



**DEPARTMENT OF CHEMISTRY
FEDERAL UNIVERSITY OF TECHNOLOGY,
MINNA.**

FIRST SEMESTER 2021/2022 SESSION

EXAMINATION

Course Code: CHM 453

Course Title: TECHNOLOGY OF FIBRES AND PLASTICS

Unit: 3

Time allowed: 2 Hours 30 minutes

Instructions: ANSWER ANY FOUR QUESTIONS

- 1(a). Define the term 'Fibre' and show its classifications (4 Marks)
- 1(b). Outline the main characteristics of fibres (3 Marks)
- 1(c). Giving suitable diagrams, describe any two of the following techniques of converting bulk polymers to fibres; (8 Marks)
 - i. Dry spinning
 - ii. Wet spinning and
 - iii. Melt spinning.
- 2(a). Define 'Draw Ratio' and explain the fibre drawing process.(5 Marks)
- 2(b). Name five Novel uses of polymers' (5 Marks)
- 2(c). What are the basic difference between dry and wet spinning on one hand and melt spinning on the other hand? (5 Marks)
- 3(a). Differentiate between thermoplastic and thermosetting polymers (3 Marks)
- 3(b). Briefly outline the main polymer processing techniques (6 Marks)
- 3(c). With the aid of a well labeled Sketch, explain the principles of operation of a melt processing extruder. (6 Marks)

5(a). Write short notes on any three of the following factors affecting polymer processing

(6 Marks)

- i. Hygroscopic nature of the polymer
- ii. Granule characteristics
- iii. Thermal properties that influence the melting of polymer
- iv. Flow properties of polymer melt

5(b). What are the thermal stability characteristics of polymer to be considered before melt processing? (5 Marks)

5(c). Explain the effect of orientation of polymer chains during processing.

6(a). Using appropriate drawings, discuss a typical compression moulding technique of thermosetting polymer'

6(b). What are the general assumptions made in describing the flow behaviour of the thermosetting material?

6(c). Show how polymer modulus or resistance to deformation affects the polymer processing in the rubbery state. (4 Marks)