UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BPE 3243
COURSE	: SPECIALTY ENGINEERING POLYMERS
SEMESTER/SESSION	: 1 - 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in 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. Explain **THREE (3)** advantages of polymer coating. (6 Marks)

b. Analyze **THREE (3)** important ingredients for coating and their functions. (6 Marks)

c. Compare the application techniques of spray coating and dip coating for polymer coatings. Analyze the advantages and limitations of each method in the context of industrial applications. (8 Marks)

QUESTION 2

a. The selection of biomedical polymers involves careful consideration of various parameters to ensure that the chosen polymer is suitable for its intended application in the medical field. Investigate the parameters that affect the selection (5 Marks)

b. Illustrate the process of tissue engineering (9 Marks)

c. Differentiate the fabrication process of chemical hydrogels and physical. (6 Marks)

QUESTION 3

a. Analyze the factors influencing competitive adsorption. (6 marks)

b. Discuss **THREE (3)** applications of water-soluble polymers in food processing. (6 marks)

c. Differentiate the properties of physisorption and chemisorption. (8 marks)

QUESTION 4

a. Define the term of polymer electrolyte and explain the ion transport mechanism in solid polymer electrolyte. (5 Marks)

b. Compare **FIVE (5)** characteristics of solid, glassy and crystalline polymer electrolytes. (15 Marks)

QUESTION 5

a. Explain **FOUR (4)** important properties of polymers used in heavy engineering. (8 marks)

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 engineering. (3 marks)

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-ether-ether-ketone. (3 marks)

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