Exam.Code:0002
Sub. Code: 0179

1056

B.A./B.Sc. (General) Second Semester

Industrial Chemistry

Paper – B: Material and Energy Balance

Time allowed: 3 Hours

Max. Marks: 60

***NOTE:*** *Attempt five questions in all, including Question No. I which is compulsory and selecting atleast two questions from each Unit.*

*x-x-x*

I. a) Write a short note on desalination of water. (4)

b) What is azeotropic distillation? (3)

c) What do you mean by net and gross calorific value of a fuel? (3)

d) Distinguish between drying and evaporation. (1)

f) Convert 1 poise into SI Units. (1)

## UNIT – I

II. a) Sodium chloride weighing 600kg is mixed with 200kg potassium chloride . Find the composition of the mixture in i) Wt% ii) mole %

b) Iron metal weighing 500 lb occupies the volume of 29.25 lt, Calculate the density of iron in $kg/m^3$.

c) If dibromopentane have specific gravity 1.57, what is its density in:-

i) $g/cm^3$

ii) $lb/ft^3$

iii) $kg/m^3$ (6,4,2)

III. a) The pressure gauge of a tank of $CO_2$ used to fill the soda water bottle reads 51 psig, at the same time the barometer reads 28in Hg. What is the absolute pressure in tank in psig?

b) The density of talc is reported as 2.7g/mL. Express the same in SI system $kg/m^3$.

c) How many moles of $K_2CO_3$ will contain 117 kg of K? (6,3,3)

## UNIT – II

IV. a) Discuss in detail the construction and working of bubble column and also draw its well labelled diagram.

b) Explain the term mass balance and energy balance. What are its applications? (8,4)

P.T.O.

V. a) What is distillation? Explain the continuous distillation in details.
b) Explain construction and working of packed distillation column with a neat sketch. (5,7)

## UNIT – III

VI. a) Define filtration and state the factors affecting rate of filtration.
b) How do film evaporators function? Elaborate the answer with a neat sketch of climbing film (upward flow) evaporator. List the merits and demerits of film evaporator system. (3,9)

VII. With the help of a well labelled diagram explain the construction and working of following:-
a) Rotary dryer (6,6)
b) Bag filter.

## UNIT – IV

VIII. a) What are fuels ? Explain the characteristic of good fuels.
b) What do you understand by heat exchangers? Draw a labelled sketch of shell and tube type heat exchanger and explain its construction and working also. (4,8)

IX. a) What are the specifications of air for industrial use? Discuss any method for the professing of air used in industry.
b) What are boilers? Discuss the functions of boilers in details. (9,3)

*x-x-x*