

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER – 2023
ENGINEERING CHEMISTRY I**

[Maximum Marks : 100]

[Time : 3 hours]

PART – A
(Maximum Marks : 10)

Marks

I. Answer **all** questions in one or two sentences. Each question carries 2 marks.

1. Atom is neutral. Why?
2. Define catalytic promoter and poison.
3. What are conjugate acid base pair? Give an example.
4. What are boiler scales? Write any two disadvantages of boiler scale formation.
5. Write the composition of bronze and solder. (5x2=10)

PART – B
(Maximum Marks : 30)

II. Answer any **five** of the following questions. Each question carries 6 marks.

1. (a) List any four medicinal application of nano materials. (4)
(b) Define atomic number and mass number. (2)
 2. (a) Define equivalent weight of a base. Calculate the equivalent weight of H_3PO_4 and $Ca(OH)_2$ [H=1, P=31, O=16, Ca=40] (4)
(b) Define buffer capacity. (2)
 3. (a) Which indicator can be used for the following titrations. (4)
(i) CH_3COOH X $NaOH$ (ii) HCl X NH_4OH
(iii) HNO_3 X KOH (iv) H_2SO_4 X Na_2CO_3
(b) Define ionic product of water. (2)
 4. (a) Explain the sterilization process of water using bleaching powder. (4)
(b) Why hard water is not suitable for washing? (2)
 5. (a) List any four characteristics of potable water. (4)
(b) What is the reason for the hardness of water? (2)
 6. (a) Write any four applications of powder metallurgy. (4)
(b) What are alloys? Give two examples. (2)
 7. (a) With diagram, explain fusion method for the preparation of alloys. (4)
(b) List the effect of any two impurities present in steel. (2)
- (5x6=30)

PART – C

(Maximum Marks : 60)

(Answer **one full** question from each unit. Each full question carries 15 marks)

UNIT – I

- III.** (a) Explain any three methods of synthesis of carbon nano tube. (6)
(b) Write any five physical properties of carbon nano tube. (5)
(c) What are positive and negative catalysts? Give an example each. (4)

OR

- IV.** (a) Explain the different types of catalysis with one examples each. (6)
(b) What is a carbon nano tube? What are its types? (5)
(c) Distinguish between atom and molecule. (4)

UNIT – II

- V.** (a) Explain Arrhenius theory and Lewis theory of acids and bases with examples. (6)
(b) What is a buffer solution? What are its types? Give one example each. (5)
(c) Define pH. Calculate the pH of 0.01N sodium hydroxide solution. (4)

OR

- VI.** (a) Define the terms: (i) Molarity (ii) Normality (iii) standard solution (6)
(b) What are the applications of pH? (5)
(c) 20ml of a solution of potassium hydroxide was neutralized 24ml solution of oxalic acid containing 12.6g/500ml. Calculate the weight of potassium hydroxide present in 400ml of the given solution. [Equivalent weights of Oxalic acid = 63, KOH = 56]. (4)

UNIT –III

- VII.** (a) Explain ion exchange method for the removal of permanent hardness. (6)
(b) What are the physical properties of water? (5)
(c) Explain the reverse osmosis method for the desalination of sea water. (4)

OR

- VIII.** (a) With the help of a block diagram, explain the various steps involved in the making of potable water. (6)
(b) Describe the methods used for the removal of temporary hardness of water. (5)
(c) Distinguish between soft and hard water. (4)

UNIT – IV

- IX.** (a) Explain any three heat treatment methods of steel. (6)
(b) Give any three advantages and any two limitations of powder metallurgy. (5)
(c) Give any four purposes of making alloys. (4)

OR

- X.** (a) Define powder metallurgy. Which are the steps involved in powder metallurgy? (6)
(b) List any five physical properties of metals. (5)
(c) Give the composition and comparison of any three physical properties of cast iron, wrought iron and steel. (4)
