Registration No : | | | | | | | | | | |

Total number of pages : 02 **B.Tech.**
PCCH4306

6th Semester Back Examination 2017-18
MASS TRANSFER – II
BRANCH : CHEM
Time : 3 Hours
Max Marks : 70
Q.CODE : C276

Answer Question No. 1 which is compulsory and any FIVE from the rest.
The figures in the right-hand margin indicate marks.
Assume suitable notations and any missing data wherever necessary.
Answer all parts of a question at a place.

Q1. **Answer the following questions :** **(2 x 10)**

(a) Define Distribution Coefficient.

(b) For a ternary system containing two pairs of partially soluble liquids, the number of plait point(s) is _____.

(c) What should be the properties of a good adsorbent?

(d) Write and explain Freundlich equation.

(e) Name some of the industrial adsorbents.

(f) Define critical and equilibrium moisture content.

(g) A wet solid is to be dried from 90 to 20 % moisture, wet basis. The moisture to be evaporated, per 500 kg of dried product is _____ kg.

(h) What is heap leaching? Mention its applications.

(i) Draw the plot showing types of moisture.

(j) What are the advantages of continuous drying over the batch drying?

Q2. **(a)** Effect of temperature on a system of three liquids in which one pair is partially soluble. Explain with a neat plot. **(5)**

(b) Explain the operation of pulsed column used for liquid-liquid extraction with a neat diagram. **(5)**

Q3. Experiments on decolourization of oil yielded the equilibrium relationship as: $Y = 0.5\ X^{0.5}$, where Y = gm of colour removed / gm of adsorbent and X = colour in the oil, gm of colour / 1000 gm of colour-free oil. 100 kg oil containing 1 part of colour to 4 parts of oil is agitated with 30 kg of the adsorbent. Calculate the % of colour removed if all 30 kg adsorbent is used in one step. **(10)**

Q4. 400 kg/hr of mustard cake is to be extracted in a counter-current cascade with ether to recover oil. The ether which has been partially purified contains 5 % oil. The fresh cake contains 15 % oil and is to be extracted to a composition of 2 % oil (on solvent free basis). If 200 kg of solvent is to be used, what % of oil entering with the cake is recovered in the extract? **(10)**

Q5. Wet solids are to be dried by passing hot air over them under constant drying conditions. Mention the constant drying conditions. And derive an expression for the total time of drying with necessary plots. **(10)**

Q6. A wet solid slab of 120 cm x 120 cm x 5 cm is to be dried under constant drying conditions from 70 to 20 % moisture. The value of equilibrium moisture for the material is 1 %. If the critical moisture content is 62 % and the rate of drying at the critical point is 2 kg/hr.m^2, calculate the drying time. The dry weight of slab is 3 kg. All moisture contents are on wet basis. **(10)**

Q7. With a neat diagram, explain the construction and working of :

(a) Rotocel **(5)**

(b) Rotating fixed-bed adsorber **(5)**

Q8. **Write short notes on any TWO :** **(5 x 2)**

(a) Shanks system

(b) Equilateral triangular diagram

(c) Rotary dryer

(d) Ion exchange