

(i) Printed Pages: 4]

Roll No. ....

(ii) Questions : 9]

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**B.A./B.Sc. (General) 2nd Semester  
Examination**

**1047**

**INDUSTRIAL CHEMISTRY**

**Paper : B : (Material and Energy Balance)**

**Time : 3 Hours]**

**[Max. Marks : 75**

**Note :-** Attempt *five* question in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Explain the features of evaporating liquids.
- (b) Define the terms weight fraction, mole fraction, weight %, recycle ratio.
- (c) Discuss the characteristics that a filter medium must have for effective filtration.
- (d) What is unbound moisture content and free moisture content ?

## Unit-I

2. (a) In a production of drug having a mol. wt. of 192. The stream from the reactor flows at the rate of 10.3 lt/min. The drug concentration is 41.2% in water and the specific gravity of the solution is 1.025. Calculate the conc. of drug in kg/lt in the exit stream and the flow rate in kgmol/min.
- (b) If a plane travels at twice the speed of sound and speed of sound is 1100 ft/s. How fast it going in miles/hr ?
3. (a) A saturated solution of salicylic acid in methanol contains 64kg salicylic acid/ 100 kg. Find the composition of mixture in (i) Wt.% (ii) mole% .
- (b) Diameter and height for a vertical cylinder is 5 ft. and 6 ft. 6 inch respectively. It is full up to 75% height with  $\text{CCl}_4$ . The density of which is 1.6 kg/lt. Find the mass in kg.

## Unit-II

4. (a) What is distillation ? Explain batch distillation in detail.
- (b) Explain the construction and working of spray column for absorption process.
5. (a) Explain the term mass balance and energy balance. What are their applications ?
- (b) Draw a labelled sketch of packed column absorber and explain its construction and working.

## Unit-III

6. (a) What is filtration ? Discuss the role of filter aids in filtration process.
- (b) Define Drying. Explain the principle, construction and working of fluidized bed dryer.
7. (a) Explain the construction and working of falling film evaporator with the help of a neat sketch.
- (b) What is extraction ? How would you select a solvent for extraction ?

#### Unit-IV

8. (a) What are boilers ? Discuss their classifications in detail.
- (b) Discuss the advantages and disadvantages of combustion of fuels.
9. (a) What are specifications of water for industrial uses ? Also discuss the various methods of water treatment.
- (b) A coal has the following ultimate analysis carbon 84%, sulphur 1.5%, nitrogen 0.6%, hydrogen 5.5% and oxygen 8.4%. Find the gross and net calorific values with the help of Dulong's formula.