3. Describe the mechanism and kinetics of free radical chain reaction. How is it different from reactions taking place in gas phase or in solution ?

Or

What do you understand by number average and weight average molecular mass ? Equal numbers of molecules with M_1 = 10,000 and M_2 = 100,000 are mixed. Calculate $\overline{M}_N$ and $\overline{M}_W$. Explain how osmotic pressure determinations can lead to $\overline{M}_N$ and light scattering determinations to $\overline{M}_W$.

4. Describe the various factors effecting glass transition temperature and crystalline melting point.

Or

What is meant by amorphous and crystalline polymers ? What is the effect of crystallinity on the properties of polymers, polymer requirements and utilization ?

✪ ✪ ✪ ✪ ✪ c ✪ ✪ ✪ ✪ ✪

G-3/315/21 **Roll No.……...**

M.Sc. III Semester Examination, April-2021

CHEMISTRY

Paper III

(Solid State and Polymer Chemistry)

Time : 3 Hours] [Maximum Marks : 80

Note : *All questions are compulsory. Question Paper comprises of 3 sections.* ***Section A*** *is objective type/Multiple Choice questions with no internal choice.* ***Section B*** *is short answer type with internal choice.* ***Section C*** *is long answer type with internal choice.*

SECTION 'A'

(Objective Type Questions)

Choose the correct answer : **1 × 8 = 8**

1. The presence of F-centres in a crystal makes it :

(a) conducting (b) coloured

(c) opaque (d) magnetic

2. Which of the following, when doped into a crystal of germanium, will convert it into a *p*-type semiconductor ?

(a) As (b) C

(c) In (d) Na

3. The high temperature superconductors are related to…… structure.

4. The temperature at which ferromagnetic materials is converted into paramagnetic substance is known as ……

5. Which of the following is an example of condensation polymer ?

(a) Nylon (b) Bakelite

(c) Urea-formaldehyde resin

(d) All the above

6. Which one of the following is used to make non-stick cookware ?

(a) Polytetrafluroethylene

(b) Polyethylene terphthalate

(c) Polystyrene

(d) Polyvinyl chloride

7. Which of the following has a higher glass transition temperature ?

(a) Polyethylene (b) Polypropylene

(c) Polyvinyl chloride (d) Polystyrene

8. Polymeric molecules ……a definite crystalline structure.

(a) have (b) do not have

(c) completely having (d) partially having

SECTION 'B' **6 × 4 = 24**

(Short Answer Type Questions)

Note : *Answer the following questions in 250 words.*

1. What are Schottky defects ? Derive an expression for the number of Schottky defects in a crystal.

Or

Explain the energy bands of conductors, semi-conductors and insulators. Discuss the effect of temperature on their electrical conductivity.

2. What is hysteresis ? Explain hysteresis curve and origin of domains in ferromagnetic materials.

Or

Write note on Superconductors and superconductivity.

3. Discuss the relationship between root mean square end to end distance R_{rms} and radius of gyration R_g for a linear coiled polymer chain. Calculate the R_{rms} for a linear polymer chain containing 250 monomeric units, each of 45Å length.

Or

How molecular mass can be determined using viscometric method ? The intrinsic viscocity of myosin is 217 cm^3g^{-1}. If the relative viscosity is 1·5, calculate the approximate concentration of the solution.

4. What is meant by glass transition temperature ? Explain the relationship between T_g and T_m.

Or

Write a brief note on morphology of polymer and types of crystalline structures.

SECTION 'C' **12 × 4 = 48**

(Long Answer Type Questions)

Note : *Answer the following questions in 500 words.*

1. Describe the various classes of defects in a crystal.

Or

What is meant by intrinsic and extrinsic semiconductors ? Discuss the nature of *p-n* junction and fabrication of transistors.

2. Differentiate between paramagnetic, diamagnetic and ferromagnetic materials. Describe the quantum theory of paramagnetism.

Or

Discuss the principle and kinetic of solid state reactions.