

Class : 10

Register

COMMON QUARTERLY EXAMINATION - 2024 - 25

Time Allowed : 3.00 Hours]

**SCIENCE
PART - I**

[Max. Marks : 75

Choose the correct answer.

12x1=12

1. Impulse is equal to
a) Rate of change of momentum
 c) Change of Momentum
b) Rate of force and time
d) Rate of change of mass
2. Atomicity of Phosphorous is
 a) 4
b) 3
c) 6
d) 7
3. Which one is referred as "Master Gland"?
a) Pineal Gland
 b) Pituitary Gland
c) Thyroid Gland
d) Adrenal Gland
4. In India domestic circuits are supplied with an alternating current of Potential
 a) $\frac{230}{220}$ V
 b) $\frac{220}{230}$ V
c) $\frac{230}{240}$ V
d) $\frac{240}{230}$ V
5. Deliquescence is due to
 a) Strong affinity to water
b) Less affinity to water
c) Strong hatred to water
d) Inertness to water
6. The _____ Units form the backbone of the DNA
a) 5 Carbon Sugar
b) Phosphate
c) Nitrogenous base
 d) Sugar Phosphate
7. Which of the following lens would you prefer to use while reading small letters found in a dictionary?
 a) A convex lens of Focal length 5 cm
b) A concave lens of Focal length 5cm
c) A convex lens of Focal length 10 cm
d) A concave lens of Focal length 10 cm
8. Neon shows Zero electron affinity due to
a) Stable arrangement of neutrons
 b) Stable configuration of electrons
c) Reduced size
d) Increased density
9. _____ is an instrument which records the electrical impulses, of brain
a) ECG
b) EGG
 c) EEG
d) EGE
10. "Heart of Heart" is called
 a) SA node
b) AV node
c) Purkinje fibres
d) Bundle of His
11. Nerve cells donot Possess
a) Neurilemma
 b) Sarcolemma
c) Axon
d) Dendrites
12. Across the period, ionic radii _____
 a) Increase and then Decrease
b) Increases
 c) Decreases
d) Remains constant

PART - II

II. Answer any seven questions. Q.No. 22 is compulsory.

7x2=14

13. Define: Co efficient of real expansion, and mention its Units.
14. What is Rust? Give the equation for the Formulation of Rust.
15. Why is Sinoatrial node Called as Pacemaker of Heart.
16. Match the items in column I to items in Column II

Column I	-	Column II
i) Electric Current	-	a) Volt 2
ii) Potential difference	-	b) Ohm meter 3
iii) Specific resistance	-	c) Watt
iv) Electrical energy	-	d) Joule 4
	-	e) Ampere 1

17. Why the Relative molecular mass has no Unit?

(Ans): 1/ 11 is only a ratio.

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18. What do you understand by the term Phenotype and Genotype?
19. Difference between Systemic Circulation and Pulmonary Circulation?
20. While catching a cricket Ball, the Fielder lowers his hands backwards. Why?
21. What is respiratory Quotient?
22. Calculate the number of water Molecules present in one drop of water which weights 0.18g.

PART - III

Answer any seven questions .Q.No: 32 is compulsory.

7x4 = 28

23. a) Differentiate Mass and Weight (any two)
b) Write any two properties of Light
24. a) Why are traffic signals Red in Colour?
b) What is Power of Accommodation Eye?
25. a) Will the cool drinks give more fizz at the top of the hills or at the foot . Explain.
b) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ i) How many moles of Calcium carbonate are involved in this reaction
ii) How many moles of CO_2 are their in this equation
26. Differentiate between hygroscopic substances and deliquescence substances.
27. a) Minerals in the plants are not lost, when the leaf falls. Give Reason.
b) Draw the structure of Human sperm and label the parts.
28. a) Write the Chargaff rule of DNA base pairing.
b) Why the mature RBC in Mammals do not have Cell Organelles?
29. The electronic configuration of metal 'A' is 2, 8, 18, 1 the metal 'A' with Con. H_2SO_4 forms C and D along with water. 'D' is a gaseous compound. Find A, B, C and D.
30. a) What is Guttation?
b) Where are Estrogens Produced? What is the role of Estrogens in the Human body?
31. Identify whether the statement are True or False. Correct the False statement.
i) An anticoagulant present in the saliva of leech is called heparin. *heparin*
ii) *Cerebellum* Cerebrum controls the voluntary actions of our body.
b) Define: Reflex arc
32. Calculate the coefficient of Cubical expansion of Zinc bar, whose volume is increased 0.25 m³ from 0.3m³ due to the change in temperature of 50k

PART-IV

Answer all the questions in detail.

