1811E1351

Candidate's Seat No :_____

M.Sc. Sem.-3 Examination

505

Polymer Science

November-2025

Time : 2-30 Hours] **[Max. Marks : 70**

General Instructions

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

Q-1(a) Explain ED membrane process and its applications **[7 marks]**

OR

Q-1(a) Explain FT-IR: Working principle, process and applications. **[7 marks]**

Q-1(b) Write types of Ion-Exchange Membranes with examples. **[7 Marks]**

OR

Q-1(b) Define isotropic and anisotropic membrane, write its structures and properties. **[7 marks]**

Q-2(a) Discuss different properties to be considered when selecting a polymer for membrane development. **[7 Marks]**

OR

Q-2(a) Give classification of membranes based on its fabrication. **[7 Marks]**

Q-2(b) List the name of polymers used for preparation of UF and MF membranes. **[7 Marks]**

OR

Q-2(b) Write name of different techniques used for development of membranes. **[7 Marks]**

Q-3(a) Explain SEM working principle and its applications for polymer membrane characterization. **[7 Marks]**

OR

Q-3(a) What is electrodialysis? Discuss working principle and applications of ED. **[7 Marks]**

Q-3(b) Describe biodegradable polymers and explain how they are used in controlled drug release systems. **[7 Marks]**

OR

Q-3(b) Define biodegradable and bioerodible polymer systems. **[7 Marks]**

Q-4(a) Explain solvent-activated polymers and their role in controlled drug release systems. **[7 Marks]**

OR

Q-4(a) What is biocompatibility? Describe the characteristics of biocompatible polymers used in controlled drug delivery systems. **[7 Marks]**

Q-4(b) Define self-assembly and describe the different types of self-assemblies, providing one example for each. **[7 Marks]**

OR

Q-4(b) Explain soluble polymers for drug release via pinocytosis. **[7 Marks]**

P.T.O

E1351-2

QUESTION –5 ANSWER ANY SEVEN QUESTIONS OUT OF TWELVE

[Max. marks: 7×2=14 MARKS]

(i) Define the dialysis process as observed in semipermeable membranes.

(ii) Membrane processes are _____controlled processes.

(iii) Which of the following polymer can be used for preparation of isoporous membrane by a Track etching technique?

A) Polysulfone (B) Polycarbonate (C) Cellulose (D) Polyacrylonitrile

(iv) Anion exchange membrane possesses fixed _____charges attached to polymer backbone. **(Fill in the Blank)**

(v) Pressure applied for 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 electrodialysis which type of the following polymeric membrane can be used ?

A) Polyamide B) Polystyrenesulfonic acid C) Polysufone D) All of these

(viii) Which one is correct order for pore size of membrane?

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 an anisotropic UF 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

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