1. if $x+\frac{1}{x}=4$ then $x^2+\frac{1}{x^2}=?$

(a) 14
(b) 12
(c) 18
(d) 16 **[a]**

Explation :

has given it.

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

According to the formula:

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

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

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

Square both sides.

$x^2+2+\left(\frac{1}{x}\right)^2=(4)^2$

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

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

2. What is the square of 42?

(a) 1564
(b) 1664
(c) 1504
(d) 1764 **[d]**

Explation :

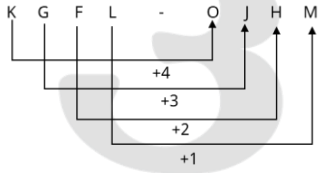
$(42)^2=1764$

3. KGFL is related to OJHM in a certain way based on the English alphabetical order. In the same way, ASNP is related to EVPQ. Following the same logic, MBTS is related to which of the following options?

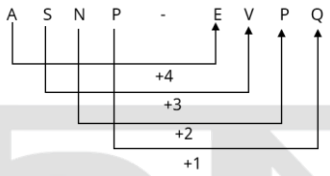
(a) QEVW
(b) QEXS
(c) QEVT
(d) QFVT **[c]**

Explation :

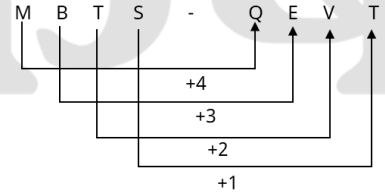
Just as



And



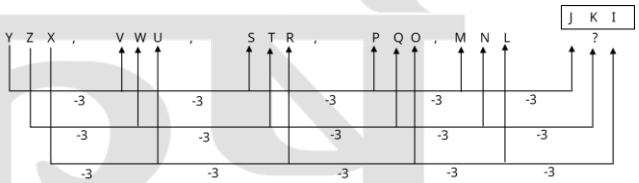
in the same manner



4. Based on the English alphabetical order, which of the following options should come in place of the question mark (?) in the given series?
YZX, VWU, STR, PQO, MNL, ?

(a) KJI
(b) IJK
(c) JKI
(d) CBA **[c]**

Explation :



? = JKI

5. The heights of Ramesh's and Suresh's mud buildings are 8 cm and 15 cm respectively. They are 24 cm apart from each other. How far are the tops of their mud buildings from each other?

(a) 24 cm
(b) 25 cm
(c) 31 cm
(d) 30 cm **[b]**

Explation :

Given

The height of the mud buildings of Ramesh and Suresh are 8 cm and 15 cm respectively.

The distance between them is 24 cm.

By Prothagoras theorem

$(\text{hypotenuse})^2$ $(\text{base})^2+(\text{perpendicular})^2$

$(x)^2=(24)^2+(7)^2$

$(x)^2=576+49$

$(x)^2=625$

$X=25$

Hence, the distance between the tops of the two buildings is 25 cm.

6. What is the formula unit mass of $CaCl_2$?

(a) 115 u

(b) 110 u
(c) 111 u
(d) 114 u **[c]**

Explation :

To find the formula unit mass of calcium chloride ($CaCl_2$), we need to add the atomic masses of each element present in it.
We will need the following atomic masses:
Atomic mass of calcium (Ca) = 40 u (approx)
Atomic mass of chlorine (Cl) = 35.5 u (approx)
$CaCl_2$ in the formula of:

- • There is 1 atom of calcium (Ca).
  • There are 2 atoms of chlorine (Cl).

Therefore, the formula unit mass of $CaCl_2$ will be calculated as: Formula unit mass = (1 × atomic mass of Ca) + (2 × atomic mass of Cl) Formula unit mass = (1 × 40 u) + (2 × 35.5 u) Formula unit mass = 40 u + 71 u Formula unit mass = 111 u
अतः, $CaCl_2$ का सूत्र इकाई द्रव्यमान 111 u है।
Hence, the formula unit mass of $CaCl_2$ is 111 u.

7. After reducing the price by 24%, the price of an item is ₹ 988. What is the original price of the item?

(a) ₹1,300
(b) ₹1,400
(c) ₹1,100
(d) ₹1,200 **[a]**

Explation :

Let the original price of an article be 100x.
The selling price of the article is Rs 988.

So $100x \times \frac{76}{100} = 988$

X= 13
So cost price = 13×100 = Rs.1300

8. If the surface area of a sphere is $2124\frac{4}{7}$ cm², find the diameter of the sphere. [Use $\pi = \frac{22}{7}$]

(a) 26 cm
(b) 13 cm
(c) 14 cm
(d) 28 cm **[a]**

Explation :

has given it.

गोले का पृष्ठीय क्षेत्रफल = $2124\frac{4}{7}$ सेमी²

Surface area of sphere = $2124\frac{4}{7}$ cm²

according to formula :

$4\pi r^2 = 2124\frac{4}{7}$

$4 \times \frac{22}{7} \times r^2 = \frac{14872}{7}$

$r^2 = 169$

r = 13

diameter of sphere = 2r = 2×13=26 cm

9. How many sports personalities received the Major Dhyan Chand Khel Ratna Award at the National Sports Awards 2023?

(a) 6
(b) 5
(c) 3
(d) 2 **[d]**

Explation :

The Major Dhyan Chand Khel Ratna award was presented to two sportspersons at the National Sports Awards 2023:
Satwiksairaj Rankireddy – Badminton player
Chirag Shetty – Badminton player
Both these players were awarded this highest sporting honour for their remarkable performance in badminton in 2023. They made India proud by winning the Asian Games gold medal, Asian Championships title and Indonesia Open Super 1000 title. However, they could not attend the ceremony as they went to Kuala Lumpur to participate in the Malaysia Open.

10. What is the ability of a fully differentiated organism to give rise to new organisms from its body parts called?

(a) Budding
(b) Regeneration
(c) Fragmentation
(d) Fragmentation **[b]**

Explation :

The ability of a fully differentiated organism to give rise to new organisms from its body parts is called regeneration.
Budding: It is a mode of asexual reproduction where a bud or outgrowth develops on the body of the parent organism, which grows to form a new organism and then breaks off. Example: Hydra, yeast.
Fragmentation: It is a form of asexual reproduction in which an organism breaks into small pieces, and each piece can grow into a complete new organism. Example: Spirogyra.
Fission: It is a common mode of asexual reproduction where a single organism splits into two or more parts to form new organisms.

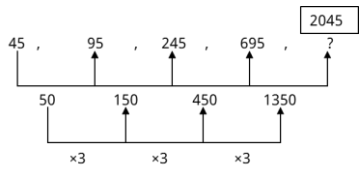
Example: Amoeba (binary fission), Plasmodium (multiple fission).

