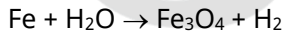


1. Choose the correct balanced equation option for the reaction $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$
- (a) $2\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
 (b) $4\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
 (c) $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 2\text{H}_2$
 (d) $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$ [d]

Explanation -

The given chemical reaction equation is -



To balance this equation we need to see that Fe_3O_4 contains 3 iron (Fe) and 4 oxygen (O), and hydrogen gas (H_2) is released from water (H_2O).

Balance:

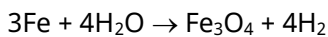
Fe_3O_4 contains 3 Fe \rightarrow we will need 3 Fe.

Fe_3O_4 contains 4 O \rightarrow it requires 4 H_2O molecules.

4 H_2O contains 8 H \rightarrow it will form 4 H_2 (hydrogen gas).

In the reaction of $\text{Fe} + \text{H}_2\text{O}$, Fe_3O_4 and H_2 are formed only when steam is used and it is a redox reaction.

So, the balanced equation will be:



2. If 'A' means ' \div ', 'B' means ' \times ', 'C' means '+' and 'D' means '-', then what will come in place of question mark '?' in the following equation?

$$61 \text{ D } 39 \text{ C } 14 \text{ C } (62 \text{ A } 2) \text{ B } 4 = ?$$

- (a) 180
 (b) 145
 (c) 110
 (d) 160 [d]

EXPLANATION -

$$61 \text{ D } 39 \text{ C } 14 \text{ C } (62 \text{ A } 2) \text{ B } 4 = ?$$

$$61 - 39 + 14 + (62 \div 2) \times 4 = ?$$

$$61 - 39 + 14 + 31 \times 4 = ?$$

$$61 - 39 + 14 + 124 = ?$$

$$199 - 39 = ?$$

$$160 = ?$$

3. In October 2023, Prime Minister Narendra Modi formally announced India's interest in bidding to host the _____ Olympics at the 141st IOC Session.

- (a) 2040
 (b) 2032
 (c) 2036
 (d) 2028 [c]

EXPLANATION -

In October 2023, Prime Minister Narendra Modi formally announced India's bid to host the 2036 Summer Olympics at the opening ceremony of the 141st International Olympic Committee (IOC) session. He described it as the "dream and

aspiration of 140 crore Indians" and said that India would leave no stone unturned to make this dream a reality.

The Prime Minister, however, did not specify on the occasion which Indian city would be chosen for the bid. But, according to media reports, Ahmedabad is being seen as a potential host city, as there has been significant investment in sports infrastructure there.

If India's bid is successful, it will become the fourth Asian country to have hosted the Summer Olympics after China, Japan and South Korea.

4. Sangameshwara temple was submerged in the backwaters of Srisailam project due to heavy rainfall in the monsoon of 2024. This temple is situated on the banks of which river?

- (a) Yamuna
 (b) Ganga
 (c) Narmada
 (d) Krishna [d]

EXPLANATION -

Sangameswara Temple, located in Kothapalli Mandal of Nandyal district of Andhra Pradesh, is situated on the banks of Krishna River. The temple is located in the backwater area of the Srisailam Project and was submerged due to heavy rainfall.

About 70% of the temple was submerged, and only a few gopurams were visible. The temple remains submerged for eight months every year, and worship is offered only for four months. The place is known as the confluence of seven rivers— Krishna, Veni, Tungabhadra, Beemaradhi, Malapaharini, Sangameswara, and Bhavanasani.

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

$$46 + 24 - (12 + 19) \times 2 + 38 \times 6 + 44 \div 4 = 262$$

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

- (a) 24 and 44
 (b) 24 and 38
 (c) 2 and 4
 (d) 6 and 2 [a]

EXPLANATION -

$$46 + 24 - (12 + 19) \times 2 + 36 \times 6 + 44 \div 4 = 262$$

On interchanging the numbers from option (a) -

$$46 + 44 - (12 + 19) \times 2 + 38 \times 6 + 24 \div 4 = 262$$

$$46 + 44 - 31 \times 2 + 38 \times 6 + 6 = 262$$

$$46 + 44 - 62 + 228 + 6 = 262$$

$$324 - 62 = 262$$

$$262 = 262$$

6. The ratio of the angles of a quadrilateral is 2 : 5 : 7 : 10. Find the difference between the largest and the smallest angles of the quadrilateral.

- (a) 120°
 (b) 180°
 (c) 50°
 (d) 60°

[a]

EXPLANATION -

Given.

The ratio of angles of a quadrilateral is 2 : 5 : 7 : 10.

Each angle of the quadrilateral is $2x$, $5x$, $7x$, $10x$ respectively.

Largest angle of the quadrilateral = $10x$

Smallest angle of the quadrilateral $2x$

Required difference =

$$\frac{360^\circ}{(2x + 5x + 7x + 10x)} \times (10x - 2x) = 120^\circ$$

7. Philately scholarship scheme 2024 was launched by the Department of Posts under 0_____.

- (a) Prime Minister Skill Development Scheme
 (b) Deen Dayal SPARSH Scheme
 (c) Digital India Programme
 (d) Sarva Shiksha Abhiyan

[b]

व्याख्या-

The Philately Scholarship Scheme was launched by the Department of Posts in 2024 under the Deen Dayal SPARSH scheme. Its objective is to encourage philately as a hobby among school students. This scheme is for students from class 6 to 9 who are members of a philately club. Annual scholarships are awarded to selected students. The full form of SPARSH is Scholarship for Promotion of Aptitude and Research in Stamps as a Hobby. This scheme also promotes creative interest along with education.

8. CYBS is related to GWFQ in a certain way based on the English alphabetical order. In the same way KUJO is related to OSNM. Following the same logic, SQRK is related to which of the following options?

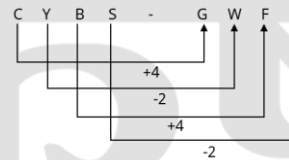
- (a) UOWH
 (b) VNWJ
 (c) UPVH

(d) WOVI

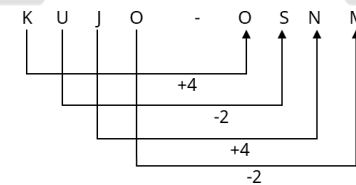
[d]

EXPLANATION -

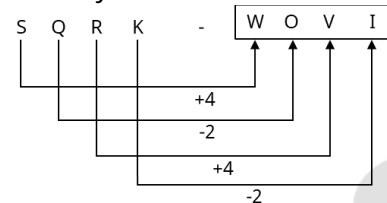
Just as



and



similarly



9. Which of the following organisations is responsible for the development of the Long-Range Glide Bomb (LRGB), GAURAV, tested in August 2024?

