IMPORTANT TWO MARKS PHYSICS

1. Define inertia. Give its classification.

   The inability of the body to change its state is called inertia.

   Types *inertia of rest   Inertia of motion   Inertia of direction

2. Classify the types of force based on their application.

   Types of Forces: (i) Like parallel force (ii) Unlike parallel force

3. If a 5 N and a 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.

   $Fnet = F2 - F1 = 15 - 5 = 10\ N$.

4. Differentiate mass and weight.

Mass	Weight
1. It measures the quantity of matter.	1. It measures the gravitational force on a body .
2. SI unit is Kilogram (Kg).	2. SI unit is Newton (N).
3. Fundamental quantity.	3. Derived quantity.
4. Scalar quantity.	4. Vector quantity.

5. State Newton's second law.

   force α the rate of change of linear momentum of the body

6. Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?

   The distance between line of action increases, The turning effect is also increases.

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

   To increase the time of contact.   To reduce the impulse and the pain.

8. How does an astronaut float in a space shuttle?

due to their huge orbital velocity.

CHAP 2 OPTICS

1 What is refractive index?

$$\text{refractive index} = \frac{\text{the speed of light in a medium}}{\text{the speed of light in vaccum}}$$

$$\mu = c/v$$

2 State Snell's law (or) State Second law of refraction.

$$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$

3 Define dispersion of light

Refraction of white light or composite light into its component colours

4. State Rayleigh's law of scattering

$$S \propto \frac{1}{\lambda^4}$$

5. Differentiate convex lens and concave lens.

Convex lens	Concave lens
1. Thicker in the middle.	1. Thinner in the middle.
2. Converging lens.	2. Diverging lens.
3. Produces real images mostly.	3. Produces only virtual images.
4. Used to treat Hypermetropia.	4. Used to treat myopia.

6. What is power of accommodation of eye?

the ability of the eye lens to focus nearby as well as the distant objects

7. What are the causes of 'Myopia'?

due to the lengthening of eye ball.

The focal length of eye lens is reduced

.8 Why does the sky appear in blue colour?

By Reyleigh's law of scattering blue colour of sunlight scatters the most by the atmosphere.

9. Why are traffic signals red in colour?

Red light has longest wavelength and scatters less.

10 Write any two applications or uses of concave lens. [SEP – 2021]

☐ Used as eye lens of 'Galilean Telescope'

☐ Used to correct myopia.

CHAP 3 THERMAL PHYSICS

1. Define one calorie.

One calories is the amount of heat energy required to rise the temperature of 1 gram of water through 1℃.

2. Distinguish between linear, arial or superficial expansion.

Linear Expansion	Areal / Superficial Expansion
1) When a body is heated or cooled, the length of the body changes	1) When a body is heated or cooled, the area of the body changes
2.) Coefficient of linear expansion $\alpha L = \Delta L / L_o \Delta T$	2) Coefficient of Areal expansion $A = \Delta A / A_o \Delta T$

3. What is co-efficient of cubical expansion?

$\alpha v = \Delta V / V_o \Delta T$ SI unit is $K-1$

4. State Boyle's law

   $P \propto 1/V$ (i.e.) $PV =$ constant.

5. State-the law of volume

   $V \propto T$ (or) $V/T =$ constant

6. Distinguish between ideal gas and real gas.

7. What is co-efficient of real expansion?

   co-efficient of real expansion = volume of the liquid per degree rise in

   temperature /unit volume.

   Its SI unit is K^{-1}

8. What is co-efficient of apparant expansion?

   co-efficient of apparant expansion = volume of the liquid per degree rise in

   temperature / unit volume

   unit $= JK^{-1}$

CHAP 3 ELECTRICITY

1 What is the role of the earth wire in domestic circuits?

   Earth wire act as protective conductor

   saves us from electric shocks.

2 State Ohm's law.

   $I \propto V \Rightarrow V = IR$

   Where R $\rightarrow$ Resistance of the material.

3 What connection is used in domestic appliances and why?

Domestic appliances are connected in parallel.

Reason: Disconnection of one circuit does not affect other circuit

Each appliance gets an equal voltage.

4 Distinguish between the resistivity and conductivity of a conductor.

Resistivity (ρ)	Conductivity (σ
resistance of a conductor of unit length and unit area of cross section	reciprocal of electrical resistivity.
ohm metre (Ωm).	mho metre-1
measure of resisting power.	measure of ability to pass the current

5 Define the unit of current.

☐ SI unit of current is ampere (A).