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

45 95 245 695 ?

(a) 2045
(b) 1995
(c) 2125
(d) 2075 **[a]**

Explation :



? = 2045

12. Which among the following is the longest cell in our body?

(a) Blood cell
(b) Egg cell
(c) Nerve cell
(d) Fat cell **[c]**

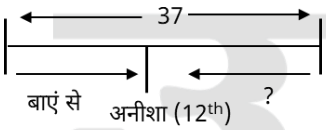
Explation :

The longest cell in our body is a neuron.
Neuron: These cells are specially adapted to carry messages from one place to another in the body. Their length can range from several centimeters to more than 1 meter (for example, nerve cells going from the spinal cord to the big toe). Their long axon structure enables them to send electrical signals over long distances, making them the longest cells in the body.

13. In a row of 37 people, Anisha is 12th from the left end. What is her position from the right end?

(a) 24
(b) 16
(c) 27
(d) 26 **[d]**

Explation :

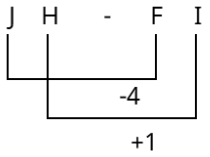


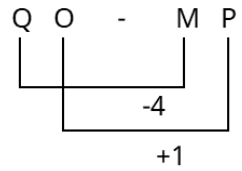
Anisha's position from the right = Total people – Position from the left + 1
= 37 – 12 + 1
= 26

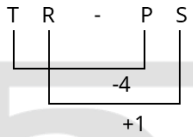
14. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which pair does not belong to that group?
(Note: The odd letter-cluster is not based on the number of consonants/vowels or their position in that letter-cluster.)

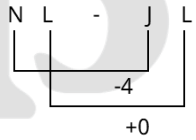
(a) JH-FI
(b) QO-MP
(c) TR-PS
(d) NL-JL **[d]**

Explation :









Hence, 'NL – JL'' is different from others.

15. 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 many days will 15 men and 20 boys take to do the same work?

(a) 6 days
(b) 7 days
(c) 5 days
(d) 4 days **[d]**

Explation :

Given
(6 men + 8 boys) can do a work in 10 days.
(26 men + 48 boys) can do the same work in 2 days.
Men = m
Boys = B
(6M+8B)×10 = (26M + 48B) ×2
60M +80 B= 52M+96B
8M = 16B

$\frac{m}{B} = \frac{2}{1}$

Total Functions = (6M+8B) × 10
= (6×2+8×1)×10

= 20×10 = 200

Total time taken by 15 men + 20 boys to do 200 units of work =

$\frac{200}{15\times2+20\times1}$ = 4 Days

16. Which Union Territory became the first state to achieve full functional literacy under the Ullas-Nav Bharat Literacy Programme?

(a) Ladakh
(b) Chandigarh
(c) Lakshadweep
(d) Puducherry **[a]**

Explanation: The Union Territory of Ladakh achieved the distinction of becoming the first administrative unit to achieve Full Functional Literacy under 'ULLAS - Nav Bharat Literacy Program'. This achievement was declared on 25 June 2024, when Ladakh achieved a literacy rate of over 97%.

The aim of the ULLAS scheme is to provide basic literacy, numeracy, life skills, vocational skills and continuing education to illiterates aged 15 years and above. The scheme is in line with the National Education Policy 2020 and is being implemented from 2022 to 2027.

Given this achievement of Ladakh, Lieutenant Governor Dr. BD Mishra formally declared it at a function held at the Indus Cultural Center in Leh. More than 500 neo-literates and volunteer teachers were present on the occasion.

17. The cost of 12 pens and 7 pencils is ₹ 233. If the cost of a pen is reduced by ₹ 1.50, and the cost of a pencil is increased by ₹ 1, then the cost of 2 pens and 3 pencils becomes ₹ 48. Find the initial cost of 2 pens and 3 pencils?

(a) ₹46
(b) ₹41
(c) ₹48
(d) ₹54 **[c]**

Explation :

Given.

(12 pens + 7 pencils) = Rs. 233

The price of pens decreases by Rs. 1.50.

The price of pencils increases by Rs. 1.

Then the price of (2 pens + 3 pencils) becomes Rs. 48.

Let the price of a pen and a pencil be Rs. x and Rs. y respectively.

12x + 7y = 233 ..... (i)

With the new price,

2 (x-1.50) + 3 (y+1) = 48

2x-3 + 3y +3 = 48

2x+3y =48 ..... (ii)

Subtracting the value of x from equation (ii),

2x= 48 -3y

$x = \frac{48-3y}{2}$

Putting the value of x in equation (i)

12x+7y = 233

$12\times\left(\frac{48-3y}{2}\right)+7y = 233$

6 (48-3y)+7y = 233

288-18y +7y = 233

288-233 =11y

55=11y

Y = 5

$x = \frac{48-3y}{2}$

$x = \frac{48-3\times5}{2}$

X= 16.5

Cost of 2 pens + 3 pencils =

2x+3y=2(16.50)+3(5)

= 33+15

= 48 रूपये

18. Select the triad that follows the same pattern as the two triads. The pattern is followed by the two triads given below.

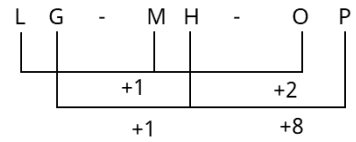
LG-MH-OP

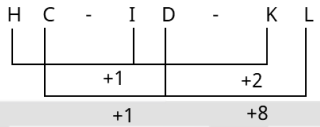
HC-ID-KL

(a) KF-LG-NP
(b) OJ-PK-RT
(c) ID-JE-LN
(d) JE-KF-MN **[d]**

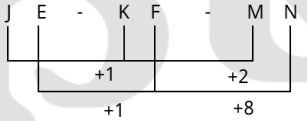
Explation :

Just as





in the same manner



19. Which of the following hormones stimulates the growth of all organs?

(a) Growth hormone
(b) Insulin
(c) Glucagon

(d) Adrenaline **[a]**

Explation :

Growth hormone stimulates the growth of all organs.

Growth Hormone (GH): It is secreted by the pituitary gland and stimulates the growth and development of almost all the tissues and organs of the body. It promotes growth by affecting protein synthesis, fat metabolism and carbohydrate metabolism. It plays an important role in the growth of bones, muscles and other organs.

Insulin: It is secreted by the pancreas and regulates the level of sugar (glucose) in the blood.

Glucagon: It is also secreted by the pancreas and acts opposite to that of insulin, i.e. increases the level of sugar in the blood.