- (a) Indian Space Research Organisation (ISRO)
 (b) Hindustan Aeronautics Limited (HAL)
 (c) Defence Research and Development Organisation (DRDO)
 (d) Indian Navy

[c]

व्याख्या-

India successfully tested its indigenous long-range glide bomb 'Gaurav' in August 2024. The test was conducted from the Indian Air Force's Sukhoi-30MKI aircraft at Long Wheeler Island off the coast of Odisha. The bomb has been designed and developed by the Hyderabad-based Research Centre Imarat (RCI) of the Defense Research and Development Organization (DRDO). The bomb hit the target with accuracy, proving its effectiveness. Development-manufacturing partners like Adani Defense and Aerospace and Bharat Forge have also contributed to the project.

10. Ravi and Kumar are working on an assignment. It takes Ravi 6 hours to type 32 pages on a computer, while it takes Kumar 5 hours to type 40 pages. Working together on two different computers, how long will it take them to type an assignment of 110 pages?

- (a) 7 hours 30 minutes
 (b) 8 hours 25 minutes
 (c) 8 hours

(d) 8 hours 15 minutes

[d]

EXPLANATION -

Given

It takes 6 hours for Ravi to type 32 pages on his computer

Number of pages typed by Ravi in 1 hour = $\frac{32}{6} \Rightarrow \frac{16}{3}$ pages

It takes Kumar 5 hours to type 40 pages.

Number of pages typed by Kumar in 1 hour = $\frac{40}{5} = 8$ pages

Time taken by Ravi and Kumar to type 110 pages

 $\Rightarrow \frac{110}{\frac{16}{3} + 8} \Rightarrow \frac{110}{\frac{16+24}{3}} \Rightarrow \frac{110 \times 3}{40} \Rightarrow \frac{33}{4} = 8\frac{1}{4}$ hour or

8 hours 15 minutes

11. Choose the correct pair from the following options.

(a) Resistance by the object to change its state of motion - Inertia

(b) Resistance by the object to change its state of motion - Acceleration

(c) Resistance by the object to change its state of motion - Gravitation

(d) Resistance by the object to change its state of motion - Momentum

[a]

Explanation -**Inertia** is the property of an object due to which it resists any change in its state of rest or uniform motion. In other words, it is the tendency of the object to maintain its state of motion.**Acceleration**:- It is the rate of change of velocity, not the resistance to change in state of motion.**Gravitation**:- It is the force of attraction between two objects, due to their masses. It is not a resistance to change in state of motion, but can cause a change.**Momentum**:- It is the product of mass and velocity of an object. It is a measure of the amount of motion, not the resistance to change in state of motion.**12. If $25 : x :: x : 36$, and $x > 0$, then what is the value of x ?**

(a) 27

(b) 18

(c) 21

(d) 30

[d]

EXPLANATION - $25 : x :: x : 36$ $x^2 = 25 \times 36$ $x = \sqrt{25 \times 36}$ $x = 5 \times 6$ $x = 30$ **13. Which of the following statements is/are correct?****Statements:****(I) The mass of an object is the same as its weight.****(II) The mass of an object is not the same as its weight.****(III) Mass is a scalar quantity, while weight is a vector quantity.**

(a) Statements I and II are correct

(b) Only Statement III is correct

(c) Statements II and III are correct

(d) Statements I and III are correct [c]

Explanation -

Mass and weight are two different physical quantities. Mass is the amount of matter in an object, while weight is the force of gravity acting on an object.

Mass and weight are not the same. Mass remains constant no matter where the object is, while weight depends on the acceleration of gravity and can change with location.

Mass is a scalar quantity because it has only magnitude (for example, 5 kg). Weight is a vector quantity because it has both magnitude and direction (the direction of the gravitational force is always toward the center of the Earth).

14. An article is sold for ₹x after giving two successive discounts of 25% and 8% on its marked price of ₹500. Find the value of ₹x.

(a) 285

(b) 345

(c) 300

(d) 280

[b]

EXPLANATION -

Given.

Marked price = Rs 500

Respective total = 25% and 8%

Single discount of 25% and 8%

 $= 25 + 8 - \frac{25 \times 8}{100} = 31\%$

Price of the item after giving discount

 $= 500 \times \frac{(100 - 31)}{100} = 345$ रुपये**15. DEF is related to CDE in a certain way. In the same way, MNO is related to LMN. Following**

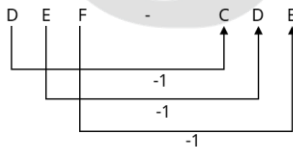
the same logic, UVW is related to which of the following options?

- (a) FDE
(b) EFD
(c) FED
(d) TUV

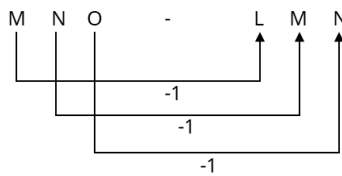
[d]

EXPLANATION -

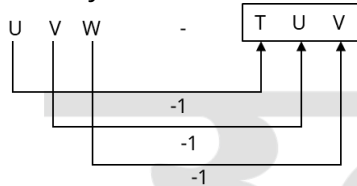
Just as



And



Similarly



16. UNESCO has declared 'Garba' as an intangible cultural heritage in the year 2023. Garba is related to which of the following states?

- (a) West Bengal
(b) Assam
(c) Kerala
(d) Gujarat

[d]

व्याख्या-

Garba is a traditional folk dance of India, which is especially performed during the Navratri festival in the state of Gujarat. This dance is performed by women in a circular circle to the beat of music, in which Goddess Durga is worshiped.

In the year 2023, UNESCO listed 'Garba' as an Intangible Cultural Heritage of Humanity. This gave Garba cultural recognition at the global level.

17. The radius of the cylinder is 5 cm more than its height. If the curved surface area of the cylinder is 792 cm^2 , what is the volume (in cm^3) of the cylinder? [Use $\pi = \frac{22}{7}$]

- (a) 5306
(b) 5254
(c) 5544
(d) 5712

[c]

EXPLANATION -

Given

Circular surface area of cylinder = 792 cm^2 Let the height of the cylinder = $x \text{ cm}$ Then radius of cylinder = $(x+5) \text{ cm}$

According to the question:-

Circular surface area of cylinder = $2\pi rh$

$$2\pi rh = 792$$

$$2 \times \frac{22}{7} \times (x+5) \times x = 792$$

$$\frac{44}{7} \times (x+5) \times x = 792$$

$$(x+5) \times x = \frac{792 \times 7}{44}$$

$$x^2 + 5x = 126$$

$$x^2 + 5x - 126 = 0$$

$$x^2 + 14x - 9x - 126 = 0$$

$$x(x+14) - 9(x+14) = 0$$

$$(x-9)(x+14) = 0$$

$$x = 9, x = -14$$

Let it be positive

Volume of a cylinder = $\pi r^2 h$ Radius = $(x+5) = 9 + 5 = 14 \text{ cm}$ Height = $x = 9 \text{ cm}$

$$\text{Volume} = \frac{22}{7} \times 14 \times 14 \times 9 = 5544 \text{ cm}^3$$

18. Choose the wrong pair in the context of asexual reproduction.

- (a) Leishmania - Binary Fission
(b) Plasmodium - Multiple Fission
(c) Yeast - Budding
(d) Hydra - Multiple Fission [d]

Explanation -

Leishmania - Leishmania (a parasite) reproduces asexually by binary fission, in which a single cell divides into two identical daughter cells.

