woman :
Time = Total work done / Efficiency of a woman
समय = 280W / W = 280 दिन
Hence, it would take 280 days for a woman alone to build the wall.

29. 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' and
'A ÷ B' means 'A is the father of B'.
If 'M + N × P – S ÷ T', then how is M related to T?

(a) Mother of father's brother's wife
(b) Daughter of father's sister
(c) Sister of father's brother's wife
(d) Wife of father's brother
[a]

व्याख्या –



It is clear from the diagram that M is the mother of the wife of the brother of T's father.

30. All the 41 people are standing in a row facing north. Juno is 23rd from the right end, while Cherry is 31st from the left end. How many people are there between Juno and Cherry?

(a) 12
(b) 13

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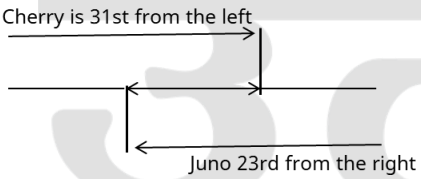
(c) 11
(d) 10 **[c]**

व्याख्या –



Position of Junes in the row from left = 41 – 23 + 1 = 19

Number of people between Juno and Cherry = 31 – 19 – 1 = 11

31. Out of his total income, Sanjay spends 20% on house rent and the remaining 70% on household expenses. What is his total income if he saves ₹1,800?

(a) ₹10,000
(b) ₹7,500
(c) ₹8,000
(d) ₹9,000 **[b]**

व्याख्या:-

Balance after spending on rent:

If he spends 20% of total income on rent, then 100% - 20% = 80% of the remaining is left.

Remaining income = 0.80x

Savings after household expenses:

If he spends 70% of the remaining income on household expenses, then 100% - 70% = 30% of the remaining is left.

This 30% is his total savings.

Finding total income through total savings:

Savings = (30% of remaining income) = (0.80X) of 30%

Savings = 0.30 × 0.80X = 0.24X

We are given that the savings are ₹1800.

$0.24X = 1800$

$X = \frac{1800}{0.24}$

$X = \frac{1800 \times 100}{24}$

$X = 7500$

Sanjay's total income is ₹7500

32. A dishonest shopkeeper claimed to sell an item at ₹23/kg, which cost him ₹25/kg. However, by using wrong weights, he gave only 600 gm instead of 1 kg. What is his overall profit or loss percentage?

(a) $62\frac{1}{2}\%$ profit
(b) $53\frac{1}{3}\%$ profit
(c) 23% loss
(d) 20% loss **[b]**

व्याख्या:-

Actual Cost of a Given Item (CP):

Cost of 600 gm $= \frac{600}{1000} \times 25 = 0.6 \times 25 = 15$

the amount received by the shopkeeper (S.P):

The customer paid ₹23 for 1kg.

So amount received = ₹23

Benefit:

Profit = Amount received – Actual cost = 23 – 15 = Rs 8

Profit Percentage:

Profit Percentage

$= \left(\frac{\text{Profit}}{\text{actual cost}}\right) \times 100 = \left(\frac{8}{15}\right) \times 100$

Profit Percentage $= \frac{800}{15}\% = 53\frac{1}{3}\% \approx 53.33\%$

33. Which of the following is the most common simple permanent tissue?

(a) Phloem
(b) Epidermis
(c) Parenchyma
(d) Sclerenchyma **[c]**

Explanation -

Tissues in plants are mainly classified into meristematic tissue and permanent tissue. Permanent tissues are those whose cells have lost the ability to divide. Permanent tissues are of two types:

Simple Permanent Tissue:- These are composed of cells of the same type.

Parenchyma:- This is the commonest and most common simple permanent tissue. Its cells are usually living, thin walled and loosely packed with large intercellular spaces between them. This tissue is found in various parts of plants, such as the cortex and pith of stems and roots, the mesophyll of leaves, and the pulp of fruits. Its main functions are food storage, photosynthesis (when chlorophyll is present - chlorenchyma), and secretion.

Collenchyma:- It is living tissue that provides flexibility and mechanical support to new plant parts. It is not as extensive as parenchyma.

Sclerenchyma:- It is made up of dead cells that provide rigidity and mechanical strength to plants (e.g. outer fibres of coconut). It is also not as extensive as parenchyma.

34. In which type of chemical reaction there is exchange of ions between reactants?

(a) Combination reaction
(b) Displacement reaction

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(c) Decomposition reaction
(d) Double displacement reaction **[d]**

Explanation -

Double displacement reaction: In this reaction there is exchange of ions between two compounds to form new compounds. It is often seen in precipitation reactions or neutralization reactions.

