KNT/KW/16/5132

Bachelor of Science (B.Sc.) Semester—III (C.B.S.) Examination

INDUSTRIAL CHEMISTRY (ICH-301)

Paper—I

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **ALL** questions are compulsory and carry equal marks.

(2) Draw diagrams and write equations wherever necessary.

1. (A) Define : Molarity, Molality and Mole Fraction. A sulphuric acid solution has a molarity 11.24 and molality 94. Calculate the density of solution. 5

(B) An Igneous solution of NaCl is prepared by dissolving 25 kg of NaCl in 100 kg of water. Find :

(a) Weight % and

(b) Mole % composition of solution. 5

OR

(C) Define : gram atom, weight percent, partial pressure and density of gas mixture. 2½

(D) What is Humidity ? What is its relation with atmospheric gases ? 2½

(E) How many kilogram of ethane are there in 210 k mol. ? 2½

(F) Define the following terms :

(i) Saturation and

(ii) Dew point. 2½

2. (A) Draw a block diagram of distillation operation of binary system. Give the equations for overall material balance and material balance in distillate. 5

(B) Explain with flow diagrams for material balance without recycle for the following operation :

(i) Extraction operation and

(ii) Crystallization.

Write overall material balance equation in these systems. 5

OR

(C) What is meant by recycled ratio, feed ratio and purge ratio ? 2½

(D) Draw a neat diagram and explain recycling operation in evaporation process. 2½

(E) Explain the terms stoichiometry, stoichiometric coefficient with suitable example. 2½

(F) Explain with a diagram of material balance in an absorption process. 2½

3. (A) What are Alloys ? How does alloying improves the metallic properties ? 5

(B) What do you mean by Adhesive ? Give the classification of adhesive and explain its adhesive action. 5

OR

(C) What are different alloys of :

(i) Nickel and

(ii) Titanium ? 2½

(D) What is the effect of temperature on the mechanical properties of material ? 2½

(E) What are the chemical factors influencing adhesive action ? 2½

(F) Write a note on adhesive strength. 2½

4. (A) What do you mean by alkalinity and acidity ? Explain the method of determination of alkalinity by experimentally. 5

(B) What are the different types of Pulp ? Explain any one method of manufacture of pulp. 5

OR

(C) Describe the method of determination of hardness of water. 2½

(D) How will you determine the dissolved oxygen in water sample ? Explain it. 2½

(E) What are the important steps involved in manufacture of paper ? 2½

(F) Explain the following terms :

(i) Beating

(ii) Refining

(iii) Filling.

in paper industries. 2½

5. Attempt any **TEN** of the following :

(i) Convert 1 ppm NO_2 into $\mu g/m^3$.

(ii) State ideal gas law.

(iii) Define equivalent weight.

(iv) What do you mean by vapour of gas ?

(v) Give the name of properties of liquids that influence evaporation.

(vi) Define gas absorption.

(vii) Draw flowsheet diagram of evaporation process.

(viii) What do you mean by Adhesive Strength ?

(ix) What are different alloys of Copper ?

(x) Mention any two advantages of Adhesive.

(xi) What do you mean by hardness of water ?

(xii) What do you mean by colouring of paper ? 1×10=10