

M.Sc Sem-3 Examination

505

Polymer Science

November-2024

Time : 2-30 Hours]

[Max. Marks : 70

General Instructions

1. All question is compulsory
2. Draw neat figure wherever necessary

Q-1(a) Classify polymer membrane based on its structure with one example of each type. [7 Marks]

OR

Q-1(a) Discuss crystallinity for the selection of polymer for membrane development. [7 Marks]

Q-1(b) Write note on "Thin Film Composite (TFC) Membrane". [7 Marks]

OR

Q-1(b) Discuss different factors affecting membrane performance. [7 Marks]

Q-2(a) Write different grafting techniques used for modification of polymer membrane. [7 Marks]

OR

Q-2(a) Discuss DSC: Working principle, process and applications. [7 Marks]

Q-2(b) Define MF, and discuss various applications of MF membrane. [7 Marks]

OR

Q-2(b) Define UF, and discuss various applications of UF membrane. [7 Marks]

Q-3(a) Write note on "nanofiltration". [7 Marks]

OR

Q-3(a) Write note on "pervaporation" and "gas separation". [7 Marks]

Q-3(b) Discuss diffusion-controlled polymers for controlled drug release. [7 Marks]

OR

Q-3(b) Explain biodegradable polymers for controlled drug release. [7 Marks]

Q-4(a) What is biocompatibility? Write characteristics of biocompatible polymers for controlled drug delivery. [7 Marks]

OR

Q-4(a) Liposomes polymer aggregates. [7 Marks]

Q-4(b) Discuss polyion complexes for controlled drug release. [7 Marks]

OR

Q-4(b) Define biodegradable and bioerodable polymer system. [7 Marks]

QUESTION –5 ANSWER ANY SEVEN QUESTIONS OUT OF TWELVE**[Max. marks: 7×2=14 MARKS]**

- (i) Define membrane.
- (ii) Membrane processes are _____ controlled processes.
- (iii) Which of the following polymer can be used for preparation of asymmetric RO membrane by a phase inversion technique ?

- (A) Polysulfone (B) Polyethersulfone (C) Cellulose (D) Polyacrylonitrile
- (iv) Cation exchange membrane possesses fixed _____ charges attached to polymer backbone. (Fill in the Blank)
- (v) Water flux of nanofiltration is _____ than reverse osmosis membrane. **(Fill in the blank).**
- (vi) Controlled drug delivery refers to methods and systems designed to release a therapeutic agent at a predetermined rate, location, and time. **(True or False).**
- (vii) In diffusion dialysis which type of the following polymeric membrane can be used ?
A) Polyvinyl alcohol B) Polystyrenesulfonic acid C) Polysulfone D) All of these
- (viii) Based on amount of pressure applied which one is correct order?
A) $MF < UF < NF < RO$ B) $MF > UF > NF < RO$
C) $UF < MF < RO > NF$ D) $MF > UF > NF > RO$
- (ix) Natural phospholipids capable of forming vesicles is called _____. (Fill in the blank).
- (x) Which of the following is not a membrane preparation technique?
A) Interfacial polymerization B) Crosslinking
C) Phase inversion D) Track etching
- (xi) Polypeptides capable of forming vesicles are called _____ (Fill in the blank).
- (xii) In the self-assembly, attractive force(s) that hold the molecules together is/ are:
A) van der Waals forces B) Hydrogen bonding
C) Electrostatic D) All of these