Example:

$AB + CD \rightarrow AD + CB$

For example, when solutions of silver nitrate ($AgNO_3$) and sodium chloride (NaCl) are mixed:

$AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s)\downarrow + NaNO_3(aq)$

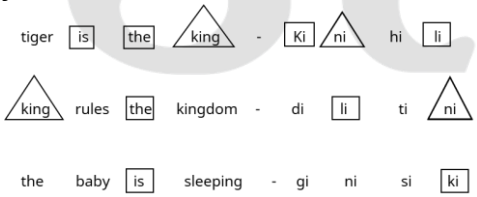
Here Ag^+ ions replace Na^+ ions and Cl^- ions replace NO_3^- ions, forming a precipitate of AgCl.

35. In a certain code language, 'tiger is the king' is written as 'ki ni hi li', 'king rules the kingdom' is written as 'di li ti ni', and 'the baby is sleeping' is written as 'gi ni si ki'. How will 'tiger' be written in the same code language?

(a) hi
(b) ki
(c) li
(d) ni **[a]**

व्याख्या –

Just as



similarly

Tiger – hi

36. For which book Gaurav Pandey was awarded the Sahitya Akademi Yuva Puraskar in 2024?

(a) The light of poetry
(b) The earth is surrounded by memories
(c) The colour of life
(d) Search for the destination **[b]**

व्याख्या –

Gaurav Pandey was awarded the Sahitya Akademi Yuva Puraskar in Hindi language for his poetry collection 'Smritiyon Ke Beech Ghiri Hai Prithvi' in 2024. The award was announced to him on 15 June 2024. In this collection, Gaurav Pandey has written poems on deep topics of life, time and existence, which inspire readers to introspect.

The Sahitya Akademi Yuva Puraskar is given every year to writers under the age of 35 for their outstanding works. The award consists of an engraved copper plaque and an honorarium of ₹50,000.

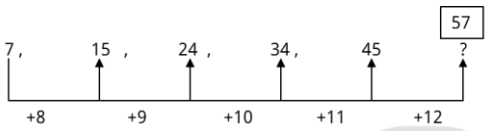
37. Choose the set in which the numbers are related in the same way as the numbers in the following sets. (Note: Operations must be performed on whole numbers without breaking the numbers into their constituent digits. Ex. 13 - Operations on number 13 such as addition/subtraction/multiplying 13 etc. can be performed. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
(144, 12, 6)
(210, 15, 7)
(a) (156, 13, 7)
(b) (180, 9, 11)
(c) (100,10,4)
(d) (96, 8, 6) **[d]**

व्याख्या –

Just as
144 , 12 , 6
12 × 6 = 72 × 2 = 144
and
210, 15, 7
15 × 7 = 105 × 2 = 210
similarly
96 , 8 , 6
8 × 6 = 48 × 2 = 96

38. Which of the following options should come in place of the question mark (?) in the given series?
7 15 24 34 45?
(a) 55
(b) 60
(c) 58
(d) 57 **[d]**

व्याख्या –



? = 57

39. If 'A' means '÷', 'B' means '×', 'C' means '+', and 'D' means '-', then what will come in place of question mark '?' in the following equation?
225 B 15 A 15 C 125 D 225 = ?
(a) 105
(b) 115
(c) 135
(d) 125 **[d]**

व्याख्या –

225 B 15 A 15 C 125 D 225 = ?
According to the question –

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$225 \times 15 \div 15 + 125 - 225 = ?$

$225 + 125 - 225 = ?$

$125 = ?$

40. Thirteen years ago, Manorama's age was $\frac{2}{5}$ times that of her sister. The ratio of the present ages of Manorama and her sister is 3 : 4. What is the sum of their present ages?

(a) 42 years
(b) 36 years
(c) 39 years
(d) 48 years **[c]**

व्याख्या:-

Let the present age of Manorama be 3k and that of her sister be 4k.

Thirteen years ago: Age of Manorama =3k−13

Sister's age =4k−13

As per the question:

$(3k-13)= \frac{2}{5} (4k-13)$

On cross multiplication:

5(3k−13)=2(4k−13)

15k−65=8k−26

15k−8k=65−26

7k=39

Sum of present ages = Manorama's age + sister's age = 3k+4k=7k

Since we found 7k=39, then the sum of their present ages is 39 years.

41. What is the full form of SER, an organelle that helps in the formation of fat molecules or lipids important for cell function?

(a) Species Endoplasmic Reticulum
(b) Similar Endoplasmic Reticulum
(c) Simple Endoplasmic Reticulum
(d) Smooth Endoplasmic Reticulum **[d]**

Explanation -

Endoplasmic Reticulum (ER) is a large network or mesh found in cells which is made up of tubes and sacs. It is of two main types:

Rough Endoplasmic Reticulum (RER):- It has ribosomes on its surface, due to which it looks rough. Its main function is to synthesize proteins and package them.

