TED(15)1004

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY

(Common to all Diploma Programmes except DCP & CABM)

Model Question Paper

Engineering Chemistry – I
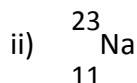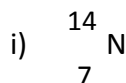
(Maximum Marks : 100)   Time : 3 Hrs

PART- A

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

    a. Define nano material. Mention two examples.

    b. Calculate the number of protons and neutrons of the following elements.

        i) $^{14}_{7}N$ ii) $^{23}_{11}Na$

    c. Concentration of hydrogen ion in a cup of black coffee is 1×10^{-5} M/L. Find the pH of the coffee. Is the coffee is acidic or alkaline.

    d. Give reasons for temporary and permanent hardness of water.

    e. Give the composition of the following alloys.
            I. Brass   II. Bronze

                                                      (5 x 2 = 10)

PART- B

II.   Answer any five full questions. Each question carries 6 marks

a. i). Give any four properties of carbon nanotubes.   (4)

   ii). Explain any one method of synthesis of carbon nano tube.   (2)

b. i). Define atomic number and mass number.   (2)

   II). Explain homogeneous catalysis and heterogeneous catalysis with one example for each.   (4)

c. i). Explain conjugate and base pour with an example.   (3)

   ii). Define pH and pOH scale. Write down the relationship between pH and pOH.   (3)

d. i). Define buffer solution. Explain acidic and basic buffers with one example for each.

(4)

ii). Define ionic product of water and give its mathematical equation. (2)

e. i). Explain Clarke's process for removing temporary hardness of water. (3)

ii). Draw the flowchart for the production of potable water in Municipal supply. (3)

f. i) List any four characteristics of potable water. (4)

ii). Hard water do not form lather with soap. Why? (2)

g. Define the terms.

      i. Tempering
      ii. Quenching
      iii. Nitriding (6)

(5 x 6 = 30)

PART – C
Module – I

III a. Name the two fundamental particles present in the nucleus of an atom. Give their charge and mass. (4)

b. List any four applications of carbon nano tubes. (4)

c. Explain the terms with one example for each. (4)

      i. Promoter   ii. Poison

d. What is a carbon nano tube and what are the different verities of carbon nano tube. (3)

OR

IV a. Explain two features of a solid catalyst with one example for each. (4)

b. Explain positive and negative catalyst with one example for each. (4)

c. Give any four applications of nano materials. (4)

d. Distinguish between atom and molecule. (3)

Module – II

V a. Explain Arrhenius theory and Lewis theory of acids and bases with one example for each. (4)

   b. Define equivalent weight of acid and base. (4)

   c. Explain the following terms.

      i. Standard solution.
      ii. Titration
      iii. End point (3)

   d. Calculate the normality of HCl which contains 2.281 g of the acid in 200 ml. Find out the volume of this solution required to neutralize exactly 50 ml of 12N NaOH solution. (4)

OR

VI a. A solution is prepared by dissolving 2.8g of potassium hydroxide (KOH) in water to give 500ml of the solution. Calculate the molarity of the solution (K-39). Also calculate the pH of the solution. (4)

   b. Mention any four applications of pH. (4)

   c. What are the indicators used in the following titrations.

      i. $H_2C_2O_4$ x NaOH   ii. H_2SO_4 x Na_2CO_3

      iii. HNO_3 x KOH   iv. HCl x NH_4OH (4)

   d. Define basicity of an acid and acidity of a base. (3)

Module – III

VII a. Give any four physical properties of water. (4)

   b. How can permanent hardness be removed by ion exchange method. (4)

   c. Distinguish between soft water and hard water. (4)

d. Give different chemical changes involved in the sterilization of water by bleaching powder. (3)

OR

VIII a. What are the disadvantages of hard water? (4)

b. Explain the changes taking place when water with.

    i.   Temporary hardness is boiled.
    ii.   Permanent hardness is boiled. (4)

c. Explain the desalination of sea water by reverse osmosis. (4)

d. What are the advantages of using ion exchange resin method? (3)

Module – IV

IX a. Which are the three verities of iron? Compare these with respect to their composition and any two physical properties. (4)

b. Mention any two advantages and limitations of power metallurgy. (4)

c. Explain the preparation of alloys by fusion method with the help of a diagram. (4)

d. Name any three impurities of steel and give their effects on its properties. (3)

OR

X a. Define alloys. Give any three purposes of making alloys. Give any three purposes of making alloys. (4)

b. Explain composition of cast iron and wrought iron with any two properties of each . (4)

c. Define the following steps involved in powder metallurgy.

    i.   Compacting
    ii.   Sintering (4)

d. Give any three physical properties of metals. (3)