



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

Course Code: CHM 562

Course Title: End-used properties and the application of some commercial polymers

Units: 2

Instruction: Answer question 1 and any 2 others. Time: 2 hours 15 minutes

1. (a). List the following;

- i. The merits associated with the application of polymers
- ii. The demerit of polymer application and how to remedy them

b). Define the following terms: (i). strength, (ii) plasticity, (iii) ductility, (iv) tensile stress and (v) compressive strength.

(c). Calculate the compressive strength of a material 5 cm in breadth and 2 m in length given that a 4000 g load is required to crush it. ($g = 10 \text{ m/s}^2$)

(d). Discuss damage, failure and fracture highlighting their relationship

(e). How does the arrangement of polymer molecules affect the T_m , of the polymer?

(f). Write short notes on any three of the following highlighting their effects on polymer application i) Softening Temperature, ii) Flammability, iii) Thermal conductivity, and iv) Heat Capacity

2. a). What is flexural strength and what is its significant in polymer application?

b). With the aid of a diagram only, describe how flexural strength can be measured

c). Given a beam 200 mm breadth and 300 mm width is supported 2000 mm between supports and a load 4 kg is placed on it. Calculate

i. the second moment of area or second moment of inertia (I), of the beam

ii. the flexural strength of the beam given that the deflection is 100 mm

iii. the deflection of the beam when the load is increased by 20 %.

3. (a) Give the basic nomenclature of polymers

(b) Name the class (or polymer) and properties of polymers that can be applied for following;

(i). Bottled water

(ii) Car distributor

(iii) Magnifying glass and roof skylight cover

4. (a) What are elastomers?

(b). List the types of synthetic elastomers.

(c) Some special properties of a popular elastomer make it useful in the car industry. Name the polymer and list the properties.