Adrenaline/Epinephrine: It is secreted by the adrenal gland and is associated with the "fight or flight" response. It increases heart rate, blood pressure and breathing rate.

20. Swarana's expenditure is 125% more than her savings. If her expenditure is reduced by 6% and savings are increased by 26.5%, then by what percentage does her income increase?

(a) 20.5%
(b) 8%
(c) 18.5%
(d) 4% **[d]**

Explation :

Let the saving in gold be 100x.

then the expenditure = $100x = \frac{225}{100} = 225x$ Rupees

so you = 100x+225x = 325x Rupees

Expenditure is reduced by 6%

$225x = \frac{94}{100} = 211.5x$ Rupees

Savings increase by 26.5%.

$100x = \frac{126.5}{100} = 126.5x$ Rupees

So new income = Rs 211.5+126.5x=338x

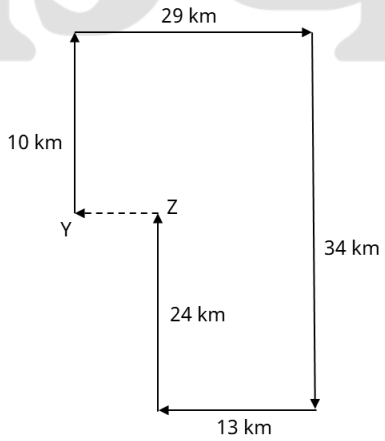
Increase in income = $\frac{338x - 325x}{325x} \times 100$

$= = \frac{13x}{325x} \times 100 = 4\%$

21. Vinit starts from point 4 and travels 10 km towards north. Then he turns right and travels 29 km, turns right and travels 34 km. Then he turns right and travels 13 km. He takes a last right turn and travels 24 km and stops at point 8. How far (shortest distance) and in which direction should he drive to reach point 4 again? (Unless specified, all turns are 90 degrees only)

(a) 16km towards west
(b) 14km towards north
(c) 19km towards east
(d) 24km towards south **[a]**

Explation :



It is clear from the diagram that Vinit will travel 16km west from point 'Z' to reach point 'y'.

22. Which institute is responsible for the development of 'Investor Information and Analysis Platform' in 2024?

(a) IIT Madras
(b) IIT Bombay
(c) IIT Delhi
(d) IIT Kanpur [a]

Explation : IIT Madras was responsible for the development of 'Investor Information and Analysis Platform' in 2024, not IIT Delhi. The platform was developed by IIT Madras' Centre for Research on Start-ups and Risk Financing (CREST). It was inaugurated by Union Minister Shri Rajeev Chandrasekhar on 26 February 2024.

The platform serves as a centralised hub for startups where they can reach out to investors, government schemes, incubators, and other important stakeholders. It also has an AI-based chatbot feature called "StartupGPT", which allows users to ask questions in simple language and get information in real-time.

The platform comprises of over 2,00,000 startups, over 11,000 angel investors, over 5,000 venture capitalists, 1,000 incubators, over 100 government agencies, and over 550 banks that provide support to startups.

23. Choose the set in which the numbers are related in the same way as the numbers in the following sets are related.
(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.)
(2, 24, 6)
(4, 32, 2)
(a) (5, 70, 3)
(b) (9, 80, 1)
(c) (6, 108, 3)
(d) (3, 48, 4) **[c]**

Explation :
Just as
2, 24, 6
$(2)^2 \times 6 = 24$
And
4, 32, 2
$(4)^2 \times 2 = 32$
in the same manner
6, 108, 3
$(6)^2 \times 3 = 108$

24. What is the arithmetic mean of the given observations, 3, 6, 8, 10, 12, 14, 18, 24 and 31?
(a) 15
(b) 14
(c) 17
(d) 16 **[b]**

Explation :
Given
Total observations 3,6,8,10,12,14,18,24,31 respectively

$$\text{Mean} = \frac{\text{total of observations}}{\text{Total number of observations}}$$

$$= \frac{3+6+8+10+12+14+18+24+31}{9}$$

$$= \frac{126}{9} = 14$$

25. In a certain code language, 'big small average' is written as '22 33 55', 'small treat party' is written as '55 44 77', and 'party average people' is written as '77 22 99'. How will 'people' be written in the same code language?
(a) 22
(b) 55
(c) 99
(d) 77 **[c]**

Explation :
Just as
big small average - 22 33 55
small treat party - 55 44 77
Party average people - 77 22 99
in the same manner
Pepole = 99

26. The base area of a rectangular tank is 6500 cm² and the volume of water it contains is 2.6 cubic metres. What is the depth of the water in the tank?
(a) 6 m
(b) 3.5 m
(c) 4 m
(d) 5 m **[c]**

Explation :
Depth of water in rectangular tank:
Area of base: 6500 cm^2 = 0.65 m2 (because 1 m^2 = 10000 cm^2)
Volume of water: 2.6 cubic metres

$$\text{depth} = \frac{\text{Volume}}{\text{Area of the base}}$$

$$\text{depth} = \frac{2.6\,m^3}{0.65\,m^2}$$

depth = 4 मीटर
Hence, the depth of water in the tank is 4 metres.

27. What is the name of Bhim Singh's book launched on August 11, 2024?
(a) Legends of Indian Revolution
(b) 75 Great Revolutionaries of India
(c) Unsung Warriors of India
(d) Heroes of Indian Freedom **[b]**

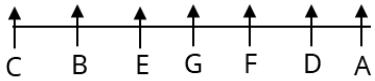
Explation : On 11 August 2024, the book "75 great revolutionaries of India" written by BJP Rajya Sabha MP Dr. Bhim Singh was released at a function organized at the Constitution Club of Delhi. The book was released by Rajya Sabha Deputy Chairman Dr. Harivansh. It highlights the struggle and sacrifice of those revolutionaries of the Indian freedom struggle, who have generally got less space in history. The author has written this book as a tribute in the 75th year of independence, in which he has studied hundreds of books and documents and highlighted the contribution of 75 revolutionaries. Among them, unsung heroes like Tatia Bhil, Master Da Suryasen, Pritilata Wadedar, Pandit Parmanand Jhansi, Jyotindra Nath Mukherjee, Vanchi Iyer,

Kanhare, Sarabha, Rani Gaidinliu have been mentioned.

28. Seven persons, A, B, C, D, E, F and G, are sitting in a row facing north. A sits third from the left end. There is only one person sitting to the right of D. G sits second to the left of D. B sits immediate right of C. F does not sit to the right of A. How many persons sit between F and E?

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

Explation :



It is clear from the diagram that only one person (G) is sitting between F and E.

