

HOLIDAY HOME-WORK

PHYSICS

- **NOTE: Do all the assignment in notebook. No assignment is to be done on A4 sheets.**
 - **Complete the following experiments in your lab manual as directed in the class.**
1. Performing and observing the following reactions and classifying them into:
 - a) Combination reaction b) Decomposition reaction c) Displacement reaction d) Double displacement reaction
 - (i) Action of water on quick lime
 - (ii) Action of heat on ferrous sulphate crystals
 - (iii) Iron nails kept in copper sulphate solution
 - (iv) Reaction between sodium sulphate and barium chloride solutions.
 2. Determination of the focal length Concave mirror by obtaining the image of a distant object.
 3. Tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence
 4. Finding the image distance for varying object distances in case of a convex lens and drawing corresponding ray diagrams to show the nature of image formed.
 5. Finding the pH of the following samples by using pH paper / universal indicator: a) Dilute Hydrochloric Acid b) Dilute NaOH solution c) Dilute Ethanoic Acid Solution d) Lemon juice e) Water f) Dilute Hydrogen Carbonate solution Studying the properties of acids and bases (HCl&NaOH) by their reaction with: a) Litmus solution (Blue/Red) b) Zinc metal c) Solid sodium carbonate
- **Write down the formulae for the following:**
 - a. Magnification , in case of mirror
 - b. Power of a lens
 - c. Mirror formula
 - d. Lens formula
 - e. Refractive index
 - f. Mathematical expression for snell's law
 - **Practice ray diagrams for the following:**
 - a. Image formation by concave and convex mirror
 - b. Image formation by concave and convex lens
 - c. Refraction through rectangular glass slab.

ASSIGNMENT (PHYSICS)

- i. If angle of incidence is zero degree, what is the angle of reflection?
- ii. What is the magnification of the images formed by plane mirrors?
- iii. Explain why a ray of light passing through the centre of curvature of a concave mirror, gets reflected along the same path?
- iv. Can absolute refractive index of any material be less than one?
- v. The speed of light in transparent medium is 0.6 times that of its speed in vacuum. What is the refractive index of medium? (A- 1.66)
- vi. Why does a ray falling normally on a plane mirror, retrace its path?
- vii. "Vehicles in this mirror are closer than they appear". Why this warning printed on the side view mirror of vehicles?
- viii. What type of image is formed a. by a plane mirror b. on a cinema screen?
- ix. Name the type of the mirrors used in design of solar furnaces. Explain how high temperature is achieved by this device?
- x. "The linear magnification produced by a spherical mirror is +3". Analyse this value and state a) type of mirror b) position of object with respect to pole of the mirror. Draw ray diagram to show the formation of image in this case.
- xi. Draw a ray diagram to show the path of the reflected ray corresponding to an incident ray which is directed towards the principal focus of a convex mirror. Mark on it the angle of incidence and angle of reflection.
- xii. "The linear magnification produced by a spherical mirror is +1/3". Analyse this value and state a) type of mirror b) position of object with respect to pole of the mirror. Draw ray diagram to show the formation of image in this case.
- xiii. "The linear magnification produced by a spherical mirror is -1/5". Analyse this value and state a) type of mirror b) position of object with respect to pole of the mirror. Draw ray diagram to show the formation of image in this case.
- xiv. An object is placed at a distance of 30 cm from a convex mirror, the magnification produced is $\frac{1}{2}$. Where should the object be placed to get the magnification of $\frac{1}{3}$. (A- -60 cm)
- xv. An object is kept in front of a concave mirror of focal length 20 cm. The image is three times the size of object. Calculate two possible distances of the object from the mirror. (A- $-\frac{80}{3}$ cm, $-\frac{40}{3}$ cm)
- xvi. How does a ray of light bend when it travels from a) a denser to rarer medium b) a rarer to a denser medium.
- xvii. Is a denser or rarer nature relative or absolute? Arrange the following media in order of increasing denser nature. Given the refractive index of glass, air, kerosene, diamond are 1, 1.5, 1.44 and 2.42.
- xviii. A ray of light falls normally on the surface of a transparent glass slab. Draw a ray diagram to show its path and also mark angle of incidence and angle of emergence.