Current through a conductor is one ampere, when a charge of one coulomb flows across its cross-section, in one second.

1 ampere = **1 coulomb / 1 second**

6. What happens to the resistance, as the conductor is made thicker?

☐ Resistance decreases.

{Because resistance is inversely proportional to area of cross section.}

7. Why is tungsten metal used in bulbs, but not in fuse wires?

☐ Because of high melting point, it is not used in fuse wire.

☐ But it is used in bulbs where it has to bear high heat.

8. Name any two devices, which are working on the heating effect of the electric current.

□ Fuse wire, electric iron, toaster, oven, etc,

.CHAPTER 5 ACOUSTICS

1. Why does sound travel faster on a rainy day than on a dry day?

Presence of moisture in air decreases the density and increases velocity.

2. Why does an empty vessel produce more sound than a filled one?

□ Amplitude of vibration of air is greater than liquid.

3 Explain why, the ceilings of concert halls are curved.

Because sound intensity is maximized after multiple reflections and reaches every corner.

4 Mention two cases in which there is no Doppler effect in sound.

- When source (S) and listener (L) both are at rest.
- When source (S) and listener (L) move with constant distance between them.

5 Write any two application of echo? [MAY-2022]

□ Used by some animals to locate objects.

□ It is used in obstetric ultrasonography.

6 What is a longitudinal wave?

It is the wave in which particles vibrate along the direction of propagation of wave.

7. What is the audible range of frequency? [SEP – 2021]

20 Hz and 20,000 Hz (Or) 20 kHz.

8. What is the minimum distance needed for an echo? [SEP – 2021, MDL – 19]

17.2 m.

9. What will be the frequency of sound having 0.20 m as its wavelength, when it travels with aspeed of 331 m s-1?

$n = V/\lambda = 331/0.20 = 3310/2 = 1655$ Hz

10. Name three animals, which can hear ultrasonic vibrations.

1) Mosquito 2) Dogs 3) Bats

11 Difference between the Sound and Light waves.

SOUND	LIGHT
Medium is required for propagation	Medium is not required for propagation
Longitudinal waves	Transverse waves.
Speed = $340 ms^{-1}$	Speed = $3 \times 10^8 ms^{-1}$
Wavelength from 1.65 cm to 1.65 m	Wavelength from 4×10^{-7} m to 7×10^{-7} m

CHAP 6 NUCLEAR PHYSICS

One mark q/a

1. Who discovered natural radioactivity? [MAY - 2022]

Henri Becquerel

2. Which radioactive material is present in the ore of pitchblende?

        Radium, Uranium

3. Write any two elements, which are used for inducing radioactivity?

        Boron, Aluminium

4. Write the name of the electromagnetic radiation, which is emitted during a natural radioactivity.

     Gamma

5. If A is a radioactive element which emits an α - particle & produces $_{104}Rf^{259}$. Write the atomic number & mass number of the element A.)

Mass number = 259 + 4 = 263

Atomic number = 104 + 2 = 106

6. What is the average energy released from a single fission process?

  $3.2 \times 10\text{-}11$ J (or) 200Mev

7. Which hazardous radiation is the cause for the genetic disease?
Gamma radiation

8. What is the amount of radiation that may cause death of a person when exposed to it? 600 R

9. When and where was the first nuclear reactor built? 1942 at Chicago, U.S.A

10. Give the SI unit of radioactivity. Becquerel (Bq)

11. Which material protects us from radiation? Lead

1. Write any three features of natural and artificial radioactivity. [AUG-22, MAY-22, PTA-1]

Natural radioactivity	Artificial radioactivity
1. Spontaneous process.	Induced process.
2. Cannot be controlled.	Can be controlled.
3. Alpha, beta and gamma are emitted.	Elementary particles like neutron, positron, etc., are emitted.

2 Give the function of control rods in a nuclear reactor. (or) What are control rods? [PTA – 3]

☐ to control the number of neutrons. Ex: Boron, Cadmium rods.

3. In Japan, some of the new born children are having congenital diseases. Why?

The atom bombs exploded in Japan emitted hazardous radiations causing genetic diseases.

4 Mr. Ramu is working as an X - ray technician in a hospital. But, he does not wear the leadaprons. What suggestion will you give to Mr. Ramu?

wear Lead coated aprons and gloves to safeguard

5 What is stellar energy?

The stars emit a large amount of energy in the form of light and heat. This energy is the stellar energy.

