PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Summer 2018 - 19 Examination

Semester: 6   Date: 09/05/2019
Subject Code: 03103381   Time: 10:30 am to 1:00 pm
Subject Name: Separation Techniques   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions -   **(15)**
1. The polymer is compressed between two heated plates under a pressure of 2000-5000 psi for 1-5 min in the process named-
   a) Solution casting method
   b) Melt extruded method
   c) Track-etch method
   d) Expanded film membranes
2. Polymer solution used for solution casting should be sufficiently _____ to prevent it from running over the casting plate.
   a) Dilute
   b) Viscous
   c) Cannot predict
   d) a) and b) both
3. Pore size of microporous membrane is-
   a) 1µm
   b) 0.1 to 10 µm
   c) < 0.1 µm
   d) None
4. For in-line microfiltration-
   a) Capital cost is high.
   b) Operating cost is high.
   c) Capital cost is low and operating cost is high.
   d) Capital cost is high and operating cost is low.
5. The key property of membrane is to control-
   a) Pore size
   b) Permeate size
   c) Permeation rate
   d) All of the above
6. Reverse osmosis is a process where water is _____ by pushing it under pressure through a semipermeable RO membrane.
7. Volume elements appear and disappear as motion of permeants traversing the membrane in _____(Name of model).
8. Examples of processes which used dense membranes are _____ and _____
9. Separation of solutes by microporous membranes is mainly a function of_____ And _____ .
10. Ultrafiltration will remove _____ and _____   .
11. Name the factors affecting retentity of membranes .
12. Thin polymer is irradiated by nuclear fission particles in which type of method.
13. What is the basic governing equation in Pore flow model.
14. Due to high cost, plate and frame module is replaced by which modules.
15. Ceramic, metal and liquid membranes comes under which type of classification of membranes

Q.2 Answer the following questions. (Attempt any three)   **(15)**
   A) Explain principle types of microfiltration membrane filters also mention the flow processes.
   B) Explain Extractive distillation method with example and diagram.
   C) Explain concentration and pressure gradient in the membrane and write the equation for chemical potential for compressible and incompressible phases.
   D) Explain the Reverse Osmosis along with principle, working and application.

Q.3 A) Explain Azeotropic distillation method along with different types of azeotropes formed during   **(07)**

process. Explain distillation process with example and diagram.

B) Explain Steam distillation method with example and diagram. **(08)**

OR

B) Explain Reactive distillation method with example and diagram. **(08)**

Q.4 A) Explain Supercritical fluid extraction method with example and diagram. **(07)**

OR

A) Why CO2 is chosen as supercritical fluid? Name some commonly used supercritical solvents. **(07)**
Name some of the important parameter for SCF extraction.

B) Explain 4 types of precipitation method under Phase Separation Membrane. **(08)**