- xix. With respect to air, the refractive index of ice is 1.31 and that of rock salt is 1.54. calculate the refractive index of rock salt with respect to ice. (A- 1.18)
- xx. The refractive index of a medium 'x' with respect to 'y' is $\frac{2}{3}$ and the refractive index of medium 'y' with respect to 'z' is $\frac{4}{3}$. Calculate the refractive index of medium 'z' with respect to 'x'. (A- $\frac{9}{8}$)
- xxi. The image of an object formed by a mirror is real, inverted and is of magnification -1. If the image is at a distance of 40 cm from the mirror, where is the object placed? Where would be the image if the object is moved 20 cm towards the mirror? State the reason and also draw ray diagram for the new position of the object to justify your answer.
- xxii. A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 50 cm from the mirror.
- Write the type of the mirror.
 - Find the distance of the image from the object.
 - What is the focal length of the mirror.
 - Draw the ray diagram to show the image formation in this case.
- xxiii. A student wants to project the image of a candle flame on a screen of 80 cm in front of a mirror by keeping the candle flame at a distance of 20 cm from the pole.
- Which type of mirror should the student use?
 - Find the magnification of the image produced.
 - Find the distance between object and its image.
 - Draw a ray diagram to show the image formation in this case and mark the distance between the object and its image.
- xxiv. A 4.5 cm needle is placed 12 cm away from a convex mirror of focal length 15 cm. Give the location of the image and magnification. Describe what happens as the needle is moved farther from the mirror? (A- $v = +6.7$ cm, height of image = 2.5 cm)
- xxv. A lemon kept in water in a glass tumbler appears to be bigger than its actual size, when viewed from the sides. Explain why it so appears.

ASSIGNMENT (CHEMISTRY)

1. Hydrogen being highly flammable gas and oxygen being supporter of combustion, yet water which is a compound made up of hydrogen and oxygen is used to extinguish fire. Why?
2. What happens when quicklime is added to water filled in a bucket?
3. Write the balanced equations for the following reactions:
 - a. Silver bromide on exposure to sunlight decomposes into silver and bromine.
 - b. Sodium metal reacts with water to form sodium hydroxide and hydrogen gas.
 - c. Phosphorus burns in presence of chlorine to form phosphorus pentachloride.
 - d. The process of respiration
 - e. Burning of natural gas
 - f. Iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.
 - g. Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.
 - h. Ethanol is burnt in air to form carbon dioxide, water and releases heat.
 - i. Sodium carbonate on reaction with hydrochloric acid in equal molar concentrations give sodium chloride and sodium hydrogen carbonate.
 - j. Copper sulphate on treatment with potassium iodide precipitates cuprous iodide, liberates iodine gas and also forms potassium sulphate.
 - k. Magnesium reacts with dil HCl to form magnesium chloride with evolution of hydrogen gas.
4. Give an example of thermal decomposition and photochemical decomposition reactions. Write relevant balanced chemical equations also.
5. A solution of substance 'X' is used for white washing. What is the substance X? State the chemical reaction of X with water.
6. Why does the colour of copper sulphate solution change when an iron nail is dipped in it?
7. A white salt decomposes to give brown fumes and a residue is left behind.
 - a. Name the salt
 - b. Write the balanced chemical equation for the decomposition reaction.
8. Consider the following chemical equation
$$X + \text{barium chloride} \rightarrow Y + \text{sodium chloride}$$
 - a. Identify X and Y
 - b. Name the type of the reaction.
9. What is observed when a solution of potassium iodide solution is added to solution of lead nitrate? Name the type of the reaction. Write a balanced chemical equation to represent the above chemical equation.
10. Give two examples of everyday life where redox reactions are taking place.
11. When magnesium ribbon burns in air with dazzling flame and forms a white ash, is magnesium oxidised or reduced? Why?