Plasmodium - Plasmodium (malaria parasite) reproduces by multiple fission under unfavourable conditions, where the parent cell divides into multiple daughter cells.

Yeast - Yeast reproduces by budding, in which a small bud develops on the parent cell which later separates to form a new organism.

Hydra - Hydra reproduces asexually mainly by budding and not by multiple fission. It develops a small bud from its body structure which separates after it is fully developed.

19. In a certain code language, 'LOBE' is written as '2653' and 'BORE' is written as '6823'. How will 'L' be written in that code language?

- (a) 2
(b) 3

(c) 5

(d) 8

[c]

EXPLANATION -

Just as

L B E - 2 6 5 3 B O R E - 6 8 2 3

similarly

L = 5

20. In the case of reflection of light by a spherical mirror, the relation between focal length 'f', object distance 'u' and image distance 'v' is expressed by _____.

(a) $1/f = (1/v) - (1/u)$

(b) $1/f = (1/u) - (1/v)$

(c) $1/f = (1/u) + (1/v)$

(d) $1/f = (uv)/(u+v)$

[c]

Explanation -

According to the laws of reflection for spherical mirror, the relation between focal length (f), object distance (u), and image distance (v) is expressed by the following formula:

$$1/f = (1/u) + (1/v)$$

This is known as Mirror Formula and is valid for all types of spherical mirrors (concave and convex). While using this formula, the sign convention for mirrors is followed.

u (object distance) is always taken as negative if the object is to the left of the mirror (which is usually the case).

v may be positive or negative depending upon the direction of image.

f is positive for convex mirror, negative for concave mirror.

21. Which of the following sexually transmitted diseases are caused by viruses?

(a) Warts and AIDS

(b) Warts and gonorrhoea

(c) Syphilis and AIDS

(d) Gonorrhoea and syphilis [a]

Explanation -

Warts and AIDS are sexually transmitted diseases caused by viruses

Warts:- These are caused by infection with the human papilloma virus (HPV), which is a virus.

Warts are small bumps or rough growths on the skin. They are most commonly found on the hands and feet, but can appear on any part of the body.

The virus often enters the skin through a small cut or scratch.

Warts are contagious and can spread from one person to another through direct contact. This includes touching the skin of an infected person or sharing infected objects (such as towels, razors, shaving brushes). Genital warts are spread through sexual contact.

AIDS (Acquired Immunodeficiency Syndrome):- This is caused by the human immunodeficiency virus (HIV), which is a virus. HIV weakens the body's immune system, causing the body to lose its ability to fight off diseases and infections. Spread through contact with an infected person, such as through unprotected sex, infected blood, or needle use.

Gonorrhoea - the bacterium Neisseria gonorrhoeae

Tuberculosis - Mycobacterium tuberculosis

Syphilis - the bacterium Treponema pallidum

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

Statements:**All bees are insects.****All bees are honeycombs.****Conclusions:****(I) Some honeycombs are insects.****(II) All honeycombs are honeycombs.**

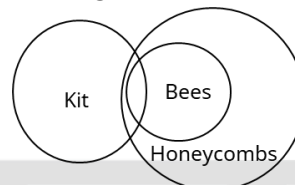
(a) Only conclusion II follows from the statements

(b) Neither conclusion I nor II follows from the statements

(c) Only conclusion I follows from the statements

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

[c]

EXPLANATION -

It is clear from the diagram that only conclusion (c) follows.

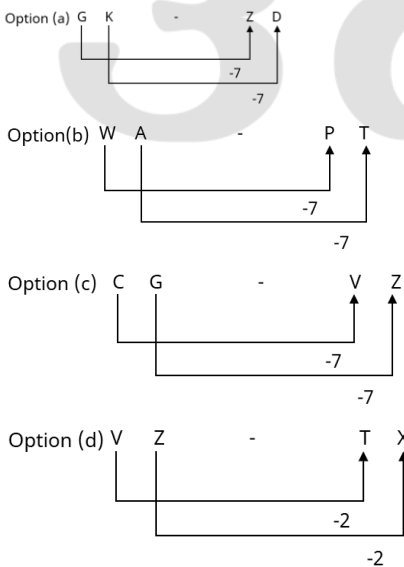
23. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which of the following pair does not belong to that group?

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

- (a) GK-ZD
- (b) WA-PT
- (c) CG-VZ
- (d) VZ-TX

[d]

EXPLANATION -



Hence option (d) is different from other options.

24. What constant speed must be maintained to cover a distance of 600 km in 10 hrs?

- (a) 50 km/h
- (b) 80 km/h
- (c) 60 km/h
- (d) 85 km/h

[c]

EXPLANATION -

has given

Time = 10 hours

Distance = 600 km

$$\text{move} = \frac{\text{distance}}{\text{Time}} \Rightarrow \frac{600}{10} \Rightarrow 60 \text{ km/h}$$

25. IIT Bombay partnered with _____ to develop India's first Quantum Diamond Microchip Imager.

- (a) TCS
- (b) Google
- (c) Mahindra and Mahindra
- (d) L&T

[a]

EXPLANATION -

Indian Institute of Technology, Bombay (IIT Bombay) has developed India's first quantum diamond microchip imager in partnership with TCS (Tata Consultancy Services). This advanced imaging device will improve the quality control, energy efficiency and reliability of semiconductor chips.

The project will see Dr Kasturi Saha, Associate Professor at the Department of Electrical Engineering, IIT Bombay, and experts from TCS

working together at the PQuest Lab. The initiative is being undertaken under the Government of India's National Quantum Mission, which aims to make the country a global leader in quantum technology.

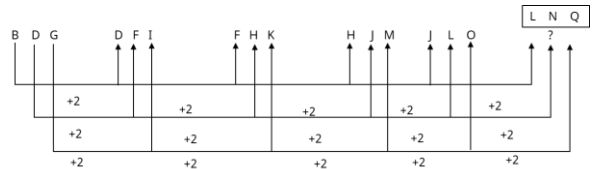
26. Based on the English alphabetical order, which of the following options should come in place of the question mark (?) in the given series?

BDG, DFI, FHK, HJM, JLO, ?

