This question paper contains 4 printed pages.

4637 *Your Roll No.* .....

B.Sc. Prog. / III **AS**

IC–302 : POLYMERS AND INSTRUMENTAL METHODS AND 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.)

Attempt six questions in all.
Question No. 1 is compulsory and carries 15 marks.
Remaining questions are of 12 marks each.

1. Attempt any *five* of the following :

   (*a*) Which among following will have higher T_g (Glass transition temperature) and why :

   Isotactic polypropylene *or* Atactic polypropylene? 3

   (*b*) Give *two* examples of conducting polymers with structure. 3

   (*c*) Differentiate between synthetic fibres and natural fibres. 3

   (*d*) What is ring opening polymerisation? 3

   (*e*) What are linear and cross-linked silicones? 3

   (*f*) What do you understand by (define) :

P. T. O.

(*i*) TGA

(*ii*) DTA

(*iii*) TMA? 3

2. (*a*) Give manufacture and uses of Polyurethane rubber. 5

(*b*) What is polymeric chain flexibility? Explain why poly (butadiene) and polyethylene polymers are flexible chains whereas polystyrene and poly-methyl methacrylate have inflexible or rigid chains. 3

(*c*) Write the structural formula of the following synthetic rubbers :

(*i*) SBR

(*ii*) Buna-N rubber

(*iii*) Neoprene rubber

(*iv*) Thiokol-A rubber. 4

3. (*a*) Give detailed manufacture of Nylon 6,6. 6

(*b*) Discuss any *one* method of spinning during fibre processing. 3

(*c*) What is Gutta Percha? 2

(*d*) ..... can polymerise to give cross-linked silicone polymer. (Fill in the blank.) 1

4. (*a*) What is the function of flame retardant? Name *two* flame retardants being used commercially. 4

(*b*) Which plasticizer would you use with PVC to make it suitable for processing? 2

(*c*) Write short note on Mouldings. 4

(*d*) Distinguish between Homopolymers and Copolymers. 2

5. Write preparation of monomer(s) of following polymers and uses of these polymers (any *three*) :

(*i*) Polyacrylonitrile

(*ii*) Polymethyl methacrylate

(*iii*) Polycarbonate

(*iv*) Nylon-6

(*v*) Polybutadiene. 3×4=12

6. (*a*) Match the following :

(*i*)	Buna-S	*1.*	Vinyon
(*ii*)	Teflon	*2.*	Plasticizer
(*iii*)	Copolymer	*3.*	Heat resistant polymer
(*iv*)	Sulphonated crosslinked polystyrene	*4.*	Synthetic rubber
(*v*)	Tricresyl phosphate	*5.*	Ion exchange resin
(*vi*)	Zeigler Natta Catalyst	*6.*	High pressure manufacture
(*vii*)	LDPE	*7.*	$TiCl_4+AlCl_3$.

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(*b*) Fill in the blanks (any *five*) :

(*i*) ..... polyblends find application as ablative shields on space vehicles.

(*ii*) ..... is an electroluminescent polymer whose major application is in LED devices.

(*iii*) ..... is superior among all chromatographic processes.

(*iv*) Modacrylic fibre may contain 35–85% .....

(*v*) ..... is a hard and transparent polymer with good resistance to the effects of light and weathering.

(*vi*) Thermoplastic materials are usually moulded by 5

7. (*a*) Give manufacture and uses of LDPE. 4

(*b*) Give structure and uses of *four* inorganic polymers. 4

(*c*) Describe standards :

BIS, ISO, EURO, ASTM. 4

8. Give principles and suitable applications of any *two* techniques :

(*i*) U.V.

(*ii*) AAS

(*iii*) N.M.R.

(*iv*) Flame photometry. 12