

22513

22232

3 Hours / 70 Marks

Seat No.

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

Marks

1. Attempt any FIVE of the following : **(5 × 2 = 10)**

- (a) Enlist different types of materials used for preparation of membrane (any four).
- (b) State the principle of microfiltration.
- (c) Enlist different types of membrane fouling.
- (d) Write any two disadvantages of membrane technology.
- (e) Distinguish membrane distillation with convectonal distillation. (two points)
- (f) Define membrane fouling.
- (g) Give any two applications of membrane separation process in waste water treatment.

2. Attempt any THREE of the following : **(3 × 4 = 12)**

- (a) Draw a well labelled diagram of tubular membrane module.
- (b) Describe bio fouling of membrane.
- (c) Write any four advantages of membrane technology.
- (d) Explain construction and working of membrane bioreactor.



- 3. Attempt any THREE of the following :** (3 × 4 = 12)
- (a) Describe construction and working of microfiltration.
 - (b) Explain the factors responsible for membrane fouling.
 - (c) Discuss the industrial application of membrane technology.
 - (d) Describe with neat sketch working of reverse osmosis.
- 4. Attempt any THREE of the following :** (3 × 4 = 12)
- (a) Explain working of plate and frame module with neat sketch.
 - (b) Compare microfiltration with ultrafiltration. (Any four points)
 - (c) Give any four applications of nanotechnology.
 - (d) Describe the ion exchange process with neat labelled diagram.
 - (e) Give comparison of membrane technology with conventional separation processes. (Any four points)
- 5. Attempt any TWO of the following :** (2 × 6 = 12)
- (a) Explain the concept of electrolysis with neat labelled diagram.
 - (b) Explain mechanism of membrane fouling.
 - (c) Explain membrane distillation with one industrial application.
- 6. Attempt any TWO of the following :** (2 × 6 = 12)
- (a) Describe construction and working of ultrafiltration with neat sketch.
 - (b) Describe working of hollow fiber membrane module with neat sketch.
 - (c) Explain any one pretreatment method to overcome membrane fouling.
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