- (a) POR
- (b) OPR
- (c) NLQ
- (d) LNQ

[d]

EXPLANATION -



? = LNQ

27. What is the average of first 30 natural numbers?

- (a) 15.5
- (b) 16
- (c) 15
- (d) 16.5

[a]

EXPLANATION -

Sum of first 30 natural numbers

$$= \frac{n(n+1)}{2} \Rightarrow \frac{30(30+1)}{2} = 465$$

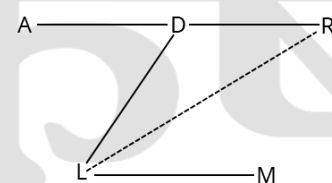
$$\text{Average of first 30 natural numbers} = \frac{465}{30} \Rightarrow 15.5$$

28. Town L is located to the west of Town M. Town D is located to the north east of Town L. Town A is located to the west of Town D. Town R is located to the east of Town D. What is the position of Town R with respect to Town A?

- (a) South-east
- (b) South-west
- (c) North-east
- (d) North-west

[c]

EXPLANATION -



It is clear from the diagram that Town-R is in the North-East with respect to Town-L.

29. Why does carbon form a stable compound?

- (a) Carbon forms strong bonds because of its high electronegativities.

- (b) Carbon forms strong bonds because of its small size.
 (c) Carbon forms strong bonds because of its large size.
 (d) Carbon forms strong bonds because of its high enthalpy. [b]

Explanation -

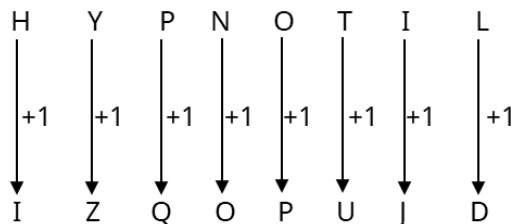
The size of carbon atom is very small. When carbon forms covalent bonds with other atoms, their nuclei can come close to each other. This makes the attraction of the nuclei on the electrons involved in the bond stronger, resulting in strong and stable bonds.

Carbon has a valency of 4, which means that it can form four covalent bonds. This ability to form four bonds equally and stably is also due to its small size and nuclear attraction.

30. If each letter of the word HYPNOTIC is replaced by the letter immediately following it in the English alphabetical order, and then the new group of letters so formed is rearranged according to the English alphabetical order, then which letter will be second from the left in the new rearranged group of letters?

- (a) J
 (b) I
 (c) D
 (d) O

[b]

EXPLANATION -

If we arrange the given group in alphabetical order then -

D I J O P Q U Z
 ← →
 from the left

So, I is in second place from left.

31. Which of the following statements regarding metals is incorrect?
- (a) Some metals can be beaten into thin sheets. This property is called malleability.
 (b) Lead and mercury are comparatively good conductors of heat.
 (c) Metals can be drawn into thin wires.
 (d) Metals are good conductors of heat. [b]

Explanation -

Malleability is an important property of metals due to which they can be drawn into thin sheets without breaking when hammered (example: gold, silver, aluminium).

Most metals are good conductors of heat, lead and mercury are among the worst conductors of heat (compared to other metals). They are not bad conductors but their conductivity is very low.

Ductility is another important property of metals due to which they can be drawn into thin wires (example: gold, silver, copper).

Metals are good conductors of heat and electricity. This is due to the presence of free electrons in them.

32. If a sum of money doubles itself in 10 years at compound interest, then in how many years will this sum become 16 times itself at the same rate of interest?

- (a) 30
 (b) 40
 (c) 10
 (d) 20

[b]

EXPLANATION -

Given.

A sum of money doubles itself in 10 years at compound interest.

Let the principal be Rs 100.

As per the formula: Compounding = Principal \times $(1+Rate)^{Time}$

The amount doubles in 10 years.

$$2P = P \times (1+r)^{10}$$

$$2 = (1+r)^{10}$$

In how many years will the amount become 16 times?

$$16P = P \times (1+r)^t$$

$$16 = (1+r)^t$$

$$2^4 = 2^{\frac{t}{10}}$$

$$4 = \frac{t}{10}$$

$$t = 40$$

33. A trader loses 20% by selling a watch for ₹ 1,024. What percentage of profit will he make by selling it for ₹ 1,472?

- (a) 10%
 (b) 20%
 (c) 15%
 (d) 12%

[c]

EXPLANATION -

Selling price of the item = Rs.1024

Then the purchase price of the item is Rs
 $= 1024 \times \frac{5}{4} = 1280$

Selling price of new item = Rs.1472

Desired Profit % = $\frac{(1472 - 1280)}{1280} \times 100$

$\Rightarrow \frac{192}{1280} \times 100 = 15\%$

34. If $(584)^2 = 3,41,056$, then what is the square root of 34.1056?

- (a) 0.0584
 (b) 0.584
 (c) 5.84
 (d) 0.000584

[c]

EXPLANATION -

Given

$$(584)^2 = 341056$$

$$\sqrt{\frac{341056}{10000}} \Rightarrow \frac{584}{100} \Rightarrow 5.84$$

35. Which of the following statements is/are correct?

Statements:

(I) A current-carrying conductor acts like a magnet.

(II) Electrons do not experience any force when they are moved perpendicular to the magnetic field.

- (a) Statement I is correct
 (b) Both Statements I and II are correct
 (c) Statement II is correct
 (d) Neither Statement I nor II is correct [a]

Explanation -

A current-carrying conductor acts like a magnet. - When electric current flows through a conductor (wire), a magnetic field is produced around it. This phenomenon is known as the Magnetic Effect of Electric Current, which was discovered by Hans Christian Ørsted. Electromagnets are made based on this principle.

Electrons do not experience any force when they move perpendicular to the magnetic field. - When a charged particle (such as an electron) moves perpendicular to a magnetic field (or at any angle, except parallel), a magnetic force (Lorentz force) acts on it. The direction of this force is perpendicular to both the direction of motion of the particle and the direction of the magnetic field. If the electron were moving parallel to the magnetic field, no force would act on it. But the maximum force acts on it when it moves perpendicularly.

The formula for magnetic force is $F=q(v \times B)$ or $F=qvB\sin\theta$, where θ is the angle between the velocity and the magnetic field. When $\theta=90$ (perpendicular), then $\sin\theta=1$, and the force is maximum.

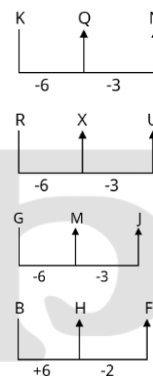
36. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which of the following letter-cluster does not belong to that group?

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

- (a) KQN
 (b) RXU
 (c) GMJ
 (d) BHF

[d]

EXPLANATION -



Hence, 'BHF' is different from others.