Smooth Endoplasmic Reticulum (SER):- It does not have ribosomes on its surface, so it looks smooth. Its main functions are to manufacture (synthesize) fat (lipid) molecules and steroid hormones, carbohydrate metabolism and detoxification of drugs and toxic substances.

42. The Central Universities (Amendment) Bill, 2023 was passed to establish Sammakka Sarakka Central Tribal University in which state?

(a) Odisha
(b) Manipur
(c) Telangana
(d) Jharkhand **[c]**

व्याख्या –

The bill was passed to establish 'Sammakka Sarakka Central Tribal University' under the Central Universities (Amendment) Bill, 2023. The university will be set up in Mulugu district of Telangana state. It aims to provide higher education and research facilities exclusively for tribal communities. The university is named after Sammakka and Sarakka, the famous tribal goddesses of Telangana.

A budget of ₹889.07 crore has been set aside for the project, which will be used for the establishment of the university, infrastructure, courses and research facilities.

43. The diagonal and one of the sides of a rectangular plot are 65m and 63m respectively. Find the perimeter of the rectangular plot.

(a) 164 m
(b) 166 m
(c) 156 m
(d) 158 m **[d]**

व्याख्या:-

Given:

Diagonal of the rectangle = 65 cm

One side of the rectangle = 63 cm

Formulas used:

In the rectangle,

$(\text{diagonal})^2 = (\text{length})^2 + (\text{width})^2$

Perimeter = 2 x (length + width)

$65 = (\text{Length})^2 + 63^2$

$4225 = (\text{Length})^2 + 3969$

$(\text{Length})^2 = 4225 - 3969$

Length = $\sqrt{256}$

Length = 16

Perimeter = 2(63 +16) = 158

Hence, the perimeter of the rectangular plot is '158 m'.

44. If 8 : 4 : : 3.2 : x, then what is the value of x?

(a) 2.4
(b) 3.2
(c) 1.2
(d) 1.6 **[d]**

व्याख्या:-

This is a ratio question. Given:

8 : 4 : 3.2 : x

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This means that the first ratio is equal to the second ratio. It can be written as a fraction as

$$\frac{8}{4}=\frac{3.2}{x}$$

Now solve this to find the value of x:

First, simplify the fraction on the left side:

$$\frac{8}{4}=2$$

So the equation becomes:

$$2=\frac{3.2}{x}$$

Now move x to the other side of the equation to solve for x and move 2 down:

$$x=\frac{3.2}{2}$$

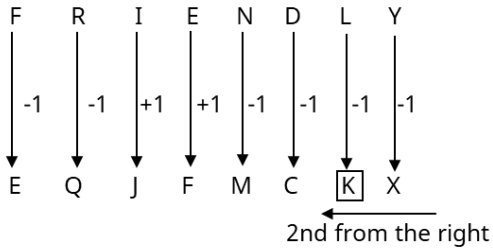
$$x=1.6$$

Therefore the value of x is 1.6.

45. If each vowel of the word FRIENDLY is replaced by the letter following it in the English alphabetical order and each consonant is replaced by the letter preceding it in the English alphabetical order, then in the new group of letters thus formed, which letter will be second from the right?

(a) C
(b) K
(c) Q
(d) J **[b]**

व्याख्या –



In the new letter arrangement K will be at the second place from the right.

46. If the resistance of a conductor is increased by three times, then the electric current will _____. (The voltage v will remain constant)

(a) one third
(b) nine times
(c) three times
(d) one ninth **[a]**

Explanation -

Ohm's law states that the electric flux between two points of a conductor is directly proportional to the voltage at those two points and inversely proportional to the resistance between those two points.

Mathematically, it is expressed as

If the resistance of a conductor is increased by three times, the electric current will decrease to one third.

$$I=\frac{V}{R}$$

Where:

I = Current

V = Voltage (constant)

R = Resistance

According to the question, voltage (V) is constant, and resistance (R) is increased three times. So, the new resistance will be R'=3R.

Let us calculate the new current (I'):

$$I'=\frac{V}{R'}$$

$$I'=\frac{V}{3R}$$

$$I'=\frac{1}{3}\times\frac{V}{R}$$

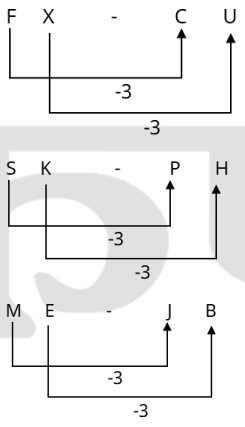
$$I'=\frac{1}{3}I$$

This means that if the resistance is increased three times and the voltage remains constant, the current will be reduced to one-third.

