

DINDIGUL DISTRICT

I REVISION EXAMINATIONS – JAN 2025

STD: X

SUB: SCIENCE

I. Multiple Choice Questions

12 x 1 = 12

- | | |
|---|--------------------------------------|
| 1. c) change of momentum | 7. d) Sulphur in carbon di sulphide. |
| 2. d) $8.31 \text{ Jmol}^{-1}\text{K}^{-1}$ | 8. a) SA node |
| 3. b) 20kHz | 9. a) 7.4 |
| 4. b) Radio Cobalt | 10. d) DNA ligase |
| 5. c) 32 g | 11. a) May 31 |
| 6. c) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ | 12. b) Script editor |

II. Answer any 7 questions. Qn no. 22 is compulsory

7x 2 = 14

13. Refractive index

-----2M

The ratio of speed of light in vacuum (c) to the speed of light in a medium (v) is defined as refractive index ' μ ' of that medium.

$$\mu = c / v$$

14. Ohm's law

-----2M

at a constant temperature, the steady current 'I' flowing through a conductor is directly proportional to the potential difference 'V' between the two ends of the conductor.

$$I \propto V.$$

$$V = IR \text{ Here, R is a constant for a given material}$$

15. Isotopes of Oxygen O_{16} -99.757, O_{17} - 0.038, O_{18} - 0.205

16. Reversible and Irreversible reaction differences – any 2 points -----2M

17. **Mesophyll:** The tissue present between the upper and lower epidermis is called mesophyll. a) Palisade parenchyma b) Spongy parenchyma

18. *Brain is covered by **duramater, arachnoid** membrane and piamater that protect from injury
***cerebrospinal fluid** acts as shock absorbing fluid and protects brain from sudden shock

19. **Allosomes** are chromosomes which are responsible for **determining the sex** of an individual. They are also called as sex chromosomes or hetero-chromosomes

20. The ratio of increase in volume of the body per degree rise in temperature to its unit volume is called as coefficient of cubical expansion.

SI unit is K^{-1}

21. 'Scratch' is software used to create animations, cartoons and games easily. Scratch is a visual programming language.

22.

Calculate the amount of energy released when a radioactive substance undergoes fusion and results in a mass defect of 2 kg.

Solution:

Mass defect in the reaction (m) = 2 kg
 Velocity of light (c) = $3 \times 10^8 \text{ m s}^{-1}$
 By Einstein's equation,
 Energy released $E = mc^2$
 So $E = 2 \times (3 \times 10^8)^2$
 $= 1.8 \times 10^{17} \text{ J}$

III. Answer any 7 questions. Qn no. 32 is compulsory

7x 4 = 28

23.a). Joule's law of heating.-----2M

Joule's law of heating states that the heat produced in any resistor is:

- Directly proportional to the square of the current
- Directly proportional to the resistance
- Directly proportional to the time.

$$H = I^2 R t$$

b). an alloy of Nickel and Chromium is used as the heating element.----- 2M Because: (i) it has high resistivity, (ii) it has a high melting point, (iii) it is not easily oxidized

24. Properties of Light. (Any four points) ----- 4M

1. Light is a form of energy.
2. Light always travels along a straight line.
3. Light does not need any medium for its propagation. It can even travel through vacuum.
4. The speed of light in vacuum or air is, $c = 3 \times 10^8 \text{ ms}^{-1}$.
5. Since, light is in the form of waves, it is characterized by a wavelength (λ) and a frequency (ν), which are related by the following equation: $c = \nu \lambda$ (c - velocity of light).
6. Different coloured light has different wavelength and frequency.
7. Among the visible light, violet light has the lowest wavelength and red light has the highest wavelength.
8. When light is incident on the interface between two media, it is partly reflected and partly refracted.

25 a). features of natural and artificial radioactivity-any two points ----- 2M

b) Uses of radio isotopes in the field agriculture-- ----- 2 M

The radio isotope of **phosphorous (P-32)** helps to increase the productivity of crops, to kill the insects, remain fresh beyond their normal life, prevent sprouting and spoilage of onions, potatoes and gram.

26. ROLE OF pH IN EVERYDAY LIFE ----- 4 M

pH in animals and plants *pH in our digestive system pH changes as the cause of tooth decay *pH of soil
 *pH of rain water

27. a). Respiratory quotient (R.Q) -----2M

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

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

b). (i) Bolting is the sudden shoot elongation followed by flowering. --- 2M

(ii). It can be induced artificially by treatment of gibberellin.

28. Ethnobotany is the study of a region's plants and their practical uses through the traditional knowledge of the local culture of people. ----- 2M

Importance of Ethnobotany -----2M

*It provides traditional uses of plant. □

□ * It gives information about certain unknown and known useful plants.

□□*Tribal communities utilize ethno medicinal plant parts like bark, stem, roots, leaves, flower bud, flowers, fruits, seeds, oils, resins, dyes, gum for the treatment of diseases like diarrhoea, fever, headache, diabetes, jaundice, snakebites, leprosy, etc.

29.a)Insects pollinated **flowers are brightly coloured, have smell and nectar.** --- 2M

The pollen grains are larger in size, the exine is pitted, spiny etc., so they can be adhered firmly on the sticky stigma.

b) Phenotype – It is the **external expression** of a particular trait.