37. Simplify the following expression.

$$(a + 2b - c)(b - c) + (a - c)2b + b^2$$

- (a) $3b^2 + 3ab - 5bc - ac$
 (b) $2b^2 + 3ab - 4bc + c$
 (c) $3ab - 5bc - ac - 2abc$
 (d) $3b^2 + c^2 + 3ab - 5bc - ac$

[d]

EXPLANATION -

$$(a + 2b - c)(b - c) + (a - c)2b + b^2$$

$$3b^2 + c^2 + 3ab - 5bc - 4c$$

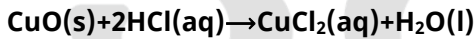
38. Which of the following will be formed when dilute hydrochloric acid is added to a beaker containing copper oxide?

- (a) Formation of copper (II) chloride results in a colourless solution.
 (b) Formation of copper (II) chloride results in a green coloured solution.
 (c) Formation of copper (II) chloride results in a blue-green coloured solution.
 (d) Formation of copper (III) chloride results in a blue-green coloured solution. [c]

Explanation -

When copper oxide (CuO) is added to dilute hydrochloric acid (HCl), a chemical reaction takes place. Copper oxide is a metallic oxide, which is alkaline in nature. The reaction of acid and alkali results in the formation of salt and water.

The reaction is as follows:



In this reaction:

- Copper oxide (CuO) is a black solid.
- Dilute hydrochloric acid (HCl) is colourless.
- The reaction results in the formation of copper (II) chloride (CuCl₂).
- The solution of copper (II) chloride (CuCl₂) is usually blue-green in colour.

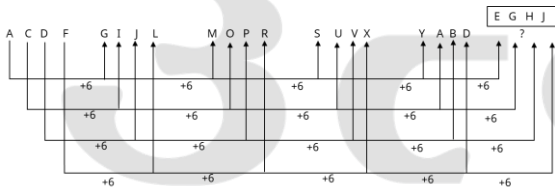
39. Based on the English alphabetical order, which of the following options should come in place of the question mark (?) in the given series?

ACDF, GIJL, MOPR, SUVX, YABD, ?

- (a) EFHJ
- (b) EGHJ
- (c) EGFJ
- (d) EGIK

[b]

EXPLANATION -



? = EGHJ

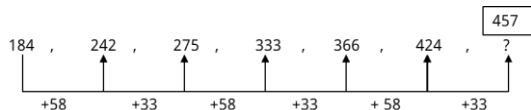
40. Select the number from the given options that can replace the question mark (?) in the following series.

184 242 275 333 366 424 ?

- (a) 457
- (b) 426
- (c) 478
- (d) 464

[a]

EXPLANATION -



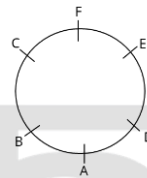
? = 457

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

- (a) Immediate left
- (b) Second to the left
- (c) Third to the left
- (d) Second to the right

[c]

EXPLANATION -



It is clear from the diagram that the position of C with respect to D is third to the left of D.

42. In the following number-pairs, the second number is obtained by performing certain mathematical operations on the first number. What numbers should come in place of X and Y so that the pattern followed by the two numbers on the left of :: is the same as that followed by the two numbers on the right of ::? (Note: Operations should be performed on whole numbers without breaking the numbers into their constituent digits. Ex. 13-Operations on number 13 such as addition/subtraction/multiplying 13 etc. can be performed. Breaking 13 into 1 and 3 and then doing mathematical operations on 1 and 3 is not allowed.)

X : 961 :: 34 : Y

- (a) X = 45 Y = 625
- (b) X = 41 Y = 576
- (c) X = 47 Y = 729
- (d) X = 39 Y = 529

[b]

EXPLANATION -

Just as

41 : 961

↓

$$41 - 10 = (31)^2 \rightarrow 961$$

Similarly

34 : 576

↓

$$34 - 10 = (24)^2 \rightarrow 576$$

Hence X = 41 and Y = 576.

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

The following graph shows the number of students involved in different after-school activities.



What is the average number of students participating in sports and yoga together?

- (a) 20
(b) 50
(c) 30
(d) 40

[a]

EXPLANATION -

Number of students participating in sports = 25

Number of students participating in yoga = 15

$$\text{average} = \frac{25+15}{2} = 20$$

44. Two angles are complementary. The larger angle is 6° less than five times the measure of the smaller angle. What is the measure of the larger angle?

- (a) 87°
(b) 63°
(c) 66°
(d) 74°

[d]

EXPLANATION -

Let the two angles be x and y respectively.

The larger angle (x) is 6 less than five times the smaller angle (y).

Complementary angle = 90°

$$90^\circ - y = y \times 5 - 6^\circ$$

$$90^\circ + 6^\circ = 5y + y$$

$$96^\circ = 6y^\circ$$

$$y = 16^\circ$$

$$\text{Larger angle} = (16^\circ \times 5) - 6^\circ = 74^\circ$$

45. In our body, the brain and spinal cord together form the:

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

Explanation -

In our body, the brain and spinal cord together form the Central Nervous System (CNS).

The nervous system is mainly divided into two parts:

Central Nervous System (CNS):- It consists of the brain and spinal cord. It is the control centre of the body, which processes information, makes decisions and controls body functions.

Peripheral Nervous System (PNS):- It includes all the nerves that extend from the CNS to the rest of the body (such as organs, muscles and glands).

Endocrine System:- It is a collection of hormone-producing glands (such as thyroid, pancreas, adrenal glands) that release hormones to control body functions. It has a different function from the nervous system.

Autonomic Nervous System (ANS):- It is a part of the peripheral nervous system that controls involuntary functions of the body (such as heart rate, digestion, breathing).

46. Seven boxes A, B, C, D, E, F and G are placed one above the other but not necessarily in the same order. G is placed third from the bottom. Only two boxes are placed between C and E. A is placed just above D. D is placed one of the places above G. Only two boxes are placed between B and E. B is not placed at the topmost position.

How many boxes are placed between D and B?

- (a) one
(b) two
(c) three
(d) four

[c]

EXPLANATION -

1 \rightarrow C

2 \rightarrow A

3 \rightarrow D

4 \rightarrow E

5 \rightarrow G

6 \rightarrow F

7 \rightarrow B

It is clear from the diagram that three boxes (E,G,F) are placed between D and B.

47. The angle of elevation of the top of a tree from a point on the ground 300 m away from the tree is 30° . When the tree grows, its angle of elevation from the same point becomes 60° . How much did the tree grow?