47. Three of the following four letter-cluster pairs are alike in a certain way based on the English alphabetical order and thus form a group. Which pair does not belong to that group? (Note: Anomalous letter clusters are not based on the number of consonants/vowels or their position in the letter cluster.)

(a) FX-CU
(b) SK-PH
(c) ME-JB
(d) UM-GZ **[d]**

व्याख्या –



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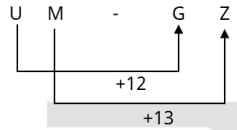
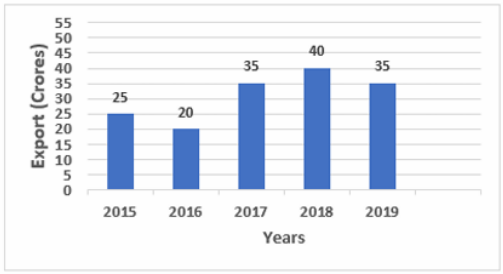


Hence, 'UM – GZ ' is different from the rest.

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

The bar graph shows the annual exports (in crores) of a company during the period 2015 to 2019.



Export (Crores) : Exports (in Crores), Years : Years

What is the ratio between annual exports of 2015 and annual exports of 2017 respectively?

(a) 13 : 16
(b) 4 : 9
(c) 5 : 7
(d) 6 : 11 **[c]**

व्याख्या:-

Annual export in year 2015 = Rs 25 crore
Annual exports in the year 2017 = Rs 35 crore
We have to find the ratio between annual exports of year 2015 and annual exports of year 2017.
Ratio = (Exports of 2015) : (Exports of 2017)
Ratio = 25 : 35
To simplify this ratio, divide both numbers by their greatest common divisor (which is 5):

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

Ratio = 5 : 7
Hence, the ratio between annual exports of year 2015 and annual exports of year 2017 is 5 : 7.

49. Seven persons A, B, C, D, E, F and G are sitting in a row facing north. Only five persons are sitting between F and D. G is sitting third to the right of F. E is the immediate neighbour of C and D. Ex. B is not the immediate neighbour of G.

How many persons are sitting between A and F?

(a) one
(b) four
(c) three
(d) two **[a]**

व्याख्या –

It is clear from the diagram that only one person is sitting between A and F.

50. A car reduces its speed from 40 m/s to 20 m/s in 55. Find the acceleration of the car.

(a) -4 m/s²
(b) 2 m/s²
(c) 12 m/s²
(d) 4 m/s² **[a]**

Explanation –

Acceleration (a) is calculated by the following formula –

$$a = \frac{v-u}{t}$$

Final velocity (v) = 20 m/s
Initial velocity (u)= 40 m/s
Time taken (t) = 5 s
Putting the values in the formula:

$$a = \frac{20-40}{5}$$

$$a = \frac{-20}{5} = -4 m/s^2$$

51. In organisms like Amoeba, the division of two cells during division may occur in _____.

(a) One definite plane
(b) Several equal planes
(c) Any plane
(d) Two definite planes **[c]**

Explanation -

Amoeba is a unicellular organism that reproduces asexually by binary fission.
In binary fission, a parent cell divides into two equal daughter cells.
Amoeba does not have a definite shape; it is irregularly shaped. Hence, when Amoeba divides, it can divide along any plane. Other organisms, like Leishmania, have a definite longitudinal division plane, while Paramecium has a definite transverse division plane. But the irregular shape of Amoeba gives it freedom to divide along any plane.

52. If LCM (27, n) = 54 and HCF (27, n) = 9, then find the value of n.

(a) 18
(b) 54
(c) 36
(d) 24 **[a]**

व्याख्या:-

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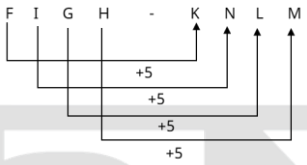
Has been given:
LCM(27, n) = 54
HCF(27, n) = 9
Formulas used:
LCM(a, b) × HCF(a, b) = a × b
LCM(27, n) × HCF(27, n) = 27 × n
54 × 9 = 27 × n
486 = 27 × n
n = 486 ÷ 27
n = 18

53. A sum of money at compound interest becomes ₹5,290 in 2 years and ₹6,083.50 in 3 years. If the interest is compounded annually, what will be the rate of interest per year?
(a) 12%
(b) 15%
(c) $16\frac{2}{3}\%$
(d) 14% **[b]**

