

22513

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Give the names of any two materials used as membrane.
- (b) Write the names of any two membrane processes used in Industries.
- (c) Write the different types of membrane fouling.
- (d) Give the names of any two fields where there is scope of membrane technology.
- (e) List the names of any two nano-scale materials.
- (f) Enlist the names of factors responsible for Bio-fouling.
- (g) Give the different applications of Membrane Technology.

**2. Attempt any THREE of the following :**

**12**

- (a) Explain the mechanism involved in Hollow fiber module.
- (b) Compare Reversible & Irreversible fouling.
- (c) Describe construction, working of membrane Bio-reactor.
- (d) Compare membrane separation process with conventional separation process.



- 3. Attempt any THREE of the following :** **12**
- (a) Explain Micro – filtration, construction, working.
  - (b) Write the different methods used to control Bio-fouling.
  - (c) Discuss the feasibility of membrane.
  - (d) Describe Reverse Osmosis process construction, working with neat sketch.
- 4. Attempt any THREE of the following :** **12**
- (a) Compare Hydrophobic & hydrophilic synthetic materials used as membrane.
  - (b) Draw the diagram of Electro-dialysis.
  - (c) Explain the construction & working of Anion & Cation Exchanger.
  - (d) Compare between organic & inorganic nano-structure materials used in membrane technology.
  - (e) Discuss about Economics & Cost of membrane.
- 5. Attempt any TWO of the following :** **12**
- (a) Explain principle, construction & working of Dialysis method used in Industrial membrane process.
  - (b) Discuss the factors responsible for fouling such as temperature, pressure & materials used for fouling.
  - (c) Explain Membrane Distillation Technology in detail.
- 6. Attempt any TWO of the following :** **12**
- (a) Describe the use of Inorganic materials & advanced materials used as a membrane.
  - (b) Write the applications of reverse osmosis & ultra-filtration.
  - (c) Discuss the future to membrane technology.
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