



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE : BPE 3243

COURSE : SPECIALTY ENGINEERING
POLYMERS

SEMESTER/SESSION : 2 - 2024/2025

DURATION : 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in the answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 3 PRINTED PAGES INCLUDING THE COVER PAGE

QUESTION 1

- a. Discover the importance of biocompatibility in medical applications (7 Marks)
- b. Point out and explain **THREE (3)** tools for tissue engineering (9 Marks)
- c. Illustrate the process of tissue engineering (9 Marks)

QUESTION 2

- a. Analyze the factors influencing competitive adsorption. (9 Marks)
- b. Discuss **FOUR (4)** applications of water-soluble polymers in the following industry (8 Marks)
 - i. food processing.
 - ii. pharmaceutical
- c. Differentiate the properties of physisorption and chemisorption. (8 Marks)

QUESTION 3

- a. Define the term of polymer electrolyte (3 marks)
- b. Classify the **FOUR (4)** types of polymer electrolytes (4 marks)

- c. Point out **FIVE (5)** applications of polyelectrolytes and explain the function of (10 marks) the electrolytes in that particular application.

- d. Explain the ion transport mechanism in solid polymer electrolyte. (8 marks)

QUESTION 4

- a. Explain **FIVE (5)** important properties of polymers used in heavy (10 marks) engineering.

- b. Silicones or polysiloxanes are inorganic-organic polymers with the chemical formula $[R_2SiO]_n$.
 - i. Construct the molecule structure of silicones. (3 marks)
 - ii. Point out **THREE (3)** advantages of using silicones in heavy (3 marks) engineering.

- c. Poly-ether-ether-ketone (PEEK) contains aromatic structures that are widely used in high temperatures of heavy engineering applications.
 - i. Sketch the molecule structure of poly-ether-ether-ketone (3 marks)
 - ii. Select **THREE (3)** appropriate material characteristics of poly- (3 marks) ether-ether-ketone.

- d. Discover **THREE (3)** applications of the rubber in the heavy engineering (3 marks) industry.

-----END OF QUESTION-----