व्याख्या:-
Has been given:
A sum of money at compound interest amounts to Rs 5,290 in 2 years and Rs 6,083.50 in 3 years.
Formulas used:
Amount (A) = Principal (P)(1 + R/100)T
R = दर %, T = Time
As per the question,
A sum of money at compound interest amounts to Rs 5,290 in 2 years.
⇒ 5290 = P(1 + R/100)2 ----(1)
A sum of money at compound interest amounts to Rs 6,083.50 in 3 years.
⇒ 6083.5 = P(1 + R/100)3 ----(2)
Divide Equation 2 by Equation 1
⇒ 6083.5/5290 = P(1 + R/100)3/P(1 + R/100)2
⇒ 6083.5/5290 = 1 + R/100
⇒ (6083.5/5290) – 1 = R/100
⇒ 793.5/5290 = R/100
⇒ 15%

54. FIGH is related to KNLM in a certain way based on the English alphabetical order. In the same way RUST is related to WZXY. Following the same logic, HKIJ is related to which of the following options?
(a) MQNO
(b) NPLO
(c) MPNO
(d) LQNO **[c]**

व्याख्या –
Just as



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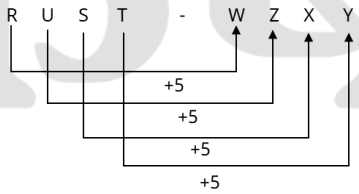
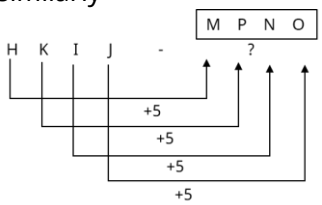


similarly



55. 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) 4 6 @ # 1 * £ 5 8 $ 7 & 3 2 & % Ω 9 (right)
How many such numbers are there in the above series, each of which is immediately preceded by a symbol and immediately followed by a number?
(a) one
(b) more than two
(c) zero
(d) two **[d]**

व्याख्या –
4 6 @ # 1 * £ 5 8 $ 7 & 3 2 & % Ω 9
In the above series there are two groups of numbers which are preceded by a symbol and followed by a number.

56. If θ is an acute angle, find the value of the denominator D in the following equation.
$$\left(\cos\theta - \operatorname{cosec}\theta\right)^2 = \frac{1 - \cos\theta}{D}$$
(a) -1- cosθ
(b) 1+ cosθ
(c) 1 + sinθ
(d) - sinθ - 1 **[b]**

व्याख्या:-
$$\left(\cos\theta - \operatorname{cosec}\theta\right)^2 = \frac{1 - \cos\theta}{D}$$

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

$$\left(\frac{1=\cos\theta}{\sin\theta}\right)^2=\frac{1=\cos\theta}{D}$$

$$\frac{(1=\cos\theta)^2}{\sin^2\theta}=\frac{1=\cos\theta}{D}$$

Now solve for D:

$$D=\frac{(1=\cos\theta)\sin^2\theta}{(1=\cos\theta)^2}$$

$$D=\frac{\sin^2\theta}{1=\cos\theta}$$

$\because \sin^2\theta=1-\cos^2\theta=(1-\cos\theta)(1+\cos\theta)$:

$$D=\frac{(1=\cos\theta)(1=\cos\theta)}{1=\cos\theta}$$

$$D=1+\cos\theta$$

57. Where was the 5th India-US 2+2 Ministerial Dialogue held on November 10, 2023?

(a) New York
(b) Mumbai
(c) Washington, DC
(d) New Delhi **[d]**

व्याख्या –

The fifth India-US 2+2 Ministerial Dialogue was held in New Delhi on 10 November 2023. The dialogue was attended by Defence Minister Rajnath Singh and External Affairs Minister Dr. S. Jaishankar from the Indian side, while the US delegation was led by Secretary of State Antony Blinken and Defense Secretary Lloyd Austin.

In this meeting, both the countries discussed topics such as the Indo-Pacific region, critical minerals, high technology cooperation, and global challenges. Additionally, India and the US expressed solidarity on the issue of terrorism against Israel and stressed the need to follow humanitarian laws. They demanded the immediate release of all Israeli citizens held hostage by the Palestine-based Hamas.

58. On October 12, 2024, the 2024 Greenaccord International Media Award was presented to _____, Managing Editor of Mongabay India, at a ceremony in Frascati, Italy.

(a) S. Gopikrishna Warrier
(b) P. Swaminathan Iyer
(c) Surjit Singh
(d) Laxman Naik **[a]**

व्याख्या –

On 12 October 2024, at a ceremony held in Frascati, Italy, S. Gopikrishna Warrier, Managing Editor of Mongabay India was presented with the 2024 GreenAccord International Media Award for his outstanding contribution to environmental journalism.

