

Total No. of Questions : 10]

SEAT No. :

P3573

[Total No. of Pages : 2

[4959] - 1175

B.E. (Chemical) (Semester - I)

Membrane Technology

(2012Pattern) (Elective - I)

Time : 2 1/2 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

Q1) a) State advantages and limitations of membrane separation process over conventional separation process. **[5]**

b) State industrial applications of membrane technology. **[5]**

OR

Q2) Explain the following methods of preparation of membrane: **[10]**

a) Sintering.

b) Stretching.

Q3) Explain construction and working of the following membrane modules used in membrane separation processes: **[10]**

a) Tubular module.

b) Hollow fiber module.

OR

Q4) Explain the following phase inversion techniques used for preparation of membranes: **[10]**

a) Precipitation by solvent evaporation.

b) Precipitation by controlled evaporation.

P.T.O.

Q5) a) Explain Boundary layer film model used for concentration polarization of membrane. [8]

b) Explain concentration polymerization in Gas separation process. [10]

OR

Q6) a) What is membrane fouling? State the source of fouling and methods to reduce fouling. [8]

b) Derive the expression for polarization modules (m) in the form [10]

$$M = \frac{\exp(Jvf \cdot \delta / Di)}{1 + Eo [\exp(Jvf \cdot \delta / Di) - 1]}$$

Q7) Explain application of reverse osmosis in following: [16]

a) Desalination of brackish and sea water.

b) Getting ultrapure water.

OR

Q8) Explain application of micro filtration in following: [16]

a) Sterile filtration of pharmaceutical.

b) Sterilization of wine and beer.

Q9) Explain application of gas separation in following: [16]

a) Natural gas separation.

b) Vapor gas separation.

OR

Q10) Explain application electrodyalisis in following: [16]

a) Salt recovery from sea water.

b) Electrode ionization.

