[This question paper contains **6** printed pages.]

Your Roll No. .....

5140 **B**

B.Sc. (Prog.)/III

IC-302 : Polymer and Instrumental Methods of Analysis

(Admissions of 2005 and onwards)

Time : 3 *Hours* *Maximum Marks* : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer *Six* questions in all.

Question No. **1** is compulsory and carries **15** marks.

Remaining questions are of **12** marks each.

1. Answer any *five* of the following :

   (*a*) What is DP? What is CRU? Explain with example. 3

   (*b*) Justify the statement, "Chain transfer agents are responsible for controlling molecular weight of the polymer." 3

   (*c*) Differentiate between LDPE and HDPE. 3

   (*d*) Give *two* examples of synthetic fibres, synthetic plastics, synthetic rubber. 3

(*e*) What is Nylon salt? How did the name 'nylon' came to use? What will be the Nylon salt of Nylon [6, 6]. 3

(*f*) Differentiate in Atomic Absorption Spectrophotometry and Flamephotometry. 3

2. (*a*) Define Fibre. 2

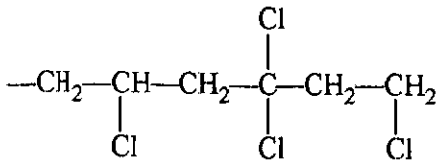
(*b*) What are essential requirements for a polymer to act fibre? 4

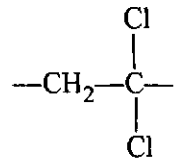
(*c*) Give manufacture of Polyester Fibre *or* Viscose Rayon. 6

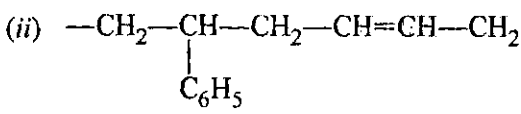
3. (*a*) Give classification of polymers. 4

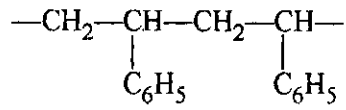
(*b*) Identify the monomers and classify the following as random, alternating, block or graft copolymers : 8

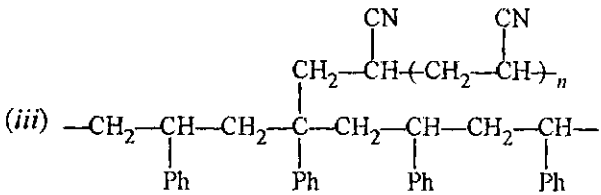
(*i*)

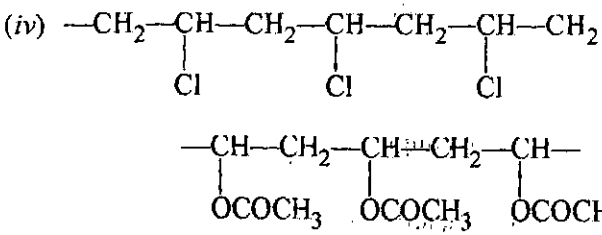




(*ii*) 



(*iii*) 

(*iv*) 

4. (*a*) Write short notes on (any *two*) : 6

(*i*) TGA

(*ii*) Polarography

(*iii*) Melt spinning

(*iv*) Flame retardants.

(*b*) Give the name of inorganic polymer, a polyphosphate which is used as water softener. 1

(*c*) What is rubber elasticity? 2

(*d*) Which will have higher melting point or higher Tg (Glass transition temperature) and why : 3

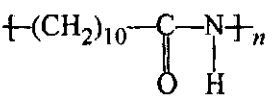
(*i*) Polyurethane or Nylon 6

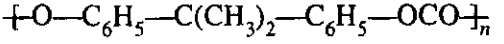
(*ii*) Polyethylene or Nylon 6.

5. (*a*) Differentiate in Step growth polymerisation and Chain growth polymerisation. 5

(*b*) Describe plasticizers with their necessity using examples. 5

(*c*) Identify the polymer name of the following : 2

(*i*) 

(*ii*) 

6. (*a*) Fill in the blanks :

(*i*) Polyester resin obtained from a triol and an unsaturated dibasic acid are called as 2

(*ii*) $SiCl_2Me_2 + H_2O \longrightarrow$ ...??... 2

(*iii*) Polyacetylene doped with AsF_5 is a 2

(*b*) What do you understand by ISO? 2

(*c*) Give manufacture of polystyrene by suspension polymerisation. 4

7. (*a*) Describe any *one* of the following techniques : 5

(*i*) UV-VIS spectrophotometry

(*ii*) NMR spectrophotometry

(*iii*) ESR spectrophotometry

(*iv*) HPLC.

(*b*) How cellulose fibre is extracted from cotton linters? 4

(*c*) Give principle of any *one* of thermal analytical technique. 3

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8. (*a*) Differentiate between FT-IR and Dispersive IR spectrophotometric techniques. 4

(*b*) What are electroanalytical techniques? Describe any *one* of them. 5

(*c*) What does following mean? 3

(*i*) ISI

(*ii*) ASTM

(*iii*) EURO.