This year, the award was focused on the continent of Asia, and Mongabay India as well as China's CBCGDF Media received the honour. Speaking on the occasion, S. Gopikrishna Warrier said that the award is a result of the collective efforts of the Mongabay India team, which has been making significant contributions to environmental journalism since its launch in 2018.

59. According to the Centre for Monitoring Indian Economy (CMIE), India's unemployment rate in June 2024 was _____.

(a) 9.2%
(b) 7.9%
(c) 8.2%
(d) 10.2% **[a]**

व्याख्या –

India's unemployment rate saw a significant rise in 2024. In June 2024, according to the Centre for Monitoring Indian Economy (CMIE), the unemployment rate reached 9.2%, an 8-month high. It was 7% in May 2024 and 8.5% in June 2023.

Key Points:

Rural Areas: The unemployment rate in rural areas increased from 6.3% in May 2024 to 9.3% in June 2024.

Female Unemployment Rate: The unemployment rate among women increased from 15.1% to 18.5%, much higher than the national average.

Urban Areas: The unemployment rate in urban areas increased from 8.6% in May 2024 to 8.9% in June 2024.

60. A 250 m long train travelling at a speed of 100 km/h crosses another train coming from the opposite direction at a speed of 62 km/h in 10 seconds. What is the length of the second train?

(a) 270 m
(b) 240 m
(c) 200 m
(d) 230 m **[c]**

व्याख्या:-

Has been given:
Length of first train = 250 m
Speed of first long train = 100 km/hr
Speed of second longer train = 62 km/hr
Time required for the second train = 10 sec
Formulas used:
Distance = Speed × Time

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Let the length of the other train coming from the opposite direction = x meters
So the total distance covered = (250 + x) meter
Relative speed = (100 + 62) km/h = 162 × $\frac{5}{18} m/\sec = 45 m/\sec$
required time =
$\frac{250+x}{45} = 10 \rightarrow 250 + x = 450 \rightarrow x = 450 - 250 \rightarrow x = 200m$
Hence, length of the second train = 200 m

61. In this question, two statements I and II are given. These statements may be independent causes or independent causes or effects of a common cause. One statement may be an effect of the other statement. Read both the statements and choose the correct answer.
I. In the last two years, the citizens of city X have multiplied their wealth by investing in government schemes.
II. The number of luxury cars in city X has seen a recent increase.
(a) Both I and II are independent causes.
(b) II is the cause and I is its possible effect.
(c) I is the cause and II is its possible effect.
(d) Both I and II are effects of independent causes. **[d]**

व्याख्या –
The converse of the two statements is: When people's wealth increases, they are able to purchase luxury items, such as expensive cars.
"Both I and II are effects of independent causes."

62. In a certain code language, 'NICE' is written as '2468' and 'CARS' is written as '1235'. How will 'C' be written in that code language?
(a) 1
(b) 6
(c) 5
(d) 2 **[d]**

व्याख्या –
Just as
N I C E - 2 4 6 8

C A R S - 1 2 3 5
similarly
C = 2

63. A ball of radius 10 cm is taken and a cylindrical hole of radius 1 cm is drilled at its centre. Which of the options listed below is closest to the value of the ratio of the total surface area of the hollow ball to the surface area of the original ball?
(a) $\frac{219}{200}$
(b) $\frac{1}{10}$
(c) $\frac{221}{200}$
(d) $\frac{11}{5}$ **[a]**

व्याख्या:-
Here is the short solution:
Surface area of the original sphere $\left(A_{original}\right) = 4\pi R^2$
Total surface area of a hollow ball $\left(A_{hollowed}\right) = 4\pi\left(R+r\right)\sqrt{R^2 - r^2}$
Here R = 10 cm and r = 1cm
$\text{Ratio} = \frac{A_{hollowed}}{A_{original}} = \frac{4\pi\left(R+r\right)\sqrt{R^2 - r^2}}{4\pi R^2}$
$\text{Ratio} = \frac{\left(R+r\right)\sqrt{R^2 - r^2}}{R^2}$
$\text{Ratio} = \frac{\left(10+1\right)\sqrt{10^2 - 1^2}}{10^2}$
$\text{Ratio} = \frac{11\sqrt{99}}{100}$
Numerical value:
$\text{Ratio} \approx \frac{11 \times 9.949874}{100} \approx 1.0945$

64. 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:
Some keys are pens.
All pens are watches.
Conclusions:
(I) Some watches are keys.
(II) All watches are pens.
(a) Only conclusion (I) follows.
(b) Neither conclusion (I) nor (II) follows.
(c) Only conclusion (II) follows.
(d) Both conclusions (I) and (II) follow. **[a]**

व्याख्या –

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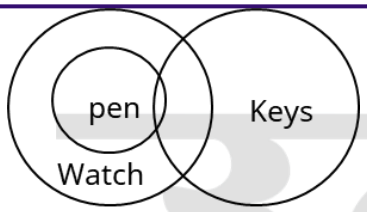

It is clear from the Venn diagram that only conclusion I follows.