29. For certain data, the mode is 24.6 and the mean is 20.1. Using the empirical formula, find the median of the data.

(a) 23.5
(b) 22.2
(c) 21.6
(d) 24.1 **[c]**

Explation :

Given,
Mode = 24.6
Mean = 20.1
According to the formula,
Mode = 3 × Median − 2 × Mean
24.6 = 3 × Median − 2 × 20.1
24.6 +40.2 = 3 × Median
64.8 = 3 × Median
Median = 21.6

30. Which two numbers should be interchanged to make the given equation correct?
(27 + 15) × 2 (95 ÷ 5) + 25 × 4 − 135 = 62
(Note: Whole numbers should be interchanged and not the individual digits of the given number.)

(a) 95 and 135
(b) 25 and 27
(c) 5 and 15
(d) 2 and 4 **[a]**

Explation :

(27 + 15) × 2 − (95 ÷ 5) + 25 × 4 − 135 = 62
Interchanging the numbers from option (a)

$(27+15)\times 2-(135\div 5)+25\times 4-95=62$
$42\times 2-27+100-95=62$
$84-27+100-95=62$
$184-122=62$
$62=62$

31. Carbon has the unique ability to form bonds with other atoms of carbon. This property is known as _____.

(a) homologous
(b) cyclisation
(c) allotropes
(d) catenation **[d]**

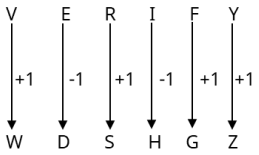
Explation :

The unique ability of carbon to form bonds with other carbon atoms is known as catenation.
Catenation: This is a unique property of carbon due to which carbon atoms can form long straight, branched or cyclic chains by forming covalent bonds with each other. This property is the basis for the formation of a large number of organic compounds. Carbon-carbon bonds are very stable, allowing the formation of large and complex structures.

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

(a) Six
(b) Three
(c) Five
(d) Four **[a]**

Explation :



Number of consonants in the new letter group = 6

33. At what rate of interest (in percent) will one get ₹520 20 as interest on ₹1,300 in 5 years?

(a) 5%
(b) 4%
(c) 7%
(d) 8% **[d]**

Explation :

has given it.
दर = R%
Time = 5 years

Principal = Rs 1300

Interest = Rs 520

$$\text{Rate} = \frac{\text{Interest} \times 100}{\text{Principal amount} \times \text{Time}}$$

$$\frac{520 \times 100}{1300 \times 5} = 8\%$$

Hence the rate of interest is 8% per annum.

34. In the following number-pairs, the second number is obtained by performing some mathematical operations on the first number. Select 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. For example 13 - Operations such as addition/subtraction/multiplying 13 etc. can be performed on the number 13. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed)

(6, 37)

(8,65)

(a) (5, 24)

(b) (7, 49)

(c) (3, 27)

(d) (9,82) **[d]**

Explation :

Just as

$(6,37)$

$(6)^2 + 1 = 37$

And

$(8,65)$

$(8)^2 + 1 = 65$

in the same manner

$(9,82)$

$(9)^2 + 1 = 82$

35. Who among the following won the gold medal in the women's 10m air rifle standing SH1 shooting category at the Paralympics?

(a) Amulya Chaudhary

(b) Preeti Pal

(c) Avani Lekhara

(d) Manisha Agarwal [c]

Explation : Avani Lekhara won the gold medal in the women's 10m air rifle standing SH1 shooting category at the 2024 Paris Paralympics. She set a new Paralympic record with 249.7 points, which she had previously set at the 2020 Tokyo Paralympics with 249.6 points. With this achievement, she became the first Indian woman to win two gold medals at the Paralympic Games.

36. From the following options, select the option that represents all biodegradable materials.

(a) Glass bottle, milk packet, egg shell, banana peel

(b) Medicine bottle, old shoe, stale biscuit

(c) Egg shell, tea leaves, potato peel

(d) Bubble pack, vegetable peel, stale bread [c]

Explation :

Biodegradable materials are those that can be naturally decomposed by microorganisms (such as bacteria and fungi) and dissolve in the environment, leaving no harmful residue.

Egg shell: Made up mainly of calcium carbonate and proteins, which can be broken down by microorganisms.

Tea leaves: Are organic matter and decompose easily.

Potato peel: These are vegetable waste and are completely biodegradable as they are organic.

37. If 'I' means '+', 'J' means '×', 'K' means '÷' and 'L' means '-', then what will come in place of question mark '?' in the following equation?

(24 J 3) K 6 I (14 J 2) L 19 =?

(a) 34

(b) 15

(c) 19

(d) 21 **[d]**

Explation :

(24 J 3) K 6 I (14 J 2) L 19 =?

according to question

$(24 \times 3) \div 6 + (14 \times 2) - 19 = ?$

$72 \div 6 + 28 - 19 = ?$

$12 + 28 - 19 = ?$

$40 - 19 = ?$

$21 = ?$

38. If a ray of light is travelling from a medium of refractive index 'n_1' to a medium of refractive index 'n_2' such that angle of incidence is 'i" and angle of refraction is 'r' (assuming 0 < i < 90°), then n_1/n_2 is equal to_____.

(a) Sin r – sin i

(b) $\frac{\sin i}{\sin r}$

(c) $\frac{\sin r}{\sin i}$

(d) sin i – sin r **[c]**

Explation :

Snell's law states that when light travels from one medium to another, the ratio of the sine of the angle of incidence and the sine of the angle of refraction is equal to the ratio of the refractive indices of the two media.

According to Snell's law:

$n_1 \sin i = n_2 \sin r$

Where:

- n_1 = refractive index of the first medium
- n_2 = refractive index of the second medium
- i = angle of incidence
- r = angle of refraction
- The value of n_1/n_2 is to be found. (Assuming $0 < i < 90$ degrees)

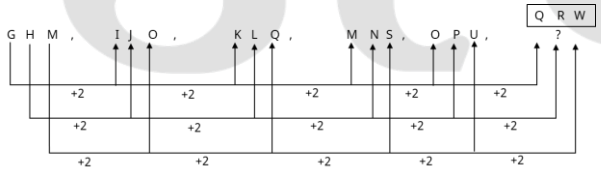
On rearranging the equation:

$$n_1/n_2 = \frac{\sin r}{\sin i}$$

39. Based on the English alphabetical order, which of the following options should come in place of the question mark (?) in the given series?
GHM, IJO, KLQ, MNS, OPU, ?

