D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY
KASABA BAWADA KOLHAPUR-416006
(An Autonomous Institute)
T. Y. B. Tech (Chem), Sem-V
END SEMESTER EXAMINATION (ESE), DEC. – 2022

Course Name: **Mass Transfer Operation** I, Course Code**201CHL301**

Q. Paper Code:
22CH301501
Set-: I

Day and Date: Tuesday, 6/12/2022

Seat No:

Time: 10 am to 12 pm **Max. Marks- 50**

Instructions:
  i.   *Question No. 1&2 is compulsory.*
  ii. *Figure to the right indicate full marks.*
  iii. *Use graphs wherever necessary.*
  iv. *Assume data wherever necessary*

BT	CO's	Q.No.		Marks
		Q.1	**All Questions are compulsory**	**20**
1,2	CO1	**a**	On what basis mass transfer operations differentiated? Give details.	**6M**
1,2	CO3	**b**	Derive an equation for flux rate? Brief about importance of mass transfer coefficient. OR Discuss different mechanical difficulties in tray tower.	**7 M**
1,2.3	CO2	**c**	A volatile organic compound benzene costing Rs 45/-per kg is stored in a tank 10 m. diameter and open at top.A Stagnent air film10 mm thick where compound beyond film absent if Temperature .25 °c and vapour pressureis 150 mm of Hg,diffusivity $0.02 m^2$/hr, Calculate the loss of benzene in Rs/day	**7 M**
		Q.2	**All Questions are compulsory**	**10**
1,2	CO4	**a**	Write notes on Absorption and Stripping factor with its importance OR How to find out height of Packed bed absorber?	**4**
1,2,3	CO4	**b**	An air-SO_2 mixture containing 5% SO_2 is scrubbed with water to remove SO_2 in a packed tower. 20 kmol/s of gas mixture is to be processed, to reduce SO_2 concentration at exit to 0.15%. If (L) actual is twice (L,) min, and the equilibrium relationship is y = 30x, HTU = 30 cms, find the height of packing to be used.	**6**
		Q.3	**All Questions are compulsory**	**10**
1,2	CO5	**a**	Give details about various adsorbents used with its application OR Discuss break through curve for adsorption with neat	**3**

				diagram.		
1,2,3	CO5	b		500 kg/min of dry air al 20 'C and carrying 5 kg of water vapour/hr.in. Is to be dehumidified with silica gel to 0.001 kg of water vapour/kg of *dry air The operation has to be carried out isothermally and countercurrently* with 25 kg/min. of dry silica gel. How many theorctical stages are required and what will be the water content in the silica gel leaving the last stage?		7

kg. of water vapour/ kg of dry silica gel, X	0	0.05	0.10	0.15	0.20
kg of water vapour/ kg of dry air, Y	0	0.0018	0.0036	0.0050	0.0062

		Q.4	**Attempt any two out of three questions**	**10**
1,2	CO6	a	Brief about industrial applications of mass transfer with reaction	5
1,2	CO6	b	Give details about film theory for absorption accompanied by reaction. OR Discuss different kintic regimes for mass transfer with reaction.	5
1,2	CO6	C	Which contacting equipments used for absorption with reaction? Explain any one with neat sketch.	5

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