

B.Sc. DEGREE EXAMINATION, APRIL 2022
BRANCH IV – CHEMISTRY
SIXTH SEMESTER

COURSE : MAJOR-ELECTIVE
PAPER : POLYMER CHEMISTRY
TIME : 3 HOURS

MAX. MARKS: 100

SECTION – A

ANSWER ALL THE QUESTIONS

(30x1=30)

I Choose the correct answer

- _____ is an initiator used in anionic polymerisation
(a) Butyl lithium (b) orthophosphate (c) AIBN (d) glycol
- The acid used in the synthesis of nylon is
(a) Adipic acid (b) Amino acid (c) Aspartic acid (d) oxalic acid
- Which of the following is a synthetic polymer?
(a) Cellulose (b) Cellulose acetate (c) Polyvinyl alcohol (d) Starch
- Which of the following are biodegradable polymers?
(a) Nylon (b) Silicones (c) Polyvinyl chloride (d) Polyvinyl alcohol
- The number of active functional groups present in a polymer is
(a) Functionality (b) Dispersity (c) Tacticity (d) Specificity
- The linkages present in nylon is
(a) Polyester (b) polyamide (c) polyvinyl (d) polyphenylene
- Which of the following does not undergo addition polymerization?
(a) vinyl chloride (b) butadiene (c) succinic acid (d) styrene
- Gutta-percha rubber is a _____ 1,4-polyisoprene polymer
(a) cis (b) trans (c) syndiotactic (d) optically active
- Which of the following polymer is resistant to thermal degradation?
(a) Teflon (b) Polystyrene (c) Nylon 66 (d) Nylon 6
- A heterogenous system is observed in
(a) Suspension polymerisation (c) Bulk polymerisation
(b) Solution polycondensation (d) Melt polycondensation

II Fill in the blanks

- Silicones contain a _____ backbone
- Regenerated cellulose acetate which is used in the form of film is called _____
- The formation micelles occurs in _____ polymerisation.
- The polymer used in making contact lens is _____
- The polymers that can be heat softened, moulded and cooled to rigidity, repeatedly are called _____
- The polymer used in making synthetic hair wigs is made up of _____
- Reaction of a polymer with a dicarboxylic acid is called _____
- Small molecules are eliminated during _____ polymerisation.
- The degree of crystallinity of a polymer increases with _____ in molecular weight of the polymer,
- Stereoregular polymers can be synthesised using _____ catalyst

III Say True or False

- 21 Thermosetting polymers can be changed to different shapes.
- 22 Isotactic polymers have a random arrangement of pendant groups on each side of the chain
- 23 Polyethylene oxide is prepared by the hydrolysis of polyvinyl acetate.
- 24 The characteristic features of fibres are due to strong intermolecular forces like hydrogen bonding.
- 25 Bakelite is prepared by the reaction between urea and formaldehyde.

IV Answer in a line or two

- 26 Define heat distortion temperature.
- 27 What is photodegradation of a polymer.
- 28 Give the structure of BuNa- S rubber.
- 29 What is a living polymer?
- 30 Define condensation polymerisation.

Section B**V. Answer any five Questions****(5x6=30)**

- 31 Using a diagram and an example, explain the different types of copolymer structures. (6)
- 32 With the help of equation explain vulcanisation of rubber. How does the property of rubber change due to vulcanisation? (4+2)
- 33 Why is it difficult to find the absolute molecular weight of a polymer. Graphically represent the weight fraction Vs different molecular weight of a polymer. (2+4)
- 34 Give the preparation, properties and applications of silicones.
- 35 Explain the determination of number average and weight average molecular weight. (2)
- 36 What is hydrogenation reaction of a polymer? Write the equation for hydrogenation reaction of polyisoprene and give the name of the product formed. (2+4)
- 37 Distinguish between suspension and emulsion polymerisation. (6)

Section C**VI. Answer any two questions****(2x20=40)**

- 38 (a) Give the free radical mechanism for polymerisation of ethylene 10
(b) Give the mechanism for coordination polymerisation 10
- 39 (a) Define glass transition temperature. Explain the factors that influence it. (2+8)
(b) Give reason for high T_g value of
(i) Polyethylene terephthalate (69 °C) (ii) Nylon 6 (50 °C) (5+5)
- 40 (a) What is thermal degradation of a polymer? Give the chemical factors that control the thermal degradation of polymers. (2+6)
(b) What is biodegradation of a polymer? Give its significance. (2+2)
(c) Discuss the basic principle of molecular weight determination by
(i) GPC method (ii) Viscosity method (4+4)