(a) QRW
(b) QSV
(c) QRV
(d) QSW **[a]**

Explation :



? = QRW

40. निम्नलिखित में से कौन-सा भिन्न $\frac{2}{3}$ से बड़ा और $\frac{4}{5}$ से छोटा है?
Which of the following fractions is greater than $\frac{2}{3}$ and smaller than $\frac{4}{5}$?

(a) $\frac{9}{11}$
(b) $\frac{5}{6}$
(c) $\frac{3}{4}$
(d) $\frac{1}{2}$ **[c]**

Explation :

has given it.

$\frac{2}{3}, \frac{4}{5}$

$\frac{2}{3} = 0.66$

$\frac{4}{5} = 0.8$

Value of option (A) $\frac{9}{11} = 0.818$

Value of option (B) $\frac{5}{6} = 0.833$

Value of option (C) $\frac{3}{4} = 0.75$

Value of option (D) $\frac{1}{2} = 0.5$

Only option (c) is greater than $\frac{2}{3}$ and smaller than $\frac{4}{5}$.

41. In a certain code language, 'know me Better' is written as 'jf bu pd' and 'better Know something' is written as 'bu jf Is'. How will 'something' be written in that code language?

(a) Is
(b) jf
(c) pd
(d) bu **[a]**

Explation :

Just as

Know me BeHer - jf bu pd

better know something - bu jf Is

Just as

something = Is

42. Find the smallest four-digit number which is exactly divisible by each of 24, 40 and 56.

(a) 1680
(b) 1260
(c) 1080
(d) 1170 **[a]**

Explation :

LCM of 24, 40, 56= 2×2×2×3×5×7 =840

24= 2×2×2×3

40 = 2 ×2 ×2 ×5

58 = 2 ×2 ×2 ×7

smallest four digit number = 840 ×2 = 1680

43. Which instrument can be used to tell the direction of magnetic field lines at a point?

(a) Generator
(b) Magnetic compass
(c) Electric motor
(d) Solenoid **[b]**

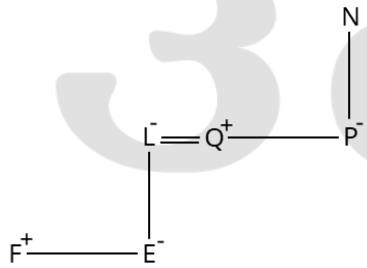
Explation :

A Magnetic Compass can be used to indicate the direction of magnetic field lines at a point.

Magnetic Compass: A magnetic compass consists of a small, pivoted magnetic needle. This needle aligns under the influence of the Earth's magnetic field or any nearby magnetic field. When placed in a magnetic field, its needle points in the direction of the magnetic field lines at that point. The north pole (red or coloured end) of the needle indicates the direction in which the magnetic field lines radiate (i.e. from the north pole to the south pole).

44. In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B',
A ÷ B means 'A is the father of B',
and A # B means 'A is the daughter of B'.
If 'F - E # L × Q – P # N', then how is P related to F?
(a) Brother's son
(b) Brother's daughter
(c) Mother's sister
(d) Father's sister **[d]**

Explation :



Hence, it is clear from the diagram that P is the sister of F's father.

45. Which of the following statements about the gravitational force between the Earth and the Moon is correct?
(a) When the Moon is far from the Earth, the gravitational force is repulsive.
(b) When the Moon is far from the Earth, the gravitational force is attractive and maximum.
(c) When the Moon is close to the Earth, the gravitational force is attractive and maximum.
(d) When the Moon is far from the Earth, the gravitational force is repulsive and minimum. **[c]**

Explation :

The gravitational force is always attractive, and when the Moon is closer to the Earth (distance is less), the force is maximum because the force is inversely proportional to the square of the distance.

Newton's universal law of gravitation states that the gravitational force between two objects is always attractive. This means they pull each other, never push (repel) each other.

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

Where,
F= Force
m_1 and m_2 are the masses of both the objects/bodies (here earth and moon).
r = Distance between the two bodies
G= Gravitational constant
It is clear from this formula that the gravitational force (F) is inversely proportional to the square of the distance (r). It means –
When distance (r) increases, the force (F) decreases.
When distance (r) decreases, the force (F) increases.

46. Which of the following compounds is used in soda-acid fire extinguishers?
(a) Sodium carbonate
(b) Sodium bicarbonate
(c) Calcium chloride
(d) Bleaching powder [b]

Explation :

Sodium bicarbonate ($NaHCO_3$) is used in soda-acid fire extinguishers.
Solution of sodium bicarbonate ($NaHCO_3$) (which is an alkaline salt). It is also called sodium hydrogen carbonate.
Sulphuric acid (H_2SO_4) in a separate vial.
When the extinguisher is used (e.g. by pressing the knob or turning it upside down), the acid and bicarbonate solutions mix. This reaction produces carbon dioxide (CO2) gas:

$$2NaHCO_3(aq)+H_2SO_4(aq) \rightarrow Na_2SO_4(aq)+2H_2O(l)+2CO_2(g)$$

The carbon dioxide gas produced comes out of the extinguisher at high pressure, which helps extinguish the fire by isolating it from oxygen and to some extent by cooling it.

47. What percentage of solar energy is absorbed by green plants in terrestrial ecosystem?
(a) 100 percent
(b) 1 percent
(c) 10 percent
(d) 5 percent **[b]**

Explation :

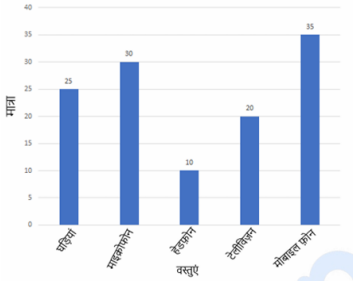
In terrestrial ecosystems, green plants (producers) are able to capture only a small fraction of the total solar energy coming from the sun for photosynthesis. This percentage is around 1 percent on average.

This is different from the "10% Law" of energy. The 10 percent rule states that only about 10 percent of the energy is transferred from one trophic level to the next.

But when it comes to capturing solar energy, green plants (producers) are able to use only a very small fraction of the sunlight energy for photosynthesis. The rest of the energy is either reflected, or absorbed but not used for photosynthesis, or not absorbed by the plant.

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

The bar graph shows the number of different items sold by a shopkeeper in their respective quantities.



How many units of headphones and mobile phones were sold together

(a) 45
(b) 15
(c) 25
(d) 35 **[a]**

Explation :

Total headphones sold = 10
Total mobiles sold = 35
Total number = 10 + 35 = 45

49. The average velocity of a body can be given by the arithmetic mean of the initial velocity and final velocity for a given period of time, when the body _____.