- (a) $\frac{100}{\sqrt{3}}$ m
(b) $100\sqrt{3}$ m
(c) $200\sqrt{3}$ m
(d) $\frac{200}{\sqrt{3}}$ m

[c]

EXPLANATION -

Initial Height(H_1):-

$$\tan(Q_1) = \frac{H_1}{D}$$

$$\tan(30^\circ) = \frac{H_1}{300}$$

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

$$\frac{1}{\sqrt{3}} = \frac{H_1}{300}$$

$$H_1 = \frac{300}{\sqrt{3}} = \frac{300\sqrt{3}}{3} = 100\sqrt{3} \text{ meter}$$

Final Height (H_2):-

$$\tan(Q_2) = \frac{H_2}{D}$$

$$\tan(60^\circ) = \frac{H_2}{300}$$

$$\tan(60^\circ) = \sqrt{3}$$

$$\sqrt{3} = \frac{H_2}{300}$$

$$H_2 = 300\sqrt{3} \text{ meter}$$

increase in height = $300\sqrt{3} - 100\sqrt{3} = 200\sqrt{3}$ meter

48. Which of the following statements about Rutherford's atomic model is incorrect?

- (a) An atom has a positively charged centre called the nucleus. (b) The size of the nucleus is very small compared to the size of the atom. (c) Electrons revolve around the nucleus in elliptical paths. (d) Electrons revolve around the nucleus in circular paths. [c]

Explanation -

An atom has a positively charged centre called the nucleus. - Rutherford's alpha-particle scattering experiment (gold foil experiment) concluded that there is a very small, dense and positively charged part at the centre of the atom, which he called the nucleus.

The size of the nucleus is very small compared to the size of the atom. - Rutherford's experiment showed that the size of the nucleus is about 100,000 times smaller than the total size of the atom (diameter of atom is about 10-10 m and diameter of nucleus is about 10-15 m).

In Rutherford's model the electrons were considered to revolve around the nucleus in circular paths and not in elliptical paths. The idea of elliptical paths was later introduced by Sommerfeld with some modifications in Bohr's model.

In his model Rutherford had considered the electrons to revolve around the nucleus in circular orbits.

49. Tax on a commodity is reduced by 10%, but its consumption increases by 20%. By what percentage will the tax revenue obtained from this increase?

- (a) 20%
(b) 8%
(c) 10%
(d) 15%

[b]

EXPLANATION -

The price of the article is reduced by 10%.

$$\left(10\% = \frac{1}{10}\right)$$

Consumption is increased by 20%. $\left(20\% = \frac{1}{5}\right)$

$$\text{Price} = 10 \quad \text{---} \quad 9$$

$$\text{Consumption} = 5 \quad \text{---} \quad 6$$

$$\text{Total Revenue} = 50 \quad \text{---} \quad 54$$

4

$$\text{Required growth \%} = \frac{4}{50} \times 100 = 8\%$$

50. Panic spread when 10% of the inhabitants of a village died of cholera, during which the remaining 25% of the inhabitants left the village and the population decreased to 4050. Find the original (initially) number of inhabitants.

- (a) 7000
(b) 5000
(c) 6000
(d) 8000

[c]

EXPLANATION -

Given

When 10% of the residents of a village got infected with cholera, panic spread, 25% of them left the village

Let the population of the village = 100%.

$$\text{Remaining population} = 100 \times \frac{10}{100} \times \frac{75}{100} = 4050$$

$$\text{total population} = \frac{4050}{90 \times \frac{75}{100}} \times 100 = 6000$$

51. Which organelle is found only in plant cells?

- (a) Chloroplast
(b) Nucleus
(c) Lysosome
(d) Mitochondrite [d]

Explanation -

(a) Chloroplast: These are the organelles in which the process of photosynthesis takes place. They contain a green pigment called chlorophyll. Chloroplasts are found only in plant cells and some algae, not in animal cells.

(b) Nucleus: It is the control centre of the cell and contains the genetic material (DNA). Nucleus is found in both plant cells and animal cells.

(c) Lysosome: These are often called the "suicide bags of the cell" because they contain digestive enzymes. Lysosomes are found mainly in animal

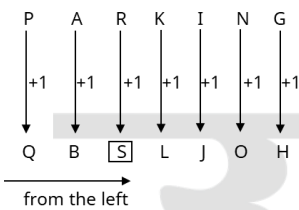
cells, although vacuoles in plant cells may also perform similar functions to some extent.

(d) Mitochondria: These are called the "powerhouse of the cell" because they produce energy (ATP) through cellular respiration. Mitochondria are found in both plant cells and animal cells.

52. If each vowel of the word PARKING is changed to its subsequent letter in the English alphabetical order and each consonant is changed to its subsequent letter in the English alphabetical order, then which of the following letters will be at the third position from the left in the letter group thus formed?
- (a) S
 - (b) J
 - (c) O
 - (d) L

[a]

EXPLANATION -



It is clear from the diagram that S will be at the third position from the left in the filled word group.

53. 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.)
- (11, 44, 2)
 - (6, 54, 3)
 - (a) (7, 98, 2)
 - (b) (12, 72, 3)
 - (c) (10, 50, 5)
 - (d) (2, 32, 4)

[d]

EXPLANATION -

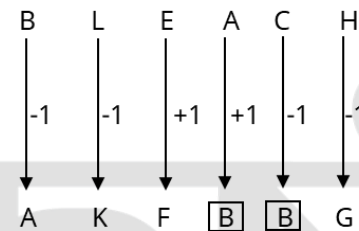
Just as
(11,44,2)
 $11 \times 2 \times 2 = 44$
and

(6,54,3)
 $6 \times 3 \times 3 = 54$
Similarly
(2,32,4)
 $2 \times 4 \times 4 = 32$

54. If each consonant of the word BLEACH is replaced by the letter immediately preceding it in the English alphabetical order, and each vowel is replaced by the letter immediately following it in the English alphabetical order, then which of the following letters will appear twice in the new group of letters thus formed?
- (a) K
 - (b) A
 - (c) B
 - (d) F

[c]

EXPLANATION -



The letter that appears twice in the given group of words is B.

55. The Disaster Management Division of which department organized a conference on 'Experience Sharing and Capacity Building in Disaster Management' in August 2024?
- (a) National Institute of Disaster Management (NIDM)
 - (b) Ministry of Communications
 - (c) National Disaster Response Force (NDRF)
 - (d) Department of Telecommunications (DOT)

[d]

व्याख्या-

In August 2024, the National Disaster Response Force (NDRF) organised a conference on 'Experience Sharing and Capacity Building in Disaster Management'. The conference was organised with the aim to coordinate disaster response efforts and strengthen the preparedness of State Disaster Response Forces (SDRF), Civil Defence, Home Guards and Fire Services.

Various sessions were organised in the conference which discussed topics such as early warning, post disaster loss assessment, role of disaster response forces, satellite based early

warning on coastal hazards, tsunamis, storm surges, cyclones etc.

56. How many small glasses of 45 ml each can be filled from a 2.25 litre bottle of mango drink?

- (a) 45
(b) 55
(c) 50
(d) 40

[c]

EXPLANATION -

$$= \frac{2.25}{45} \times 100$$

$$= 50 \text{ Glass}$$

57. India's rank in the Corruption Perceptions Index (CPI) has improved from ____ in 2022 to ____ in 2023.

- (a) 85 ; 93
(b) 93 ; 85
(c) 40 ; 39
(d) 85 ; 40

[a]

व्याख्या-

India's rank in the Corruption Perceptions Index (CPI) has declined between 2022 and 2023. India's rank fell from 85 in 2022 to 93 in 2023. However, India's overall score fell from 40 in 2022 to 39 in 2023, showing a fraction of a drop.