12. When you have mixed the solutions of lead(II) nitrate and potassium iodide.
 - a. What was the colour of the precipitate formed and name the precipitate.
 - b. Write the balanced chemical equation for the reaction.
 - c. Is this also a double displacement reaction?
13. What is meant by
 - a. Precipitation reaction
 - b. Exothermic reaction
 - c. Oxidation and reduction reaction
14. Why is respiration considered as exothermic reaction?
15. Explain two ways by which food industries prevent rancidity?
16. Discuss the importance of decomposition reaction in metal industry with three points.
17. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.
 - a. Nitrogen gas is treated with hydrogen gas in the presence of a catalyst at 773K to form ammonia gas.
 - b. Sodium hydroxide solution is treated with acetic acid to form sodium acetate and water.
 - c. Ethanol is warmed with ethanoic acid to form ethyl acetate in the presence of concentrated H_2SO_4 .
 - d. Ethene is burnt in the presence of oxygen to form carbon dioxide, water and releases heat and light.
18. Complete the missing components/variables given as x and y in the following reactions
 - a. $\text{Pb}(\text{NO}_3)_2 (\text{aq}) + 2\text{KI}(\text{aq}) \longrightarrow \text{PbI}_2 (\text{x}) + 2\text{KNO}_3(\text{y})$
 - b. $\text{Cu}(\text{s}) + 2\text{AgNO}_3 (\text{aq}) \longrightarrow \text{Cu}(\text{NO}_3)_2 (\text{aq}) + \text{x}(\text{s})$
 - c. $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{x}) + \text{H}_2(\text{y})$
 - d. $\text{CaCO}_3(\text{s}) \xrightarrow{\text{x}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
19. Which among the following changes are exothermic or endothermic in nature?
 - a. Decomposition of ferrous sulphate
 - b. Dilution of sulphuric acid
 - c. Dissolution of sodium hydroxide in water
 - d. Dissolution of ammonium chloride in water
20. Identify the reducing agent in the following reactions
 - a. $4\text{NH}_3 + 5\text{O}_2 \longrightarrow 4\text{NO} + 6\text{H}_2\text{O}$
 - b. $\text{H}_2\text{O} + \text{F}_2 \longrightarrow \text{HF} + \text{HOF}$

- c. $\text{Fe}_2\text{O}_3 + 3\text{CO} \longrightarrow 2\text{Fe} + 3\text{CO}_2$
- d. $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$
21. Identify the oxidising agent (oxidant) in the following reactions
- a. $\text{Pb}_3\text{O}_4 + 8\text{HCl} \longrightarrow 3\text{PbCl}_2 + \text{Cl}_2 + 4\text{H}_2\text{O}$
- b. $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$
- c. $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{Cu} + \text{ZnSO}_4$
- d. $\text{V}_2\text{O}_5 + 5\text{Ca} \longrightarrow 2\text{V} + 5\text{CaO}$
- e. $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
- f. $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$
22. A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction?
23. Ferrous sulphate decomposes with the evolution of a gas having a characteristic odour of burning sulphur. Write the chemical reaction involved and identify the type of reaction.
24. During the reaction of some metals with dilute hydrochloric acid, following observations were made.
- a. Silver metal does not show any change
- b. The temperature of the reaction mixture rises when aluminium (Al) is added.
- c. The reaction of sodium metal is found to be highly explosive
- d. Some bubbles of a gas are seen when lead (Pb) is reacted with the acid. Explain these observations giving suitable reasons.
25. A substance X, which is an oxide of a group 2 element, is used intensively in the cement industry. This element is present in bones also. On treatment with water it forms a solution which turns red litmus blue. Identify X and also write the chemical reactions involved.
26. Why do we store silver chloride in dark coloured bottles?
27. Balance the following chemical equations and identify the type of chemical reaction.
- a. $\text{Mg}(\text{s}) + \text{Cl}_2(\text{g}) \longrightarrow \text{MgCl}_2(\text{s})$
- b. $\text{HgO}(\text{s}) \longrightarrow \text{Hg}(\text{l}) + \text{O}_2(\text{g})$
- c. $\text{Na}(\text{s}) + \text{S}(\text{s}) \longrightarrow \text{Na}_2\text{S}(\text{s})$
- d. $\text{TiCl}_4(\text{l}) + \text{Mg}(\text{s}) \longrightarrow \text{Ti}(\text{s}) + \text{MgCl}_2(\text{s})$
- e. $\text{CaO}(\text{s}) + \text{SiO}_2(\text{s}) \longrightarrow \text{CaSiO}_3(\text{s})$
- f. $\text{H}_2\text{O}_2(\text{l}) \longrightarrow \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$

28. Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid, whereas copper does not. Explain why?
29. A silver article generally turns black when kept in the open for a few days. The article when rubbed with toothpaste again starts shining.
- Why do silver articles turn black when kept in the open for a few days? Name the phenomenon involved.
 - Name the black substance formed and give its chemical formula.
30. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas X is formed
- Write a balanced chemical equation of the reaction.
 - Identify the brown gas X evolved.
 - Identify the type of reaction.
 - What could be the pH range of aqueous solution of the gas X?
31. On adding a drop of barium chloride solution to an aqueous solution of sodium sulphite, white precipitate is obtained.
- Write a balanced chemical equation of the reaction involved
 - What other name can be given to this precipitation reaction?
 - On adding dilute hydrochloric acid to the reaction mixture, white precipitate disappears. Why?
32. You are provided with two containers made up of copper and aluminium. You are also provided with solutions of dilute HCl, dilute HNO₃, ZnCl₂ and H₂O. In which of the above containers these solutions can be kept?