



C14-CH/CHST-406

**4434**

BOARD DIPLOMA EXAMINATION, (C-14)

OCT / NOV-2017

DCHE-FOURTH SEMESTER EXAMINATION

MASS TRANSFER OPERATIONS- I

Time : 3 Hours ]

[Total Marks : 80

**PART - A**

3 x 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 steady state operations and unsteady state operations.
2. Define reverse osmosis.
3. State the phase rule.
4. State the Fick's first law of diffusion.
5. Define equilibrium.
6. Define the stage efficiency.
7. Differentiate between batch operation and continuous operation.
8. Write the McCabe Thiele assumptions.
9. Define steam distillation.
10. Define channeling in an absorption tower.

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## PART - B

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- Instructions :* (1) Answer any five questions  
 (2) Each question carries ten marks.  
 (3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. Explain the Process of diffusion, Molecular diffusion and Eddy diffusion with examples.
12. In  $O_2 - N_2$  gas mixture at 101.3 kpa and 298 K. The concentration of  $O_2$  at two phases 2 mm apart are 10% and 20% by volume respectively. Calculate the flux of diffusion of  $O_2$  for equimolar counter diffusion. Diffusivity of  $O_2$  in  $N_2$  is  $1.81 \times 10^{-5} \text{ m}^2/\text{sec}$
13. a) Explain two film theory in interphase mass transfer.  
 b) Define an ideal stage.
14. Explain the continuous distillation process with a neat diagram.
15. A liquid mixture containing 40 mol% methanol and 60 mol% water is fed to distillation at atmospheric pressure with 60 mol% of liquid is distilled. Find the composition of the composited distillate and residue. Equilibrium data

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x	0.05	0.1	0.2	0.3	0.4	0.5
y	0.27	0.42	0.57	0.66	0.73	0.78

16. Explain the effect of feed conditions and feed tray location in a distillation column.
17. Explain the process of an absorption with a neat diagram.
18. Differentiate between packed column and plate column.

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