(a) moving with uniform velocity
(b) moving with uniform speed
(c) moving with non-uniform acceleration
(d) moving with uniform acceleration [d]

Explation :

The average velocity of a body can be given by the arithmetic mean of the initial velocity and final velocity for a given period of time when the body is moving with uniform acceleration.

When a body moves with uniform acceleration, its velocity changes at a linear rate with time. In this particular case, the average velocity can be calculated as the arithmetic mean (arithmetic mean) of the initial velocity (u) and final velocity (v):

Average velocity= u+v/2

50. A policeman whose speed is 10 km/h chases a thief running at a speed of 8 km/h. If the thief is 100 m ahead of the policeman, how much time will the policeman take to catch the thief?

(a) 6 minutes
(b) 2 minutes
(c) 10 minutes
(d) 3 minutes **[d]**

Explation :

The speed of the policeman is 10 km/h.
The speed of the thief is 8 km/h.
The distance between the thief and the policeman is 100 meters.

Speed of policeman m/sec = $10\times\frac{5}{18}=\frac{25}{9}$ meter/second

Speed of the thief in m/s = $8\times\frac{5}{18}=\frac{20}{9}$ meter/second

Total time taken by the policeman to catch the thief =

$$\frac{100}{\left(\frac{25}{9}-\frac{20}{9}\right)\times 60}=\frac{100\times 9}{60\times 5}=3 \text{ Minute}$$

51. Which of the following products is formed when sodium sulphate reacts with barium chloride?

(a) Yellow precipitate of $BaSO_4$ and 2NaCl (aq)
(b) White precipitate of $BaSO_4$ and 2NaCl (aq)
(c) Black precipitate of $BaSO_4$ and 2NaCl (aq)
(d) Brown precipitate of BaSO4 and 2NaCl (aq) **[b]**

Explation :

When sodium sulphate (Na_2SO_4) reacts with barium chloride ($BaCl_2$), a double displacement reaction takes place. The products of this reaction are barium sulphate ($BaSO_4$) and sodium chloride (NaCl).

The reaction is as follows:

$Na2SO_4(aq)+BaCl_2(aq)\rightarrow BaSO_4(s)+2NaCl(aq)$

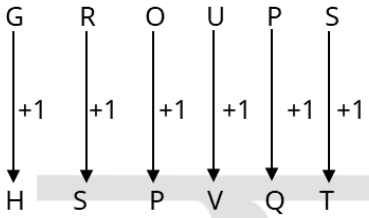
• Sodium Chloride (NaCl): It is common salt and it is highly soluble in water, so it remains in aqueous solution.

- Barium Sulphate (BaSO4): Barium sulphate is insoluble in water. When it forms in a reaction, it precipitates out of the solution and forms a precipitate. Barium sulphate is a white solid.

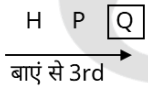
52. If each vowel of the word GROUPS is replaced by its next letter in the English alphabetical order and each consonant is replaced by its next letter in the English alphabetical order and then the letters are arranged in the English alphabetical order, then which of the following letter will be at the third position from the left in the letter group thus formed?

(a) T
(b) S
(c) Q
(d) P **[c]**

Explation :



On arranging the new letter group in English alphabetical order –



Hence, the third letter from the left in the group of letters arranged in the English alphabet is 'Q'.

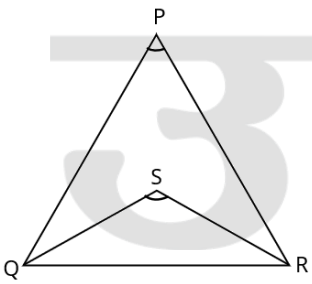
53. The internal bisectors ∠Q and ∠R of △PQR meet at S. If ∠P = 75°, then what is the value of ∠QSR?

(a) 127.5°
(b) 112.5°
(c) 102.5°
(d) 105.5° **[a]**

Explation :

The internal bisectors∠Q and ∠R of △PQR meet at S.

Given-



$$\angle QSR = 90° + \frac{\angle P}{2}$$

$$\angle QSR = 90° + \frac{75°}{2}$$

$$\angle QSR = 90° + 37.5$$

$$\angle QSR = 127.5°$$

54. In June 2024, the Indian Army opened the Khalubar War Memorial to tourists, which is located in _____, India.

(a) Ladakh
(b) Bengaluru
(c) Chandigarh
(d) New Delhi **[a]**

Explation : In June 2024, the Indian Army opened the Khalubar War Memorial located in the Aryan Valley of Ladakh to tourists. The memorial honors the valor and sacrifice of Indian soldiers in the 1999 Kargil War. It displays the valor of martyrs like Captain Manoj Pandey. A special trekking program was also organized on the occasion of the inauguration of the memorial, in which a journey to the battle site was led by Brigadier OP Yadav (Retd). This initiative is an important step towards preserving the military heritage of the Indian Army and making it accessible to the general public through tourism.

55. Indian Air Force (IAF) contingent returned to India on 10 August 2024 after participating in Exercise _____ in Malaysia.

(a) Cope India
(b) Liberal Power
(c) Garuda
(d) Red Flag **[b]**

Explation : Indian Air Force contingent participated in bilateral air exercise Udar Shakti 2024 held from 5 to 9 August 2024 in Kuantan, Malaysia. In this exercise, IAF participated with SU-30MKI fighter aircraft while Royal Malaysian Air Force supported with its SU-30MKM aircraft. Technical experts of both the air forces exchanged maintenance procedures, thereby enhancing operational efficiency and technical proficiency. After successful completion of the exercise, IAF contingent returned to India on 10 August 2024.

56. When 1 ohm and 2 ohm resistors are connected in parallel combination, then the equivalent resistance of the combination of resistors is _____.

(a) 3 ohm

(b) (3/2) ohm
(c) 2 ohm
(d) (2/3) ohm **[d]**

Explation :

When resistors are connected in parallel combination, the formula for equivalent resistance is as follows:

$$\frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}$$

Req is the equivalent resistance.
R1 = 1 ohm
R2 = 2 ohm

$$\frac{1}{R_{\text{तुल्य}}}=\frac{1}{1}+\frac{1}{2}$$
$$=\frac{2+1}{2}=\frac{3}{2}$$
$$\Rightarrow R_{\text{तुल्य}}=\frac{2}{3}\Omega$$

57. A dealer gives a discount of 30% on the marked price of an item. If the selling price of the item is ₹ 12,460, then what is its marked price?
(a) ₹16,800
(b) ₹17,860
(c) ₹17,800
(d) ₹16,760 **[c]**

Explation :

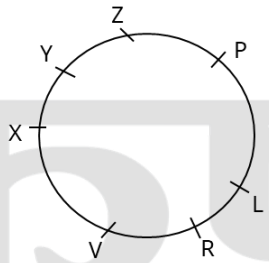
Let the marked price be 100x.
Discount = 30%
Selling price = Rs. 12460

$$100x\times\frac{70}{100}=12460$$
$$x=\frac{12460}{70}$$

X= 178
Marked price = 100x = 178×100=Rs.17800

58. L, P, R, V, X, Y and Z are seated around a circular table facing the centre. R sits immediate right of V. Only three persons sit between R and Z when counted from the left of R. Only three persons sit between V and P. X sits immediate right of Y. How many persons sit between I and Y when counted from the left of Y?
(a) one
(b) four
(c) three
(d) two **[d]**

Explation :



It is clear from the diagram that two persons sit between y and L from the left of y.

