

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE –APRIL -2022.

**ENGINEERING CHEMISTRY-I**

(Maximum Marks : 100)

[Time : 3 hours]

**PART-A**  
(Max. Marks:10)

Marks

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

1. Define nano materials with any one example
2. What is ionic product of water? Write its value at 25°C
3. Which are the varieties of CNT?
4. What do you mean by desalination of sea water?
5. Define alloy. Give one example

(5x2=10)

**PART - B**  
(Max. Marks: 30)

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

1. a) Write any three differences between atom and molecule (3)  
b) Define atomic number and mass number (3)
2. a) Give any three properties of CNT (3)  
b) Differentiate positive and negative catalyst with any one example (3)
3. a) Define equivalent weight of a base. Calculate equivalent weight of  $\text{Na}_2\text{CO}_3$   
(atomic mass of Na=23, C=12, O=16) (3)  
b) Explain acid-base indicator. Which indicator is used for the titration?  
 $\text{HCl} \times \text{KOH}$  (3)
4. a) What is basicity of acids? Write two examples for dibasic acids (3)  
b) Define conjugated acid-base pair with one example (3)
5. a) Illustrate reverse osmosis. Give any one advantage of reverse osmosis (3)  
b) Write any three disadvantages of hard water (3)

6. a) List any three physical properties of water (3)  
 b) Mention chemical actions of sterilization by Chlorine and ozone (3)  
 7. a) Write the composition and any one use of Brass (3)  
 b) Give any three physical properties of metal. (3)  
 (5x6 =30)

**PART - C**  
 (Max. Marks: 60)

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

**UNIT I**

- III** (a) Define fundamental particles. Differentiate their charges and masses (5)  
 (b) Describe HiPCO and CVD methods of synthesis of CNT (5)  
 (c) Differentiate homogenous and heterogenous catalysis with two examples each (5)

**OR**

- IV** (a) List any five applications of manomaterials (5)  
 (b) Explain the terms with example  
       (i) Catalytic promoter (ii) Catalytic poison (5)  
 (c) Give any five applications of CNT (5)

**UNIT- II**

- V** (a) Define pH. Calculate pH of  $1 \times 10^{-3}$  M KOH solution (5)  
 (b) Explain buffer solution. Distinguish acid buffer and basic buffer with example (5)  
 (c) What is volumetric analysis? 20 mL of 0.1 N NaOH solution is completely neutralized 18 mL HCl solution. Calculate normality of HCl. (5)

**OR**

- VI** (a) What is normality? Calculate the normality of 0.63 g oxalic acid is dissolved in 100 mL water. (Mol. Weight of oxalic acid = 126 g/mol) (5)  
 (b) List any five applications of pH (5)  
 (c) Describe Arrhenius and Lewis theory of acids and bases with one example each (5)

**UNIT- III**

- VII** (a) Illustrate production of potable water with the help of block diagram (5)  
 (b) Describe ion exchange method to remove permanent hardness (5)  
 (c) Distinguish between soft water and hard water (5)

**OR**

- VIII** (a) Write any five qualities of potable water (5)  
(b) Differentiate permanent hardness and temporary hardness (5)  
(c) Explain any two methods to remove temporary hardness (5)

**UNIT – IV**

- IX** (a) Describe fusion method with the help of diagram (5)  
(b) Differentiate properties of cast Iron. Wrought Iron and steel (5)  
(c) Mention any five advantages of powder metallurgy (5)

**OR**

- X** (a) Explain steps involved in powder metallurgy (5)  
(b) Write any five impurities and their effects in steel (5)  
(c) Describe quenching and nitriding (5)

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