3x7=21

33. a) "Wearing helmet and fastening the seat belt is highly recommended, for safe Journey". Justify your answer using Newton's Laws of Motion.
b) State Newton's Third Law.
c) Give any two examples for moment of a Couple.
(OR)
a) Differentiate series and Parallel circuit (any two)
b) State. Joule's law of Heating.
c) What is the role of the Earthwire domestic circuits.
34. a) Give the salient features of Modern atomic theory.
b) Identify the bond between the 'H' and 'F' in HF Molecule
c) Name the Acid that renders Aluminium Passive.
(OR)
a) What happens when $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ is heated? Write the appropriate equation.
b) Write notes on Various features affecting solubility.
35. a) Luteal Phase of the Menstrual cycle is also called the secretory Phase. Give Reason.
b) Define: Triple Fusion.
c) Why family planning methods are not adopted by all the people of our country?
(OR)
a) List out the Parasitic adaptations of Leech.
b) What are the structures involved in the Protection of Brain.

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10 th SCIENCE QUARTERLY EXAM Chennai district 2024

13.What is co-efficient of real expansion?

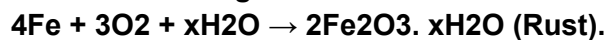
Answer:

- Coefficient of real expansion is defined as the ratio of the true rise in the volume of the liquid per degree rise in temperature to its unit volume. The SI unit of coefficient of real expansion is the K^{-1}

14.What is rust? Give the equation for the formation of rust.

Answer:

When iron is exposed to moist air, it forms a layer of brown hydrated ferric oxide on its surface. This compound is known as rust and the phenomenon of formation of rust is known as rusting.



15.Why is the Sinoatrial node called the pacemaker of the heart?

Answer:

Sinoatrial node is called the pacemaker of the heart because it is capable of initiating impulse, which can stimulate the heart muscles to contract.

16,17...Marked in question paper itself

18.What do you understand by the term phenotype and genotype?

Answer:

The external expression of a particular trait is known as the phenotype.

The genetic expression of an organism is a genotype.

19.Differentiate between systemic circulation and pulmonary circulation.

Systemic circulation	Pulmonary circulation
In systemic circulation, the oxygenated blood entering the aorta from the left ventricles is carried by a network of arteries to the tissues.	In pulmonary circulation, the blood from the heart (right ventricle) is taken to the lungs by pulmonary artery. SamacheerKalvi.Guide
The deoxygenated blood from the tissue is collected by veins and vena cava, emptied into the right atrium.	The oxygenated blood from lungs is emptied into the left auricle by the pulmonary veins.

20. While catching a cricket ball the fielder lowers his hands backwards. Why?

Answer:

While catching a cricket ball the fielder lowers his hands backwards, so increase the time during which the velocity of the cricket ball decreases to zero. Therefore the impact of force on the palm of the fielder will be reduced.

21. What is respiratory quotient?

Answer:

Respiratory quotient is the ratio of volume of carbon dioxide liberated and the volume of oxygen consumed during respiration. It is expressed as,

$$RQ = \frac{\text{Volume of CO}_2 \text{ liberated}}{\text{Volume of O}_2 \text{ consumed}}$$

22. Calculate the number of water molecule present in one drop of water which weighs 0.18 g.

Answer:

$$\text{Avagadro number} = 6.023 \times 10^{23}$$

Given mass = 0.18

Molecular weight of water

$$= H_2O = (2 \times 1) + (1 \times 16) = 2 + 16 = 18$$

Number of molecules = Avagadro number \times given mass / gram molecular mass

$$= 6.023 \times 10^{23} \times 0.18$$

18

$$= 6.023 \times 10^{21}$$

Part c

23a. Differentiate mass and weight.

<i>Mass</i>	<i>Weight</i>
1. It is the quantity of matter contained in a body.	1. It is the force with which a body is attracted towards the earth.
2. Mass of an object can never be zero.	2. Weight of an object can be zero, if $g = 0$.
3. Mass is a scalar quantity.	3. Weight is a vector quantity.
4. It is measured by a beam-balance or a physical-balance.	4. It is measured by a spring-balance.
5. The S.I. unit of mass is kilogram (kg).	5. The S.I. unit of weight is newton (N).
6. It is constant and is independent of the place and position of the body.	6. It varies from place to place as it depends on gravity at the place.

b. List any 2 properties of light?

Answer:

Light is a form of energy.

Light always travels along a straight line.

24a) Why are traffic signals red in colour?

Answer:

Red light has the highest wavelength.

It is visible clearly

b) What is the power of accommodation of the eye?

Answer:

The ability of the eye lens to focus nearby as well as the distant objects is called the power of accommodation of the eye.

