

T.E - VI sem - Chem
~~Library~~
Mass Transfer Operations **QP Code : 6323**
 [3 Hours] [Total Marks: 80] CHE/MTO
17

- (1) Q.1 is compulsory.
 (2) Attempt any 3 from the remaining 5 questions.
 (3) Use graph paper if required

Q.1 Write short notes on the following:

- (a) Solubility curves for Crystallization (05)
 (b) Steam distillation (05)
 (c) Properties of extraction solvent. (05)
 (d) Reverse Osmosis (05)

- Q.2 (a) Describe Swenson-Walker crystallizer. (07)
 (b) 1000 kgmoles/hr ethanol-propanol mixture containing 65mole% ethanol is fed to a distillation column. The output concentrations are $x_D=0.92$ & $x_W=0.07$. The feed is saturated vapor. Reflux ratio = 4 and relative volatility 2.1. Find the no. of theoretical plates. (13)

- Q.3 (a) Derive Rayleigh's equation. (06)
 (b) Halibut oil is extracted from granulated livers by countercurrent extraction using ether. The feed rate of livers is 350kg/h with 20% oil. The solvent rate is 250kg/h with 2% oil. The residue after separation contains 1% oil on solvent free basis. Find the no. of stages. The equilibrium data is as follows: (14)

Kg oil/kg solution	0	0.1	0.2	0.3	0.4	0.5	0.6
Kgsolution/kgresidue	0.28	0.34	0.4	0.47	0.55	0.66	0.8

- Q.4 (a) Describe McCabe Thiele method of calculating no. of theoretical plates in rectification. Explain the effect of feed conditions. (12)
 (b) A water sample contains 12ppm chlorine, to be treated with activated carbon to reduce it to 0.5ppm. Find the minimum quantity of adsorbent/unit volume of feed. The equilibrium distribution coefficient = $z/x = 0.8 \text{ kgCl}_2/\text{m}^3\text{water}/\text{kgCl}_2/\text{kgCarbon}$ (08)

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- Q.5 (a) Explain Binodal curve. (06)
(b) Describe any 4 extraction equipments (14)
- Q.6 (a) Describe breakthrough curve (06)
(b) Write the applications of adsorption. Describe any 4 adsorbents (08)
(c) Compare minimum & maximum boiling azeotropes. (06)
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