

ESKPXI-XXVI (I)
CHEMISTRY PART-I

Time: 2 Hours 40 Minutes

SECTION "B"

Marks: 40

Note: Give short answers to any TEN (10) questions. All questions carry equal marks.

- Q.1.** The balanced equation for the formation of ammonia is: $N_2 + 3H_2 \rightarrow 2NH_3$. 2+2
a). Write any two mole ratios from the balanced equation.
b). If 6 moles of H_2 react completely, calculate the moles of NH_3 produced using the appropriate moles ratio.
- Q.2.** Define theoretical yield and actual yield. If the theoretical yield of a reaction is 25 g and the actual yield obtained is 20g, calculate the percentage yield. 2+2
- Q.3.** State any four postulates of Bohr's atomic model. Using Bohr's model, explain why electrons in hydrogen atom do not fall into the nucleus. 0.5x4=2+2
- Q.4.** Using VSEPR theory, predict the shape of NH_3 (ammonia) molecule. Explain how lone pair of electrons on nitrogen affects its geometry. 2+2
- Q.5.** Explain how Boyle's law, Charles's law and Avogadro's law can be combined to obtain the combined gas law. 1+1+1+1
- Q.6.** Define pressure and write it mathematically. Write its SI unit and two other commonly used units. 2+2
- Q.7.** Define evaporation in liquids. Explain at least three factors that affect the rate of evaporation. 1+1+1+1
- Q.8.** Explain the diffusion of liquids according to the Kinetic molecular theory. Why is diffusion slower in liquids than in gases? 2+2
- Q.9.** Define the levelling effect. Why do strong acids appear to have same strength when dissolved in water? 2+2
- Q.10.** What is meant by the terms catalyst and catalysis? How does a catalyst increase the rate of a chemical reaction without being consumed? 1+1+2
- Q.11.** Define solvation. How does solvation occur when an ionic solute dissolved in a polar solvent? Give example. 1+2+1
- Q.12.** Define system and surroundings. Give one example to illustrate the concept. 2+2
- Q.13.** Define electrolytic cell. How many electrodes does it contain? Write their names and functions. 1+1+2

SECTION "C"

Marks: 27

Note: Attempt any THREE (03) questions from the following. Each question carries equal marks.

- Q.14.** a) Define bond length. How is it determined experimentally? Explain any three factors that affect bond length. 1+1+3
b) What are X-rays? Who discovered them? Name the three ways in which they are produced. 1.5+1+1+5
- Q.15.** a) What are amorphous solids? What does amorphous mean? Differentiate between amorphous and crystalline solids on the basis of symmetry, shape and arrangement of particles. 1+1+1+1+1
b) i). State Dalton's law of partial pressure with a suitable example. 1+3
ii). A mixture of gases contains 15% CO_2 , 35% O_2 and 50% N_2 . The total pressure of the mixture is 80 atm. Calculate the partial pressure of each gas.
- Q.16.** a) State Le-Chatelier's Principle. Explain the effects of increase in pressure on the following chemical equilibria: 2+1+1+1
i). $2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)}$
ii). $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
iii). $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
b) Define Born-Haber Cycle. Explain its principle. How is lattice energy calculated? 2+1+1
- Q.17.** a) i). Define percentage by mass and write its formula. Give one example. 2+3
ii). Calculate the mass percent of NaCl when 10g of NaCl is dissolved in 90g of water.
b) State Faraday's first law of electrolysis and explain it mathematically. 2+2