25a. Will the cool drinks give more fizz at top of the hills or at the foot? Explain.

The cold drinks will give more fizz at the top of the hill, because, the fizz is created due to the excessive pressure released which is sealed inside the bottle for carbonation.

b) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

1 mole of CaCO_3

1 mole of CO_2

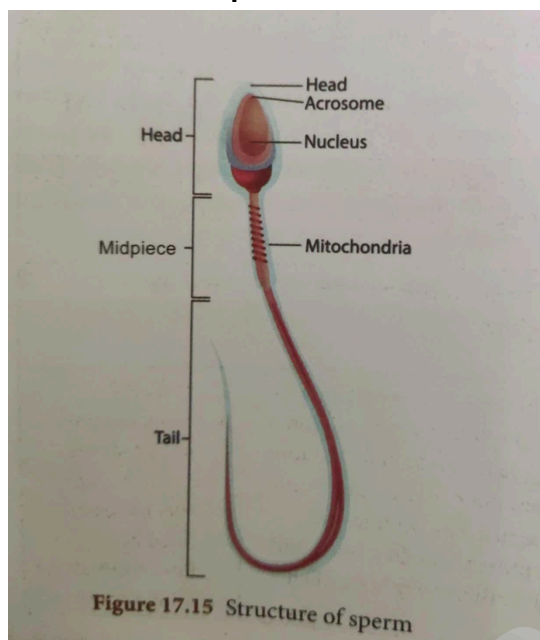
26. In what way hygroscopic substances differ from deliquescent substances.

Hygroscopic substances	Deliquescent substances
When exposed to the atmosphere at ordinary temperature, they absorb moisture and do not dissolve.	When exposed to the atmospheric air at ordinary temperature, they absorb moisture and dissolve.
Hygroscopic substances do not change in physical state on exposure to air.	Deliquescent substances change its physical state on exposure to air.
Hygroscopic substances may be amorphous solids or liquids.	Deliquescent substances are crystalline solids.

27. a) Minerals in plants are not lost when the leaf falls. Give reason

Minerals are remobilised from older leaves to younger leaves.
This exchange takes place between xylem and phloem

b) Draw human sperm



28a) Write Chargaff rule of DNA base pairing

The last it's that in DNA the proportion of adenine is always equal to that of thymine and proportion of guanine is always equal to that of cytosine

b) Mature RBC in mammals does not have cell organelles.

The lack of Nucleus and other cell organelles to allow more space to carry oxygen

29. b) Metal (A) with electronic configuration- 2, 8, 18, 1 is copper.

- (A) – Copper (Cu)
- (B) – Copper Carbonate (CuCO_3 , Cu(OH)_2)
- (C) – Copper Sulphate (CuSO_4)
- (D) – Sulphur dioxide (SO_2)

30.a)What is Guttation?

Guttation is a natural process in plants that involves the release of excess water, minerals, and chemicals from the tips or edges of leaves.

b)Where are oestrogens produced? What is the role of oestrogens in the human body?

Answer:

Oestrogen is produced by the Graafian follicles of the ovary.

Functions of oestrogens:

It brings about the changes that occur during puberty.

It initiates the process of oogenesis.

It stimulates the maturation of ovarian follicles in the ovary.

It promotes the development of secondary sexual characters (breast development, high pitched voice etc).

31a.marked in question paper itself

b.Define reflex arc.

Answer:

The path taken by nerve impulse to accomplish reflex action is called a Reflex arc.

32.Calculate the coefficient of cubical expansion of a zinc bar. Whose volume is increased 0.25 m^3 from 0.3 m^3 due to the change in its temperature of 50 K .

Answer:

Initial volume $V_0 = 0.3 \text{ m}^3$

Final volume = $0.3 \text{ m}^3 + 0.25 = 0.55$

Change in volume $\Delta V = 0.25 \text{ m}^3$

Temperature $\Delta T = 50 \text{ K}$

Sol:

$$\frac{\Delta V}{V_0} = \alpha_V \Delta T$$

$$\frac{0.25}{0.3} = \alpha_V (50)$$

$$0.833 = \alpha_V (50)$$

$$\therefore \alpha_V = \frac{0.833}{50}$$

$$\alpha_V = 0.0167 \text{ K}^{-1}$$

Part D

33Aa) Wearing helmet and fastening the seat belt is highly recommended for safe journey” Justify your answer using Newton’s laws of motion.

Answer:

(i) According to Newton’s Second Law, when you fall from a bike on the ground with a force equal to your mass and acceleration of the bike.

According to Newton’s Third Law, an equal and opposite reacting force on the ground is exerted on your body. When you do not wear a helmet, this reacting force can cause fatal head injuries. So it is important to wear helmet for a safe journey.

b) Newton's third law

For every action there is equal and opposite reaction

C) Give examples for moment of couple?