65. Choose the set in which the numbers are related in the same way as the numbers in the following sets.
(Note: Operations must be performed on whole numbers without breaking the numbers into their constituent digits. Ex. 13 - Operations on number 13 such as 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.)
(9, 6, 56)
(7, 8, 58)
(a) (5,11, 57)
(b) (6, 5, 40)
(c) (12, 10, 118)
(d) (8, 5, 40) **[a]**

व्याख्या –
Just as
9, 6, 56
9 × 6 + 2 = 56
and
7, 8, 58
7 × 8 + 2 = 58
similarly
5, 11, 57
5 × 11 + 2 = 57

66. Which of the following is the formula unit mass of NaCl?
(a) 46.5u
(b) 94 u
(c) 71 u
(d) 58.5u **[d]**

Explanation -
To find the formula unit mass of NaCl, we have to add the atomic masses of the atoms present in it.
- Atomic mass of sodium (Na) = 23 u (approx.)
- Atomic mass of chlorine (Cl) = 35.5 u (approx.)

One formula unit of NaCl contains 1 sodium atom (Na) and 1 chlorine atom (Cl).
So, Formula unit mass of NaCl = (atomic mass of Na) + (atomic mass of Cl)
= 23 u + 35.5 u = 58.5 u

67. What is the force exerted by the earth on the moon?
(If G = 6 × 10^{-11} Nm^2 kg^{-2}, mass of the earth M = 6 × 10^{24} kg, mass of the moon = 8 × 10^{22} kg, and distance between the earth and the moon is 4 × 10^8 m).
(a) 1.8 × 10^{22} N
(b) 1.8 × 10^{24}N
(c) 1.8 × 10^{20} N
(d) 1.8 × 10^{18} N **[c]**

Explanation -
To find the force exerted by the Earth on the Moon, we can use the universal law of gravitation, whose formula is:

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

Here:
- F is the gravitational force
- G is the gravitational constant (6×10^{-11} Nm^2 kg^{-2})
- m_1 is the mass of the Earth (6×10^{24} kg)
- m_2 is the mass of the Moon (8×10^{22} kg)
- r is the distance between the Earth and the Moon (4×10^8 m)

$$F = (6\times10^{-11})\frac{(6\times10^{24})\times(8\times10^{22})}{(4\times10^{8})^2}$$

$$F = (6\times10^{-11})\times\frac{48\times10^{(24+22)}}{16\times10^{(8\times2)}}$$

$$F = (6\times10^{-11})\times\frac{48\times10^{46}}{16\times10^{16}}$$

$$F = (6\times10^{-11})\times3\times10^{(46-16)}$$

$$F = (6\times10^{-11})\times3\times10^{30}$$

$$F = 18\times10^{19}$$

$$F = 1.8\times10^{20}\,N$$

68. To achieve the objective of National State Policy 2024, which of the following options is not a pillar of the strategic framework?
(a) Strong professional sports governance, enforcement and monitoring
(b) Technological interventions
(c) Restrictions on private sector participation
(d) National framework and regulatory bodies **[c]**

व्याख्या –
The National State Policy 2024 is a strategic framework of the Government of India aimed at establishing coordination between the states and the Centre, achieving developmental goals and improving the quality of governance.

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The key pillars laid down under this policy include:
Strong Professional Sports Governance, Implementation and Monitoring: This pillar focuses on strengthening the administrative structure of sports, making the implementation process effective and strengthening the monitoring mechanism.
Technological Interventions: This includes improving the quality and pace of developmental work by using the latest technological solutions.
National Framework and Regulatory Bodies: This pillar emphasizes on establishing a coherent and effective regulatory framework that is helpful in achieving the objectives of the policy.

69. 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) 9 # 2 6 @ 8 $ Ω 1 * £ 5 7 & % 4 3 (Right)
How many such symbols are there in the above series, each of which is immediately preceded by a number and immediately followed by a symbol?
(a) one
(b) two
(c) zero
(d) more than two **[d]**

व्याख्या –

9 # 2 6 @ 8 $ Ω 1 * £ 5 7 & % 4 3

In the above series there are more than two groups having a number immediately before a symbol and a symbol immediately after it.