6. Give any two uses of radio isotopes in the field of agriculture.

Phosphorous isotopes (P-32):

☐ Increases the productivity of crops.

☐ Used to kill insects and parasites.

7. ATOMS AND MOLECULES

1. Define: Relative Atomic Mass (or) Define Standard atomic weight.

$$\text{Relative Atomic Mass, } A_r = \frac{\text{Average mass of the isotopes of the element}}{\frac{1}{12}\text{th of the mass of one carbon}-12 \text{ atom}}$$

2 Write the different types of isotopes of oxygen and its percentage abundance.

Isotope	Atomic Mass (amu)	% abundance
$_8O^{16}$	15.9949	99.757
$_8O^{17}$	16.9991	0.038
$_8O^{18}$	17.9992	0.205

3. Define: Atomicity. Give an example. [AUG – 2022, MAY-2022, SEP – 2021]

ϖ Number of atoms present in molecule is called its atomicity.

ϖ Ex : Atomicity of Phosphorous(P_4) is 4.

4. Give any two examples for hetero diatomic molecules. [AUG - 2022]

Hydrogen Chloride (HCl), Hydrogen Fluoride (HF)

5. What is Molar volume of a gas?

It is the volume occupied by one mole of a gas at STP.

Its value is 22.4 litre / 22400 ml

6. Find the percentage of nitrogen in ammonia. [PTA – 1

% of Nitrogen in NH3 = Mass of element / Molecular mass × 100

= 14 /17 × 100

= 82.35 %

4 marks

1. Calcium carbonate is decomposed on heating in the following reaction.

$CaCO_3 \rightarrow CaO + CO_2$

i) How many moles of Calcium carbonate are involved in this reaction?

One mole of $CaCO_3$.

ii) Calculate the gram molecular mass of calcium carbonate involved in this reaction.
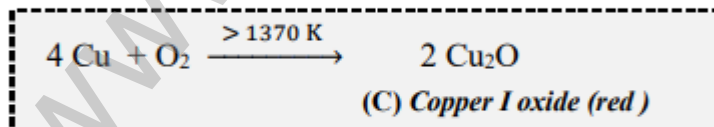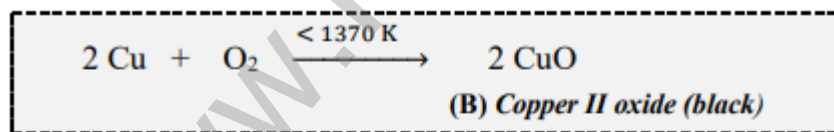
Gram Molecular Mass of $CaCO_3$ = (40 × 1) + (12 × 1) + (16 × 3) = 40 + 12 + 48 = 100 g

iii) How many moles of CO_2 are there in this equation?

One mole of CO_2.

## 8. PERIODIC CLASSIFICATION OF ELEMENTS

1. A is a reddish brown metal, which combines with O_2 at < 1370 K gives B, a black coloured compound. At a temperature > 1370 K, A gives C which is red in colour. Find A, B and C with the reaction.

$$2\ Cu\ +\ O_2 \xrightarrow{\ <\ 1370\ K\ } 2\ CuO$$
$$\text{(B) Copper II oxide (black)}$$

$$4\ Cu\ +\ O_2 \xrightarrow{\ >\ 1370\ K\ } 2\ Cu_2O$$
$$\text{(C) Copper I oxide (red)}$$

A → Copper (Cu);
B → Copper II oxide (CuO)
C → Copper I oxide (Cu₂O)

2. A is a silvery white metal. A combines with O2 to form B at 800oC, the alloy of A is used in making the aircraft. Find A and B.

$$4\,Al + 3O_2 \xrightarrow{\ 800°C\ } 2\,Al_2O_3$$
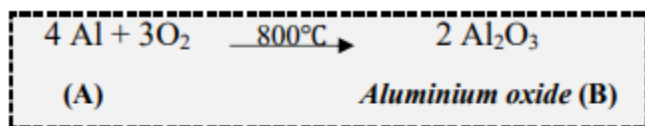
(A)   Aluminium oxide (B)

A → Aluminium (Al)

B → Aluminium oxide (Al_2O_3)

3. What is rust? Give the (chemical) equation for formation of rust. [SEP – 2021, PTA – 4] 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.

$$4Fe + 3O_2 + x\,H_2O \longrightarrow 2\,Fe_2O_3 \cdot x\,H_2O \ (Rust)$$

Iron   Hydrated ferric oxide
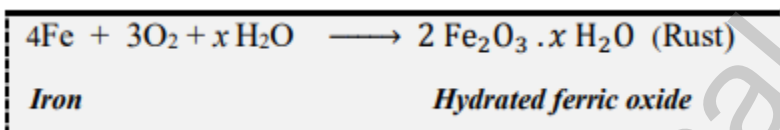
4. State two conditions necessary for rusting of iron.

