

C09-CH-406/C09-PET-405

**3437**

BOARD DIPLOMA EXAMINATION, (C-09)  
MARCH/APRIL—2018  
DCHE—FOURTH SEMESTER EXAMINATION

MASS TRANSFER

Time : 3 hours ]

[ Total Marks : 80

PART—A

3×10=30

**Instructions :** (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define phase rule and terms involved in it.
2. Apply phase rule to distillation operation.
3. Discuss briefly about sieve plate column.
4. Where is adsorption applicable? Give example.
5. Define absorption and stripping.
6. Where is the extraction operation used?
7. Define the terms humid volume and dew point.
8. What are the uses of a psychometric chart?

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PART—B

10×5=50

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**Instructions :** (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Oxygen (A) and carbon monoxide (B) are diffusing by equimolar counter diffusion under steady-state conditions with the carbon monoxide non-diffusing. The total pressure is  $1 \times 10^5 \text{ N/m}^2$  and the temperature is  $0^\circ\text{C}$ . The partial pressure of  $\text{O}_2$  at two planes, 2 mm apart, is  $10000 \text{ N/m}^2$  and  $5500 \text{ N/m}^2$  respectively.  $D_{AB} = 1.87 \times 10^{-5} \text{ m}^2/\text{s}$ . Calculate the rate of diffusion of  $\text{O}_2$  in  $\text{k moles/m}^2\text{-s}$ .
12. A plain separated by a continuous plate column operating at 1 atm total pressure. The desired terminal compositions of ethanol are  $X_D = 0.90$ ,  $X_W = 0.05$ . The feed is a saturated liquid and total condenser is used. When the reflux ratio is 5 times, the amount of top product, find the number of theoretical plates required if  $a = 2.1$ .
13. Write about problems that are observed in absorption towers.
14. Write about (a) NTU and (b) boiling point diagram.
15. Explain the single-stage and multistage extraction equipments.
16. Explain about the industrial applications of membrane separations.
17. Describe the working principle of Swenson walker crystallizer with a neat sketch.
18. (a) Write the uses of psychometric chart.  
(b) Write about spray driers.

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