Steering wheel of a car.

Turning of a screw driver.

Opening and closing of water tap.

SERIES	PARALLEL
The amount of current flows through all the loads is same	The current flowing through each load combines to form the net current
In an electrical circuit, loads are arranged in a line	In an electrical circuit, loads are arranged parallel to each other
The voltage across each resistor is different. $V_1+V_2+V_3$	The voltage across each resistor is same. $V_1=V_2=V_3$
If one component breaks down, the whole circuit will burn out.	Other components will function even if one component breaks down, each has its independent circuit

33Ba)

b) Joule’s law of heating states that the heat produced in any resistor is:

directly proportional to the square of the current passing through the resistor.

directly proportional to the resistance of the resistor.

directly proportional to the time for which the current is passing through the resistor.

C) The main function of the earth wire is to prevent live wire from overloading and absorbs the excess electrons & flows to beneath the ground. It is necessary because it prevents the electrical appliances from damage and absorbs the excess electricity from appliances.

34)Aa) The salient features of “Modern atomic theory” are,

An atom is no longer indivisible.

Atoms of the same element may have different atomic mass.

Atoms of different elements may have the same atomic masses.

Atoms of one element can be transmuted into atoms of other elements. In other words, an atom is no longer indestructible.

Atoms may not always combine in a simple whole-number ratio.

Atom is the smallest particle that takes part in a chemical reaction.

The mass of an atom can be converted into energy [$E = mc^2$].

b) Identify the bond between H and F in HF molecule.

Answer:

Ionic, because the electronegativity difference is more than 1.7.

c) Name the acid that renders aluminium passive. Why?

Answer:

Dilute or concentrated nitric acid (HNO_3) renders aluminium passive. Because nitric acid does not attack aluminium but it renders aluminium passive due to the formation of an oxide film on its surface.

34Ba)(a) What happens when $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ is heated? Write the appropriate equation

(a) When Epsom salt $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ crystals are gently heated, it loses seven water molecules and becomes anhydrous MgSO_4 .



b) Write notes on various factors affecting solubility.

Answer:

There are three main factors which affects the solubility of a solute. They are

Nature of the solute and solvent

Temperature

Pressure

1. Nature of the solute and solvent : The nature of the solute and solvent plays an important role in solubility. Even though water is Universal solvent, all substances do not dissolve in water. Dissolution occurs when similarities exist between the solvent and the solute.

Ionic compounds are soluble in polar solvent like water and covalent compounds are soluble in non-polar solvents like ether, benzene, alcohol etc.

2. Effect of Temperature :

Solubility of solid in liquid : Generally solubility of a solid solute in a liquid increases with increase in temperature.

In Endothermic process : Solubility increases with increase in temperature.

In Exothermic process : Solubility decreases with increase in temperature.

Solubility of Gases in liquid : Solubility of gases in liquid decreases with increase in temperature.

3. Effect of Pressure : Effect of pressure is observed only in the case of solubility of a gas in a liquid. When the pressure is increased, the solubility of a gas in liquid increases.

35Aa)The luteal phase of the menstrual cycle is also called the secretory phase. Give reason.

Answer:

During the Luteal phase of the menstrual cycle in the uterus, the hormone progesterone is produced by the ovaries. Progesterone and estrogen are secreted by the Corpus Luteum, which develops from the Graafian follicle. So this phase of the menstrual cycle

b)Define triple fusion.

Answer:

The fusion involving two polar nuclei and a sperm nucleus, that occurs in double fertilization in a seed plant and results in the formation of endosperm, is called the triple fusion.

c)Why are family planning methods not adopted by all the people of our country?

Answer:Family planning is a way of living that is adopted voluntarily by couples on the basis of knowledge and responsible decision to promote the health and welfare of the family group and society. As it is voluntary many people are not aware of the importance of family planning.

35Ba) List out the parasitic adaptations in the leech.

Blood is sucked by the pharynx.

Anterior and Posterior Suckers are provided, by which the animal attaches itself to the body of the host.

The three Jaws, inside the mouth, causes a painless Y – shaped wound in the skin of the host,

The salivary glands produce Hirudin, which does not allow the blood to coagulate. So, the continuous supply of blood is maintained.

Parapodia and Setae are absent.

Blood is stored in the crop. It gives nourishment to the leech for several months. So there is no elaborate secretion of the digestive juices and enzymes.

b) What are the structures involved in the protection of brain?

Answer:

Cranium (skull) and three connective tissue membrane meninges – Duramater, Arachnoid membrane and piamater protect the brain.

Thank you

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