This drop is mainly due to improvements in the ranks of other countries, while India's position remained stable. According to the UNESCO report, "India's score (39) shows so little fluctuation that firm conclusions cannot be drawn on any significant change.

58. What is the effect of heating on the rate of diffusion?

- (a) It increases with increase in temperature
(b) It first increases and then decreases after some time
(c) There is no effect of heating on the rate of diffusion.
(d) It decreases with increase in temperature [a]

Explanation -

Heating has a direct effect on the rate of diffusion. Diffusion is the process in which particles (molecules or ions) move from an area of high concentration to an area of low concentration. This movement is due to the kinetic energy of the particles.

When temperature increases:

The kinetic energy of particles increases: At higher temperatures particles have more energy, making them move more quickly and erratically.

The frequency of collisions increases: The frequency of collisions between fast-moving particles increases, making them move more quickly.

Effect on intermolecular forces: At higher temperatures intermolecular forces become weaker, making it easier for particles to move freely and diffuse.

59. In which of the following chlorofluorocarbons (CFCs) are not used?

- (a) Refrigerators
(b) Fire extinguishers
(c) Aerosol sprays
(d) Grinders [b]

Explanation -

Chlorofluorocarbons (CFCs) are a group of man-made organic compounds that contain carbon, fluorine and chlorine atoms. They were developed in the mid-20th century and due to their properties, such as non-toxic, non-flammable and chemical stability, they were widely used in various industrial and domestic applications.

Key Features:

Stability: CFCs are extremely stable and non-reactive, which means they do not break down quickly in the lower parts of the atmosphere.

Non-toxic and non-flammable: Due to these properties they were considered ideal for use in industrial and consumer products.

Uses:

Refrigerants: As coolants in refrigerators, air conditioners and freezers. They were also known as "Freon".

Aerosol Propellants: As propellants in spray cans (such as hairspray, deodorant, insecticide) to eject liquids.

Solvents: Used in the electronics industry for cleaning circuit boards and polishing metal components.

Foam-blowing agents: Used in the production of foam plastics (such as insulation and packaging materials).

60. Amita is 2 years older than her friend Amrita. Amita's father is twice as old as Amita, and Amrita is twice as old as her sister. The difference between Amita's father's age and Amrita's sister's age is 43 years. Find the sum of the ages of Amita and Amrita.

- (a) 64
(b) 50
(c) 68

(d) 54

[d]

EXPLANATION -

Let the age of Amita be x and the age of Amrita be y .

$$x = y + 2$$

$$\text{Age of Amita's father} = 2x$$

$$\text{age of amrita's sister} = \frac{y}{2}$$

according to question

$$2x - \frac{y}{2} = 43$$

$$4x - y = 86 \quad (i)$$

Putting the value of x in equation (i)

$$4(y + 2) - y = 86$$

$$4y + 8 - y = 86$$

$$3y + 8 = 86$$

$$3y = 78$$

$$y = 26$$

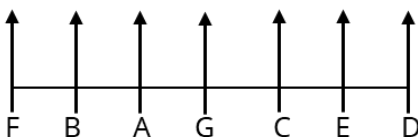
Hence, Amrita's age is 26 years and Amita's age = $26 + 2 = 28$ years.

Sum of the ages of both = $26 + 28 = 54$ years

61. Seven persons, A, B, C, D, E, F and G, are sitting in a row facing north. A sits fifth from the right end. Only two persons sit between E and A. C is the immediate neighbour of G and E. B sits immediate right of F. How many persons sit between D and B?

- (a) three
(b) one
(c) two
(d) four

[d]

EXPLANATION -

It is clear from the diagram that only four persons sit between D and B.

62. The sum of the length, breadth and height of a cuboid is 38 cm and the length of its diagonal is 22 cm. The surface area of the cuboid is _____.

- (a) 480 cm²
(b) 432 cm²
(c) 864 cm²
(d) 960 cm²

[d]

EXPLANATION -

Given.

The sum of the length, breadth and height of the cuboid = 38 cm.

The length of the diagonal = 22 cm.

The surface area of the cuboid = $2(lb + bh + hl)$

According to the formula

$$(l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + hl)$$

$$(38)^2 = (22)^2 + 2(lb + bh + hl)$$

$$2(lb + bh + hl) = 1444 - 484$$

$$2(lb + bh + hl) = 960 \text{ cm}^2$$

63. A cause is given below followed by possible effects numbered I, II and III. Read the cause carefully and decide which of the three possible effects can be the cause.

Cause - A major rail accident took place at Katpadi Junction last night where seven coaches of GT Express derailed and fell across the track.

Impact I - Many trains on Katpadi-Chennai route are running late by several hours today.

Impact II - Long queues were seen at railway ticket booking counters in Bengaluru.

Impact III - Railways have decided to run two holiday special trains between Kolkata and Patna from October to December 2023.+

- (a) Only II is a possible effect.
(b) Both I and II are possible effects.
(c) Both II and III are possible effects.
(d) Only I is a possible effect.

[d]

EXPLANATION -

Impact I - Many trains on the Katpadi-Chennai route are running late by several hours today.

Analysis: The rail accident may cause disruption of tracks, which is bound to delay trains running on that route. This is a direct and logical impact.

Impact II - Long queues were seen at railway ticket booking counters in Bengaluru.

Analysis: Bengaluru is far from Katpadi. While the accident may have caused some passengers to take alternate routes or cancel trips, leading to crowding at booking counters, this is not directly a result of the accident at Katpadi alone. It is an indirect and less certain impact, which may depend on several other factors as well.

Impact III - Railways have decided to run two holiday special trains between Kolkata and Patna from October to December 2023.

Analysis: This impact is completely unrelated to the Katpadi rail accident. Holiday special trains are scheduled in advance to handle the festive rush and have nothing to do with any accident.

Based on the above analysis, only effect I is the most probable and direct consequence of the given cause.

Hence option (d) is correct.

64. **Three years ago, the average age of a family of six members was 19 years. Then a boy was born and the average age of the family is the same today as it was three years ago. What is the age of the boy?**

- (a) 2 years
(b) 1 year
(c) 1.5 years
(d) 2.5 years

[b]

EXPLANATION -

The average age of a family of six members three years ago was 19 years.

Average age of 6 members at present = $19 + 3 = 22$ years

Present age of 6 members = $22 \times 6 = 132$ years

Total age of 7 members at present = $19 \times 7 = 133$ years

Age of child = $133 - 132 = 1$ year

65. **The work done in moving a charge of 10 coulombs through a potential difference of 5 volts is _____.**

- (a) 50 Joules
(b) 20 Joules
(c) 5 Joules
(d) 2 Joules [a]

Explanation -

Correct option is (a) 50 Joules

According to the definition of potential difference between two points, the work done in moving a unit positive charge from one point to another is the potential difference between those two points.