Genotype – It is the **genetic expression** of an organism

30. Prevention and Control of Heart Disease **Diet management,**
Increase in the intake of fibre diet, fruits and vegetables, protein, minerals and vitamin are required. **Physical activity**

31. Homologous series is a group or a class of organic compounds having same general formula and similar chemical properties in which the successive members differ by a - CH₂ group -----
-----1M

Characteristics of homologous series ----- any three-----3M

32. % of sulphur in H₂SO₄

$$\begin{aligned}
 &\text{Calculate \% of S in H}_2\text{SO}_4 \\
 &\text{molecular mass of H}_2\text{SO}_4 \\
 &= (1 \times 2) + (32 \times 1) + (16 \times 4) \\
 &= 2 + 32 + 64 \\
 &= 98 \text{ g} \\
 &\% \text{ of S in H}_2\text{SO}_4 = \frac{\text{Mass of sulphur}}{\text{Molecular mass of H}_2\text{SO}_4} \times 100 \\
 &\% \text{ of S in H}_2\text{SO}_4 = \frac{32}{98} \times 100 \\
 &= 32.65 \%
 \end{aligned}$$

Iv. Answer all the questions**3x 7 = 21****33. Newton's laws of motion**

a) **Newton's First law** : Every body continues to be in its state of rest or the state of uniform motion along a straight line unless some external force acts upon it.

b) **Newton's second law** : The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force.

$$F = \frac{m(v - u)}{t} = ma$$

c) **Newton's third law** : For every action, there is an equal and opposite reaction. They always act on two different bodies. $F_B = -F_A$

b) The Value of Avogadro number = **6.023x10²³**

(OR)

a) **Ultrasonic waves** – These are sound waves with a frequency greater than 20 kHz, Human ear cannot detect these waves, but certain creatures like mosquito, dogs, bats, dolphins can detect these waves. e.g., waves produced by bats.

b) **three uses of ultrasonic vibrations**

* Used in Ultrasonic soldering and welding * Used to scan the growth of foetus * Used in sonar

c). **Mosquito, Dogs, Bats.**

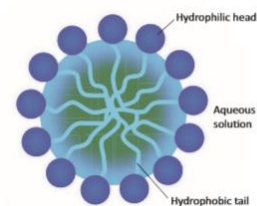
34. a) Mechanism of cleansing action of soap.

A soap molecule contains two chemically distinct parts that interact with water. It has one polar end, which is a short head with a carboxylate group ($-\text{COONa}$) and one non-polar end having the long tail made of the hydrocarbon

The **polar end is hydrophilic** (Water loving) in nature and this end is towards water. The **non-polar end is hydrophobic** (Water hating) in nature and it is attracted towards dirt or oil on the cloth, but not attracted towards water. Thus, the hydrophobic part of the soap molecule traps the dirt and the **hydrophilic part makes the entire molecule soluble in water.**

When a soap or detergent is dissolved in water, the molecules join together as clusters called '**micelles**'. Their long hydrocarbon chains attach themselves to the oil and dirt. The dirt is thus surrounded by the non-polar end of the soap molecules.

The charged carboxylate end of the soap molecules makes the micelles soluble in water. Thus, the dirt is washed away with the soap.



differently

chain.
attracted
is

makes

b) Propane : C_3H_8 ($\text{CH}_3\text{CH}_2\text{CH}_3$)

Benzene : C_6H_6

(OR)

a)

Chemical Equilibrium: It is state of a reversible chemical reaction in which no change in the amount of the reactants and products takes place.

At equilibrium, Rate of forward reaction = Rate of backward reaction

Characteristics of equilibrium □

* In a chemical equilibrium, the rates of the forward and backward reactions are equal.

* The observable properties such as pressure, concentration, colour, density, viscosity etc., of the system remain unchanged with time.

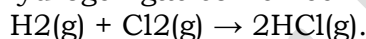
* The chemical equilibrium is a dynamic equilibrium, because both the forward and backward reactions continue to occur even though it appears static externally. □

* In physical equilibrium, the volume of all the phases remains constant.

b). **Combination Reaction**

A combination reaction is a reaction in which two or more reactants combine to form a compound

Example: Hydrogen gas combines with chlorine gas to form hydrogen chloride gas.



3. Why are leucocytes classified as granulocytes and agranulocytes? Name each cell and mention its functions.	
* Leucocytes are classified as granulocytes and agranulocytes because of its presence and absence of granules in it respectively.	
1) Granulocytes: They contain granules in cytoplasm. Its nucleus is irregular (or) lobed.	
i) Neutrophils	They increase during infection and inflammation.
ii) Eosinophils	• They increase during allergy & parasitic infections. • It brings detoxification of toxins.
iii) Basophils	They release chemicals during inflammation.
2) Agranulocytes: Granules are not found in cytoplasm. Its nucleus is not lobed.	
i) Lymphocytes	They produce antibodies during bacterial and viral infections.
ii) Monocytes	They are phagocytic and can engulf bacteria.

35. a)

(OR)

a). **Consequences of soil erosion**

----- 3M

The top layers of soil contain humus and mineral salts, which are vital for the growth of plants. Removal of upper layer of soil by wind and water is called soil erosion.

Soil erosion causes a significant loss of humus, nutrients and decrease the fertility of soil.

b) **Types of stem cells**

----- 2M

* Embryonic stem cells

* Adult stem cell or somatic stem cell

c). Archaeopteryx is the oldest known fossil bird -----2M

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