

Total number of printed pages – 6

B. Tech
PECH 7305

Sixth Semester Examination – 2008

POLYMER TECHNOLOGY

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory
and any **five** from the rest.

The figures in the right-hand margin
indicate marks.

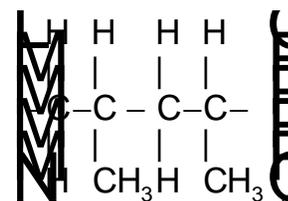
1. Answer the following questions : 2×10
- (a) What is the importance of plasticizers in the production of plastic articles ?
- (b) Calculate the average degree of polymerisation (D.P) for the material which



contains the following % of polymer units corresponding to D.P

(D.P)% - 400:10, 500:15, 600:35, 800:15.

- (c) Write down the monomer of the given polymer :



- (d) What do you mean by polydispersity index ? Specify its significance.
- (e) Write down the monomers of the polymer Nylon 6, 10.
- (f) What is dead polymer ?
- (g) What is KEVLAR ?
- (h) Mention the difference between thermo-plastic and thermosetting resins.

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Contd.

- (i) Vulcanization improves the physical, mechanical and chemical properties of rubber. Comment on it.
- (j) Why is average molecular weight important for polymers ?
2. With a neat flow diagram describe the manufacturing process of Phenol-formaldehyde. Discuss the basic chemistry involved in it. Also, mention the consumption pattern in Indian context. 10
3. (a) Derive an expression that shows the relation between number of average degree of polymerization (X_n) with time (t) for an external acid catalysed reaction. 5
- (b) An acid catalysed polycondensation reaction is carried out in such a manner that 80% reactants get consumed at a time 25 minutes. Calculate the average degree

of polymerization of the reaction, if it proceed for 625 minutes. If the same reaction is carried out in the absence of acid catalyst, then calculate the time ratio for the reaction to complete from 80% to 99.2%. 5

4. (a) Derive Carother's equation. 4
- (b) What is Flory's equal reactivity principle ? 2
- (c) For a system of polycondensation, the reaction taking place between Phthalic acid and glycerol. What will be the critical extent of reaction for this system ? 4
5. (a) 216 gm of butadiene is copolymerized with 104 gm of styrene. Write down the molecular formula of the copolymer formed. 4
- (b) Teflon is an addition polymer and forms linear chain. Then justify whether it will be a thermoset or thermoplast. 2

(c) If 42 gm of ethylene was polymerized to an extent of 500 repeated units, then calculate the number of polyethylene molecules formed. 4

6. Describe in detail about the following types of moulding of plastics : 10

(a) Compression moulding

(b) Injection moulding

(c) Extrusion moulding.

7. What are the different methods available for the determination of molecular weight of polymers ? Explain any two of them in detail. 10

8. Write short note on any *four*: 2.5 × 4

(a) Polymer degradation

(b) Vulcanization of rubber

(c) Bakelite

(d) Importance of polymers in construction of chemical equipments

(e) Elastomers.