70. What is used in the manufacture of calcium sulphate hemihydrate?
(a) Copper sulphate
(b) Sodium carbonate
(c) Gypsum
(d) Sodium hydrogen carbonate **[c]**

Explanation -

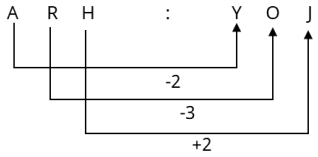
Gypsum is used in the manufacture of Calcium Sulphate Hemihydrate.
Calcium sulphate hemihydrate is commonly known as Plaster of Paris (POP). Its chemical formula is $CaSO_4 \cdot \frac{1}{2} H_2O$
It is made by heating gypsum. The chemical formula of gypsum is $CaSO_4 \cdot 2H_2O$ (calcium sulphate dihydrate).
When gypsum is heated to about 100°C (373K), it loses 3/4 of its water molecules and becomes plaster of Paris:

$$CaSO_4 \cdot 2H_2O \xrightarrow{100^\circ C} CaSO_4 \cdot \frac{1}{2} H_2O + 1\frac{1}{2} H_2O$$

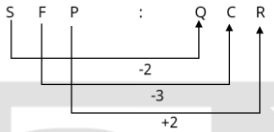
71. Select the pair that follows the same pattern as followed by the two sets of pairs given below. Both the pairs follow the same pattern.
ARH : YOJ
SFP : QCR
(a) WBN : YFT
(b) FTH : BNZ
(c) QPV : OLP
(d) WLL : UIN **[d]**

व्याख्या –

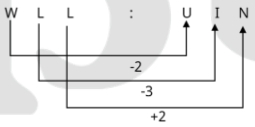
Just as



and

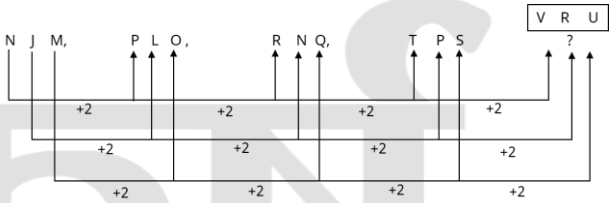


similarly



72. Which of the following options should come in place of the question mark (?) in the given series based on the English alphabetical order?
NJM, PLO, RNQ, TPS, ?
(a) VUR
(b) RVU
(c) RUV
(d) VRU **[d]**

व्याख्या –



? = VRU

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 conclusions logically follows from the given statement/statements.
Statements:

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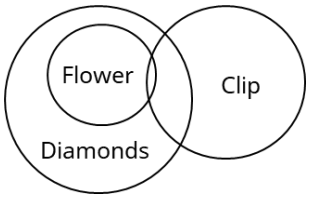
All flowers are diamonds.
Some clips are flowers.
Conclusions:
(I) All diamonds are clips.
(II) Some diamonds are flowers.
(a) Neither conclusion (I) nor (II) follows
(b) Only conclusion (I) follows
(c) Only conclusion (II) follows
(d) Both conclusions (I) and (II) follow **[c]**

व्याख्या –



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

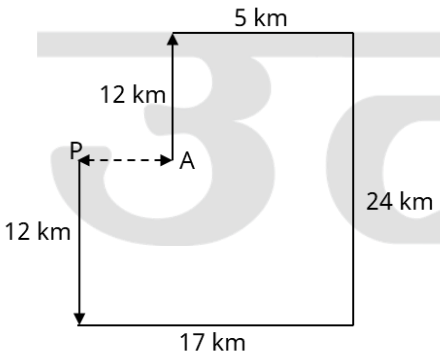
74. What is the value of (x-y)(x+y)+(y-z)(y+z)+(z-x)(z+x)?
(a) 0
(b) xy + yz + ZX
(c) x + y + Z
(d) $x^2 + y^2 + z^2$ **[a]**

व्याख्या:-

$(x-y)(x+y)+(y-z)(y+z)+(z-x)(z+x)$
$= x^2-y^2+y^2-z^2+z^2-x^2$
$= 0$

75. Sally starts from point A and walks 12 km towards north. She turns right, walks 5 km, and again turns right and walks 24 km. She again turns right and walks 17 km, she takes a last right turn, walks 12 km and stops at point P. How far (shortest distance) is she from her starting point and in which direction? (Unless specified, all turns are 90 degree turns.)
(a) 22km towards north
(b) 5km towards east
(c) 12km towards west
(d) 12km towards east **[c]**

व्याख्या –



It is clear from the diagram that Seli is 12 km west of the starting point.

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