

SECTION—II

Chemistry

(Maximum marks : 50)

PART—A

(Answer the questions in one or two sentences. Each question carries 2 marks)

- I (a) Define pH of a solution. Marks
 (b) What is meant by degree of hardness? (2×2=4)

PART—B

(Answer any two questions. Each question carries 8 marks)

- II (a) Distinguish between normality and molarity of a solution. 4
 (b) Account why the pH of the blood remains constant. 4
- III (a) What are the important disadvantages of hard water? 4
 (b) Give any two examples of nanomaterials. 4
- IV (a) Point out the oxidizing agent and the reducing agent in the following reaction : 4

$$2 \text{FeCl}_3 + \text{SnCl}_2 \rightarrow 2 \text{FeCl}_2 + \text{SnCl}_4$$

 (b) Give an account of applications of carbon nanotubes. 4
- (2×8=16)

PART—C

(Answer two full questions. Each question carries 15 marks)

- V (a) Calculate the molecular weight of the following compounds :
 (i) $\text{C}_{12} \text{H}_{22} \text{O}_{11}$ (ii) $\text{Fe SO}_4 (\text{NH}_4)_2 \text{SO}_4 6\text{H}_2\text{O}$.
(At. wt. of Fe = 55.85 & S = 32) 3
- (b) Illustrate with suitable examples, Lewis acids and bases. 3
- (c) Explain the ionic product of water. 3
- (d) Which indicator is suitable for the titration of a strong acid against a weak base and explain? 3
- (e) 20 ml KOH solution containing 8.5 g of KOH per litre of the solution is titrated against sulphuric acid solution. The volume of the acid required is 19.2 ml. Calculate the normality and strength of the acid solution. 3

OR

	Marks
VI (a) Write down the molecular formulae of the following compounds :	
(i) Ammonium sulphate (ii) Potassium dichromate	3
(b) Illustrate redox reaction with suitable example.	3
(c) A solution is prepared by dissolving 0.4 g of NaOH in 100 ml of water. What is the pH of the solution ?	3
(d) Explain the terms :	
(i) Standard solution (ii) Indicator.	3
(e) 5600 ml of hydrogen gas at NTP is required to fill a balloon. Calculate the weight of Zn required to produce this amount of hydrogen by reaction with dil. H_2SO_4 . (Zn = 65).	3
VII (a) Distinguish between temporary hardness and permanent hardness.	3
(b) One ml of a sample of EDTA solution is found to be equivalent to 1.75 mg. $CaCO_3$. If 25 ml of this solution is required by 10 ml of a water sample, calculate the total hardness of water.	3
(c) Explain any two methods for the synthesis of carbon nanotubes.	3
(d) List any three applications of nano materials.	3
(e) What are the important disadvantages of hardwater when used in steam boilers ?	3
OR	
VIII (a) How will you determine the degree of hardness of water by EDTA method ?	3
(b) What are the important properties of carbon nanotubes ?	3
(c) How the hardness of water can be removed using ion exchange method ?	3
(d) What are the different types of carbon nanotubes ?	3
(e) Describe the important characteristics of potable water.	3

(2×15=30)