Presence of air and water vapour

5. Name the acid that renders aluminium passive. Why? [PTA – 3]

ϖ nitric acid.

ϖ It is due to formation of oxide layer.

9. SOLUTIONS

1. Define the term - Solution.

ϖ It is a homogeneous mixture of two or more substances.

Solute + Solvent = solution

Ex : Sea water

2. What is mean by binary solution?

Binary solution consists of two components one solute and one solvent.

   Ex: NaCl in water

3. Give an example each   i) gas in liquid   ii) solid in liquid   iii) solid in solid   iv) gas in gas

  i) Gas in liquid - Soda water

  ii) Solid in liquid - NaCl in water

  iii) Solid in solid - Copper in gold

 iv) Gas in gas - Mixture of Helium and oxygen

 4. What is aqueous and non-aqueous solution? Give an example.

Aqueous solution : water acts as a solvent. Ex: Sugar in water.

Non - Aqueous solution : any liquid other than water acts as solvent.

   Ex: Sulphur dissolved in carbon - disulphide.

 5. Define Volume percentage.

$$Volume\ percentage = \frac{Volume\ of\ the\ solute}{Volume\ of\ the\ solute + Volume\ of\ the\ solvent} \times 100$$

 6. The aquatic animals live more in cold region. Why?

   • solubility of gas in liquid is more at lower temperature.

   ● Thus, more oxygen is dissolved in water

7. Define Hydrated salt.

It is the ionic substances, which contain water of crystallization.

Ex : Blue vitriol ($CuSO_4 . 5H_2O$)

8 A hot saturated solution of copper sulphate forms crystals as it cools. Why?

ϖ excess copper sulphate in the solution will be crystallized.

ϖ Solubility decreases with decrease in temperature.

9. Classify the following substances into deliquescent, hygroscopic. [AUG - 2022]

(Conc. Sulphuric acid, Copper sulphate penta hydrate, Silica gel, Calcium chloride, and Gypsum salt)

ϖ Deliquescent substances : Calcium chloride

ϖ Hygroscopic substances : Conc. Sulphuric acid, Silica gel, Gypsum salt, Copper sulphate penta hydrate

10. TYPES OF CHEMICAL REACTIONS

1Why does the reaction rate of a reaction increase on raising the temperature? (or) Why food kept at room temperature spoil faster than at refrigerator?
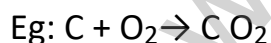
ϖ Raising temperature provides more energy to break more bonds

(i.e) Reaction rate is increased.

2 Define combination reaction. Give one example for an exothermic combination reaction.

$A + B \rightarrow AB$
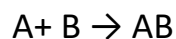
Element + Element $\rightarrow$ compound

Eg: $C + O_2 \rightarrow CO_2$

3   Differentiate reversible and irreversible reactions.

Reversible reaction	Irreversible reaction
1. It can be reversed under suitable condition.	1. It cannot be reversed.
2. Both forward and backward reactions	2. forward direction
3. It attains equilibrium.	3. Equilibrium is not attained
4. It is slow...	4. It is fast.

11. CARBON AND ITS COMPOUNDS

1. Name the simplest ketone and give its structural (or) molecular formula.

Simplest ketone : Acetone

Structural formula : CH3−CO−CH3

IUPAC Name : Propanone

2 How do detergents cause water pollution? Suggest remedial measures to prevent this pollution.

They are not fully biodegradable by micro organisms in water.

So, they cause water pollution.

Remedy: We can use hydrocarbons which are easily degraded by bacteria.

5. Differentiate soaps and detergents.

Soaps	Detergents
1. Sodium salt of long chain fatty acid	1. Sodium salts of sulphonic acids.
2. Ionic part is $-COO^-Na^+$	2. Ionic part is $- SO_3^-Na^+$
3. It is less effective in hard water.	3. 4. It is effective even in hard water.
4. It forms a scum in hard water.	5. It does not form a scum in hard water.
5. Poor foaming capacity.	6. Rich foaming capacity.
6. Biodegradable.	7. Mostly non-biodegradable.