22513

23242

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) Enlist membrane materials (any four).

(b) Draw a sketch of dead end membrane filtration.

(c) Define membrane fouling.

(d) Give the uses of nanotechnology (any two).

(e) Define reverse osmosis.

(f) Define cross flow membrane filtration.

(g) Discuss the concept of driving force for membrane processes.

2. Attempt any THREE of the following : **12**

(a) Explain electro-dialysis with sketch.

(b) Write scope of membrane technology in chemical industries.

(c) Discuss any four factors which are responsible for fouling of membrane.

(d) Describe working of ultrafiltration with neat sketch.

3. Attempt any THREE of the following : **12**

(a) Describe the concept of nanotechnology.

(b) Describe external membrane bioreactor with well-labelled diagram.

(c) Compare membrane separation processes with conventional separation processes (any four points).

(d) Discuss the concept of membrane fouling.

4. Attempt any THREE of the following : **12**

(a) Write industrial application of membrane separation process (any four).

(b) Describe any one membrane distillation process with diagram.

(c) Differentiate ultrafiltration & microfiltration (four points).

(d) Distinguish cost of membrane technology with conventional separation process.

(e) Explain hollow fibre membrane module with neat sketch.

5. Attempt any TWO of the following : **12**

(a) Draw a well-labelled diagram of plate and frame membrane module.

(b) Explain concept of ion exchange method.

(c) Explain any two methods of cleaning of membrane.

6. Attempt any TWO of the following : **12**

(a) Describe construction & working of reverse osmosis with neat sketch.

(b) Describe construction and working of electro-dialysis.

(c) Explain construction and working of immersed membrane bioreactor with neat diagram.
