TED (15/19) - 1004   Reg.No.............................

(Revision-2015/19)   Signature..........................

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/ COMMERCIAL PRACTICE   -   NOVEMBER-2021

ENGINEERING CHEMISTRY - I

[Maximum marks: 75]   (Time: 2.15 Hours)

PART – A

Marks

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

1. Name two methods for removing temporary hardness of water.

2. Explain Bronsted – Lowry concept for acids and bases.

3. Define nanochemistry. Give any two nanosized materials.

4. Give any two physical properties of water.

5. Give the composition of solder.   (3 x 2 = 6)

PART – B

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

1.   (a) Explain promoter and poison with one example each.

     (b)Write any three applications of nanomaterials.

2.   (a) Calculate equivalent weight for the following; (i) NaOH (ii) H_2SO_4(S=32,Na=23,0=16)

     (b) Define pH and pOH scales. Write down the relation between pH and pOH

3.   (a) Explain Clarke's process.

     (b) Explain desalination using reverse osmosis.

4.   (a) Name any three impurities of steel and give their effect on its properties.

     (b) List any three advantages of reverse osmosis.

5.   (a) List any three properties of carbon nanotube

     (b) Name three important fundamental particles of matter. Give their masses

6.   (a) What is the indicators used in the following titration. Why? HCl x Na_2CO_3

     (b) Define normality and molarity. Give the relation between normality and molarity for an acid and base.

7.   (a) Give any three uses of powder metallurgy.

     (b) Give the composition of bronze and write any two uses.   (4 x 6= 24)

PART – C
Answer *any of the three units* from the following. Each full question carries 15 marks
UNIT –I
III. (a) Explain homogeneous and heterogeneous catalysis with two examples each. (6)

   (b) List any five applications of carbon nanotube (5)

   (c) Distinguish between atom and molecule (4)

OR

IV. (a) What is carbon nanotube and mention different varieties of carbon nanotube. (6)
   (b) Explain any two methods of synthesis of carbon nanotube (5)
   (c) Define atomic number and mass number. Also calculate number of electrons, protons and neutrons of the following elements.
   (i)$_{11}Na^{23}$ (ii) $_6C^{12}$ (iii) $_1H^1$ (4)

UNIT-II

V. (a) Explain acidic and basic buffer with one example each. (6)

   (b) Explain Arrhenius and Lewis concept with two example each (5)

   (c) Write normality equation. 20 ml of sodium hydroxide solution is neutralized by 25 ml if an acid of normality 0.11. Find the normality of base? (4)

OR

VI. (a) Calculate the normality of hydrochloric acid which contains 3.65g of acid in 250ml. Find out the volume of this solution required to neutralize 25ml of 0.12N sodium hydroxide. (6)

   (b) Write any five applications of pH (5)

   (c) Define ionic product of water. Give its mathematical statement. (4)

UNIT-III

VII. (a) Write the reason for permanent hardness of water. How can we remove permanent hardness by ion exchange method. (6)

   (b) List any five characteristics of potable water (5)

   (c) Differentiate between soft water and hard water (4)

OR

VIII. (a) Explain with the help of block diagram different steps involved in the purification of water by Municipal supply. (6)
   (b) Explain the sterilization of bleaching powder with necessary chemical equations. List two disadvantages. (5)
   (c)Explain four disadvantages of hard water. (4)

UNIT-IV

IX. (a) Explain powder mettalurgy with different steps involved (6)
   (b) What are alloys? Mention any three purpose of making alloys. (5)
   (c) Give any four physical properties of metals. (4)

OR

X (a) Explain the following methods of heat treatment of steel
      (i)Quenching (ii)Tempering   (iii)Nitriding (6)

(b) Explain the preparation of brass by fusion method with the help of diagram. (5)

(c) Give any two advantages and disadvantages of powder metallurgy. (4)