It can be expressed as a formula:

$$V = W / Q$$

Where:

V = Potential Difference (in Volts)

W = Work done (in Joules)

Q = Charge (in Coulombs)

The work done (W) is to be found.

$$W = V \times Q$$

Putting the values:

$$W = 5 \text{ V} \times 10 \text{ C}$$

$$W = 50 \text{ J}$$

So, the work done in moving a charge of 10 Coulombs through a potential difference of 5 Volts is 50 Joules.

66. **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'.

Based on the above, if 'P + Q - R × S ÷ T then how is Q related to T?

(a) Mother's brother

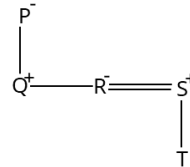
(b) Brother

(c) Mother's mother

(d) Father's brother

[a]

EXPLANATION -



It is clear from the diagram that Q is the brother of P's mother.

67. **In 2024, which company signed a memorandum of understanding (MoU) with iCreate to promote AI startups in India?**

(a) Infosys

(b) Meta

(c) Google

(d) Microsoft

[d]

व्याख्या-

In 2024, Microsoft partnered with iCreate (International Centre for Entrepreneurship and Technology) and launched the iMPEL-AI program. The program was launched with the aim of promoting AI (Artificial Intelligence) startups in India. The Ministry of Electronics and Information Technology (MeitY) is also a partner in this initiative.

68. **What is the greatest common factor of a set of co-prime numbers equal to?**

(a) 2

(b) 1

(c) The lowest of them

(d) The highest of them

[b]

EXPLANATION -

Co-prime numbers which will not have any common factors other than 1, hence their significant common factor is always 1.

69. **The magnification produced by a spherical mirror is equal to _____.**

(a) Distance of object × Distance of image

(b) $\frac{\text{distance to the object}}{\text{distance of image}}$

(c) Height of image × Height of object

- (d) $\frac{\text{height of the image}}{\text{distance height of object}}$

[d]

Explanation -

The magnification produced by a spherical mirror is defined in several ways. It is the ratio of the size of the image to the size of the object, or the ratio of the distance of the image to the distance of the object.

The formula for magnification (m) is:

$$m = \frac{\text{height of the image}}{\text{distance height of object}}$$

and

$m = - \frac{\text{distance of object}(u)}{\text{distance of image}(v)}$

70. The book to be written by Vijay Lokapally on Virat Kohli in the year 2023 is _____.

- (a) Driven: The Virat Kohli Story (Revised and Updated World Cup Edition)
 (b) The Cover Drive: The Virat Kohli Story (Revised and Updated World Cup Edition)
 (c) The Cover Shot: The Virat Kohli Story (Revised and Updated World Cup Edition)
 (d) [The Straight Drive: The Virat Kohli Story (Revised and Updated World Cup Edition) [a]

EXPLANATION -

In the year 2023, a revised and updated edition of Virat Kohli's biography written by sports journalist Vijay Lokpally was published. The name of this book is:

Driven: The Virat Kohli Story (Revised and Updated World Cup Edition)"

This book is based on Virat Kohli's early life, career beginnings, international success and his performance in the World Cup. This edition is a new version of the original book published in 2016, with events up to 2023 added.

71. In a certain code language, 'lost in space' is written as 'vp dc ez' and 'never get lost' is written as 'gb ez cy'. How will 'lost' be written in that code language?

- (a) gb
 (b) dc
 (c) ez
 (d) vp

[c]

EXPLANATION -

Just as

lost in space - vp dc ez

never get lost - gb ez cy

similarly

Lost - ez

72. Which of the following statements refers to the law of conservation of energy?

Statements:

I) Energy can be converted from one form to another.

II) Energy can neither be created nor destroyed.

- (a) Both Statements I and II are correct
 (b) Neither Statement I nor II is correct
 (c) Only Statement I is correct
 (d) Only Statement II is correct [a]

Explanation -

The correct option is:

(a) Both Statements I and II are correct.

The law of conservation of energy states that energy can only be converted from one form to another. For example, in a hydroelectric power plant, the potential energy of water is converted into kinetic energy, then into mechanical energy and finally into electrical energy.

This is the basic principle of the law of conservation of energy. In any closed system, the total amount of energy always remains constant; It can only change its form but cannot be created or destroyed. It can also be understood as the total amount of energy in the universe which remains constant.

73. Who coined the term 'protoplasm' for the fluid of the cell?

- (a) Purkinje
 (b) Robert Hooke
 (c) Robert Brown
 (d) Virchow [a]

Explanation -

The correct answer is (a) Purkinje.

The term 'protoplasm' for the fluid of the cell was coined by Purkinje.

Purkinje (Jan Evangelista Purkinje): He used this term in 1839 for the living fluid within the cell, which contains both the cytoplasm and the nucleus.

Robert Hooke:- He coined the word 'cell' in 1665 after observing cork cells.

Robert Brown:- He discovered the nucleus of the cell in 1831.

Rudolf Virchow:- He gave the theory of "Omnis cellula e cellula" (every cell originates from a cell) in 1855, which is an important part of the cell theory.

74. Read the statements and conclusions given below carefully. You have to assume that the given statements are true even if they seem to

be at variance from commonly known facts and decide which of the conclusions logically follows from the given statement(s).

Statements:

All seas are rivers.

Some rivers are ponds.

Conclusions:

(I) All ponds are seas.

(II) Some seas are ponds.

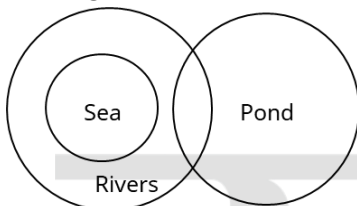
(a) Both conclusion (I) and (II) follow from the statements.

(b) Only conclusion (I) follows from the statements.

(c) Neither conclusion (I) nor (II) follows from the statements.

(d) Only conclusion (II) follows from the statements. [c]

EXPLANATION -



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

75. What is the size of the particles of a solution?

(a) Smaller than 28 nm in diameter

(b) Smaller than 1 nm in diameter

(c) Smaller than 52 nm in diameter

(d) Smaller than 100 nm in diameter [b]

Explanation -

The size of the particles of solute in a true solution is very small. They are so small that they cannot be seen with naked eyes or even with a simple microscope. They do not scatter light and easily pass through filter paper.

Scientifically, the diameter of the particles in a solution is usually less than 1 nanometer (nm).

(1 nanometer = 10^{-9} meter)

Colloidal Solution: The size of the particles is between 1 nm to 100 nm.

Suspension: The size of the particles is larger than 100 nm.