

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.

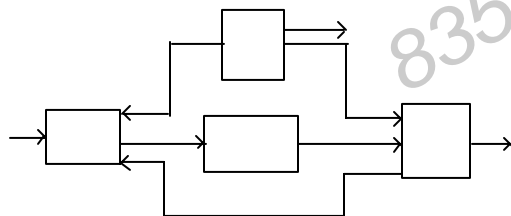
1. (A) Explain the terms :

- (i) Molarity
- (ii) Molality
- (iii) Normality
- (iv) Mole fraction

The density of pure water at room temperature is 0.997 g cm^{-3} . Calculate the molarity of water in pure water. 5

(B) State the Ideal gas law. Derive the ideal gas equation. 5**OR**(C) Define vapour pressure. Explain its relation with boiling point. 2½(D) The vapour pressure of a 5% aq. solution of a non-volatile solute at 373 K is 745 mm. Calculate the m. wt of solute. 2½(E) Explain Humidity with suitable example. 2½(F) What are the various levels of mass and energy balance ? 2½

2. (A) How many recycle streams are there in the following process ? Explain each of them.



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(B) Explain distillation and crystallization with respect to material balance. 5**OR**(C) Explain the role of solvent selection in extraction process. 2½(D) Differentiate between recycle ratio, feed ratio and purge ratio. 2½(E) Explain material balance chemical reaction without recycle. 2½(F) What would be the mass production rate of the K_2CrO_4 crystals if the filtrate was discarded instead of recycled ? 2½3. (A) What is adhesive action ? Explain the chemical factors influencing the adhesive action. 5

(B) Explain the mechanical and chemical properties of the following :

- (i) Iron
- (ii) Nickel

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OR(C) Give industrial applications of steel alloys. 2½(D) What is animal glue ? How will you manufacture hide glue ? 2½(E) What is the effect of temperature on the mechanical properties of material ? 2½(F) What is the role of solvent for synthesis of adhesives ? 2½

4. (A) Explain the principle of dissolved oxygen determination in water on the basis of chemical reaction. 5
- (B) How Soda pulp is prepared commercially ? 5
- OR**
- (C) What is hard water ? What is role of hardness of water for preparation of paper ? 2½
- (D) How nitrate is estimated in water sample ? 2½
- (E) Write a note on refining. 2½
- (F) Give the names of any five solid wastes generated from pulp and paper industries. 2½
5. Attempt any **ten** of the following :
- (i) What is the normality of a 0.2 M H₂SO₄ solution ?
- (ii) Define saturation.
- (iii) Which has more water vapour in it : warm air or cool air ?
- (iv) What is the % of excess air if 10 moles of air entered the process and only 5 moles of that are required ?
- (v) What is a need of composition of bypass stream ?
- (vi) What is absorption ?
- (vii) Name any two alloys of Aluminium.
- (viii) What is starch adhesive ?
- (ix) What is heat treatment ?
- (x) How is temporary hardness of water removed ?
- (xi) What is meant by sizing ?
- (xii) Define acidity. 1×10=10