A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 95902

B.E./B.Tech. DEGREE EXAMINATION, DEC 2021

Fifth Semester

Chemical Engineering

19UCH502 - MASS TRANSFER-II

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. For the Absorber design, the plotting with mole ratio helps to find the CO1- R

   (a) Slope of operating line (b) Slope of equilibrium curve

   (c) Minimum number of trays (d) Maximum number of trays

2. Spray tower is a _____ process. CO1- R

   (a) Co-current (b) Counter current

   (c) Continuous (d) Batch

3. Porcelain pieces are put into the distillation flask to avoid _____ CO1- R

   (a) Overheating (b) Uniform boiling

   (c) Bumping of the solution (d) None of the mentioned options

4. When heat is supplied to bottom of liquid stage to vaporize a portion it is called CO1- R

   (a) Condensing (b) Boil up (c) Cooling (d) Desalting

5. Packed tower with _____ packing preferable for liquid extraction. CO1- R

   (a) Uniform (b) Random

   (c) Complete (d) None of the mentioned

6. When the component has a small value of K, it is supposed to have an affinity for CO1- R

(a)Mobile phase (b)No phase (c)Stationary phase (d)Whole solution

7. Wood ash leaching for alkali is known as _____ CO1- R

(a) Lixivation (b) Lixartion (c) Lixation (d) None of the mentioned

8. When R is infinite, the slope of this rectifying becomes CO1- R

(a) 0 (b) 1 (c) 0.5 (d) Cannot be specified

9. The physical process that occurs when gas or liquid molecules are brought into contact with a solid surface and condense on the surface CO1- R

(a) Absorption (b) Adsorption

(c) Both Adsorption and Absorption (d) None of the mentioned

10. When did ion-exchange resin is used? CO3- Ana

(a) Linear (b) Low molecular weight

(c) Organic polymer with porous structure (d) Soluble

PART – B (5 x 2= 10 Marks)

11. Define scarcity CO1- U

12. What is Inflation? CO1- U

13. What is solvent extraction method? CO1- U

14. What is solid-liquid extraction process? CO1- U

15. What is the principle of adsorption? CO1- R

PART – C (5 x 16= 80 Marks)

16. (a) An Air-NH3 mixture containing 5% NH3 by volume is absorbed in water using a packed tower at 20(degree Celsius) and 1 atm pressure to recover 98% NH3.gas flow rate is 1200 kg/hm2.calculate (a) Minimum mass flow rate of liquid,(b) NTU using 1.25 times the minimum liquid flow rate.(c) Height of packed column KGa= 128 kg/h m2.atm. The equilibrium relation is a y= 1.154 x where x,y are expressed in mole fraction units. CO2- App (16)

Or

(b) Write a note on pressure drop in packed towers for absorption. CO1- U (16)

17. (a) Explain in detail about the design calculations by McCabe- Thiele and Ponchon-Savarit, methods. CO1- U (16)

Or

(b) Explain briefly about the steam distillation. CO1- U (16)

18. (a) Discuss about the Equilibrium in ternary systems. CO1- U (16)

Or

(b) Water-dioxane solution is to be separated by extraction process using benzene as solvent.at 25(degree Celsius) the equilibrium distribution of dioxane between water and benzene is as follows: CO2- App (16)

Weight % of dioxane in water	5.1	18.9	25.2
Weight % of dioxane in benzene	5.2	22.5	32.0

At these concentrations water and benzene are substantially insoluble.1000 kg of a 25% dioxane water solution is to be extracted to remove 95% of dioxane.the benzene is dioxane free.

(i)Calculate the benzene requirement for a single batch operation.

(ii)Calculate the benzene requirement for a five-stage cross-current operation with 600kg of solvent used in each stage.

19. (a) Explain about the solid-liquid extraction(leaching).. CO1- U (16)

Or

(b) Describe about the solid-liquid equilibria. CO1- U (16)

20. (a) Describe about the Adsorption equipment for batch and continuous operation. CO1- U (16)

Or

(b) Explain briefly about the industrial adsorbent. CO5- U (16)