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[28/A-12]

SARDAR PATEL UNIVERSITY

B.Sc. Industrial Chemistry

(Semester –6TH) EXAMINATION

6th April 2018, Friday

Course No. : US06CICH06

(Mass Transfer Operations)

Total Marks: 70 **Time: 10:00am to 1:00pm**

Q.1 Answer the given multiple choice questions. **[10]**

1. Rayleighs equation is valid for
   a) Simple distillation c) Flash distillation
   b)Rectification d)None of these
2. Azeotropic mixture is___
   a) Binary mixture c) Tertiary mixture
   b) Constant boiling mixture d) None of these.
3. Spray dryer is useful for drying _____.
   a)Granules b) Slurries c) Sheets d) None of these
4. Removal of moisture by thermal means is known as
   a) Drying b) evaporation c) Distillaion d) None of these
5. Solubility is expressed as parts by weight of solute per _____ parts by weight solvent.
   a)50 b) 100 c) 110 d) 10
6. Magma is the mixture of mother liquor and _____.
   a)Crude b) Crystals c) Slurry d) Solvent
7. In Krystal crystallizer, super saturation is achieved by _____.
   a)Evapoartion b) Cooling c) Adiabatic evaporation d) None of these
8. Half miscella is a _____ mixture.
   a)Saturated b) unsaturated c) Both (a) and (b) d) None of these
9. Leaching is a _____ operation.
   a)Solid-liquid b) Liquid-liquid c) Both (a) & (b) d) None of these
10. Selectivity must be ---------- one for extraction.
    a)greater than c)Both a) and b)
    b)Less than d)None of these

Q.2 Attempt any Ten. **[20]**

i. Draw a neat diagram of rectification column.
ii. State Raoult's law & Dalton's law.
iii. List different conditions of feed.
iv. List the dryers commercially used for drying solids, semisolids and slurries.
v. State the various heat carriers used in industrial dryer.
vi. List different objectives of drying.
vii. Give classification of crystallizers.
viii. State the desirable characteristics of packings.
ix Explain the mechanism of crystallization.
x Explain stage type and differential extractor.
xi Explain Leaching and Extraction.
xii Write industrial example of leaching and extraction.

[P.T.O.]

Q.3a)	Derive mass and energy balance equation for a Rectification column	**[5]**
b)	Derive an equation for relative volatility of simple distillation.	**[5]**
	OR	
Q.3a)	Discuss Flash Distillation.	**[5]**
b)	Write a note on: Boling Point Diagram	**[5]**
Q.4a)	Discuss about different types of moisture and rate of drying curve.	**[10]**
	OR	
Q.4a)	Write notes on: i) Rotary Dryer ii) Compartment dryer.	**[10]**
Q.5a)	Discuss about Agitated Tank Crystallizer.	**[5]**
b)	With the help of diagram explain working of Vacuum crystallizer.	**[5]**
	OR	
Q.5a)	Discuss Swenson Walker Crystallizer.	**[5]**
b)	Explain different methods used to obtain super saturation in crystallization.	**[5]**
Q.6a)	Discuss different factors which should be considered while selection of solvent for extraction.	**[5]**
b)	Write a note on: Rotocell Extractor.	**[5]**
	OR	
Q.6a)	With the help of diagram explain Mixer Settler.	**[5]**
b)	Discuss about effect of particle size on rate of extraction.	**[5]**