59. The cells of meristematic tissue are highly active but they lack ___.
(a) Vacuole
(b) Lots of cytoplasm
(c) Clear nucleus
(d) Thin cell wall [a]

Explation :

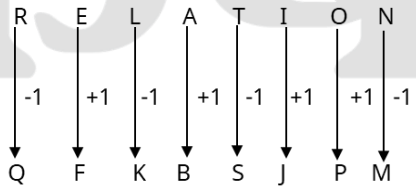
Tissues in which cells are continuously dividing are called meristems.

These tissues help in increasing the length and thickness of the plant. Meristems are found only in growing parts. The tip of the stem and the tip of the root are the places where meristems are found.

Meristematic cells do not have large central vacuoles. Vacuoles usually perform the functions of storage, waste disposal and maintaining turgor pressure in mature plant cells. Since meristematic cells are constantly dividing and growing, they have to concentrate on active metabolism rather than storage, so they do not need large vacuoles.

60. If each vowel of the word RELATION 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, and then arranged in the reverse English alphabetical order, then which of the following letters will be fourth from the right in the group of letters thus formed?
(a) M
(b) Q
(c) P
(d) K **[d]**

Explation :



When the new letter group is arranged in the reverse order of the English alphabet

S Q P M [K] J F B

4th दाएं से

Hence, "K" is at the fourth place from the right.

61. In the case of reflection of light from a concave mirror, when a parallel beam of light is incident on the reflecting surface, reflected light_____.

(a) appears to converge at the centre of curvature
(b) appears to diverge from the centre of curvature
(c) appears to diverge from the principal focus
(d) appears to converge at the principal focus **[d]**

Explation :

A concave mirror is a spherical mirror whose reflecting surface is sunken (cave-shaped) inwards. It is also called a converging mirror because it focuses the parallel light rays falling on it to a single point.

According to the laws of optics, when rays of light fall on the reflecting surface of a concave mirror parallel to the principal axis, all those rays after reflection converge at the principal focus or focal point, F of the mirror.

Converge: It means that the rays actually meet or appear to meet at a point. In the case of a concave mirror, the reflected rays actually meet at the principal focus.

Diverge: It means that the rays appear to diverge from a point. This is the property of a convex mirror.

62. In which of the following phenomena a solid gets converted into a liquid?

(a) Sublimation
(b) Fusion
(c) Solidification
(d) Deposition **[b]**

Explation :

Fusion: It is also called melting. It is the process in which a solid substance gets converted into liquid state by getting heat. Example: Ice melting and becoming water.

Sublimation: It is the process in which a solid gets converted into gas directly, without coming into liquid state. Example: Dry ice (CO_2), camphor, naphthalene etc.

Fusion: It is also called melting. It is the process in which a solid substance gets converted into liquid state by getting heat. Example: Ice melting and becoming water.

Solidification: It is also called freezing. It is the process in which a liquid substance gets converted into solid state by getting cooled. Example: Water becoming ice.

Deposition: It is the process in which a gas gets converted into solid state directly, without coming into liquid state. It is the opposite of sublimation. Example: Formation of frost.

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

Statement:

The special task force constituted by the government has found that toxic waste is being mixed with dry waste in many apartment complexes before collection by the municipality, posing a serious threat to the waste processing personnel and the environment.

Action:

(I) Heavy fines should be imposed on apartment complexes where toxic and dry waste are not properly segregated before collection.

(II) Apartment complexes should issue clear guidelines on waste segregation to apartment residents.

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

Explation :

(I) Heavy fines should be imposed on apartment complexes in a situation where toxic and dry waste are not properly segregated before collection.

This action is appropriate as it will make apartment complexes realise the importance of waste segregation and motivate them to follow the rules.

(II) Apartment complexes should issue clear guidelines on waste segregation to apartment residents.

This is also necessary as clear guidelines will help residents understand the process of waste

segregation, which will enable them to segregate waste properly.
Conclusion:
Both actions (I) and (II) follow logically.

64. A person sells an item at a profit of 25%. If he had bought it at a price 20% less and sold it at a price of ₹ 10.50 less, he would have made a profit of 30%. Find the purchase price of the item.
(a) ₹50
(b) ₹25
(c) ₹100
(d) ₹125 **[a]**

Explation :
Let the cost price of the article be **100**x.
selling price = $100x \times \frac{125}{100} = 125x$ Rs.
If he had bought it at **20%** less price and sold it at Rs **10.50** less, he would have earned a profit of **30%.**

$$125x - 10.50 = 80x + \left(30 \times \frac{80}{100}\right)x$$

125x – 10.50 = 80x+24x
125 – 10.50 = 104x
21x = 10.50

$$x = \frac{10.50}{21}$$

$$\text{purchase price} = \frac{10.50}{21} \times 100 = 50 \text{ Rs.}$$

65. Which of the following elements is extracted using electrolytic reduction?
(a) Zn
(b) Na
(c) Pb
(d) Fe **[b]**

Explation :
Sodium is a highly reactive metal. It is extracted by electrolysis of its molten salt (such as molten sodium chloride, NaCl). This is a classic example of electrolytic reduction (Down's process).
Electrolytic reduction is used to extract metals that are highly reactive and cannot be reduced from their ores by carbon or other common reducing agents. These metals typically include the alkali metals and alkaline earth metals, as well as aluminum (Al).

66. यदि अंश में 2 और हर में 5 जोड़ दिया जाए जाए तो भिन्न $\frac{1}{2}$ हो जाती है। यदि अंश और हर दोनों में से में से 2 घटा दिया जाए तो यह $\frac{1}{3}$ भी हो जाती है। भिन्न के हर और अंश के बीच धनात्मक अंतर क्या है?

If 2 is added to the numerator and 5 to the denominator, the fraction becomes $\frac{1}{2}$. If 2 is subtracted from both the numerator and the denominator, it also becomes $\frac{1}{3}$. What is the positive difference between the numerator and the denominator of a fraction?
(a) 3
(b) 2
(c) 4
(d) 1 **[b]**

Explation :
Considered different is $\frac{x}{y}$
According to the first condition,

$$\frac{x+2}{y+5} = \frac{1}{2}$$

2x +4 = y +5
2x-y = 1 ..... (i)
According to the second condition

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

3x -6 = y – 2
3x -y = 4 ..... (ii)
On subtracting equation (i) from equation (ii),
(3x -y) – (2x-y) = 4-1
X = 3
Putting the value of x in equation (i)
2 (3)-y=1
6-y=1
Y=5
Basic Variants is $\frac{3}{5}$
Difference = 5-3 = 2

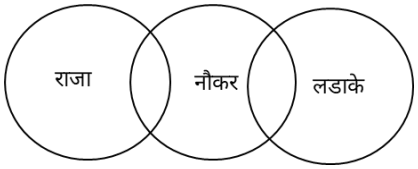
67. Which of the following roadmaps is for achieving development and child protection priorities in line with the Sustainable Development Goals (SDGs)?
(a) Mission Vardan
(b) Mission Surksha
(c) Mission Vatsalya
(d) Mission Arpan **[c]**

Explation : Mission Vatsalya is a flagship centrally sponsored scheme of the Government of India, implemented by the Ministry of Women and Child Development in 2021-22. The scheme provides a holistic framework for child protection services and aims to create a safe, sensitive and supportive ecosystem for children.

Main Objectives:
Ensuring a healthy and happy childhood for every child in the country.
Protecting the rights of children under the Juvenile Justice Act, 2015.
Assisting States and Union Territories in achieving Sustainable Development Goals (SDGs).
Promoting family-based non-institutional care instead of institutionalisation.

68. 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/statements.
Statements:
Some kings are servants.
Some servants are fighters.
Conclusions:
(I) Some fighters are kings.
(II) All servants are kings.
(a) Neither conclusion I nor II follows from the statements
(b) Only conclusion I follows from the statements
(c) Only conclusion I follows from the statements
(d) Both conclusion I and II follow from the statements [a]

Explation :



It is clear from the Venn diagram that neither conclusion I nor conclusion II follows.

69. Which of the following is the SI unit of work done
(a) Meter
(b) Joule
(c) Erg
(d) Newton **[b]**

Explation :

The work done on an object is equal to the product of the force applied on that object and the displacement in the direction of force.

Work = Force × Displacement

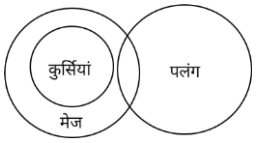
SI unit of work = Newton meter or Joule

$$= Kg \times \frac{m^2}{Sec^2}$$

Erg: It is the CGS (centimetre-gram-second) unit of work and energy. It is not an SI unit. (1 joule = 107 ergs)
Meter: It is the SI unit of length.
Newton: It is the SI unit of force.

70. 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 chairs are tables.
Some tables are beds.
Conclusions:
(I) All beds are chairs.
(II) Some tables are chairs.
(a) Only conclusion (I) follows from the statements.
(b) Both conclusions (I) and (II) follow from the statements.
(c) Neither conclusion (I) nor (II) follows from the statements.
(d) Only conclusion (II) follows from the statements. **[d]**

Explation :



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

71. A solution contains 25 g of copper chloride salt in 250 g of water. Calculate the concentration of the solution in terms of the mass percentage of the solution.
(a) 18.01%
(b) 27.01%
(c) 9.09%
(d) 36.01% **[c]**

Explation :

The formula to calculate the mass percentage concentration of a solution is:
Mass percentage =

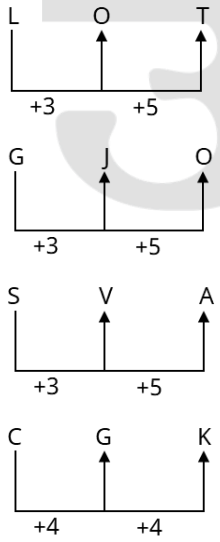
$$\frac{\text{विलेय का द्रव्यमान}}{\text{विलयन का द्रव्यमान}} \times 100$$

Here:
Mass of solute (copper chloride salt) = 25 g

Mass of solvent (water) = 250 g
First, find the total mass of the solution: Total mass of solution = Mass of solute + Mass of solvent Total mass of solution = 25 g + 250 g = 275 g
Now, calculate the mass percentage:
Mass percent (%) = (25 g / 275 g) / 100 Mass percent (%) = 0.090909... / 100
Mass percent (%) = 9.09% (approx.)

72. Based on the English alphabetical order, the following four letters form a group. Which letter group does not belong to that group? Three of the following are alike in a certain way and thus form a group
(Note: Odd letter group is not based on the number of consonants/vowels or their position in the letter group.)
(a) LOT
(b) GJO
(c) SVA
(d) CGK **[d]**

Explation :



Hence, "CGK" is different from the rest.

73. As per information received till 2024, as reported by the Central Bureau of Investigation (CBI), how many members are there in the Steering Committee of GlobeE Network, in which India has been selected as a member?
(a) 15
(b) 10
(c) 20
(d) 12 **[a]**

Explation :
According to information provided by the Central Bureau of Investigation (CBI), the Steering Committee of the GlobeE Network has 15 members, with India being elected as one of the members.
The Steering Committee consists of a Chair, a Vice-Chair, and 13 member countries. India is one of the 15 members that have been elected.

74. If x : y = 7 : 3, then (x – y) : (x + y) = ?
(a) 5 : 2
(b) 1 : 5
(c) 5 : 1
(d) 2 : 5 **[d]**

Explation :
Let x and y be **7**x and **3**x respectively. (x-y) : (x+y)
(7x-3x) : (7x+3x)
4x : 10x
2 : 5

75. Which award has been awarded to Ms. Prema Dhanraj in the field of medicine in 2024?
(a) Padma Bhushan
(b) Padma Shri
(c) Padma Vibhushan
(d) Bharat Ratna [b]

Explation : Dr. Prema Dhanraj, who hails from Karnataka, has been awarded the Padma Shri award in the field of medicine in 2024. The award was given to her for becoming a plastic surgeon despite suffering 50% burns in her life and performing free surgeries on more than 25,000 burn victims. She founded an organization called 'Agni Raksha', which provides medical aid and rehabilitation work for burn victims. Her inspirational journey has made her an example in the medical field.