y Rita Macroys

National Institute of Technology-Hamirpur End-Term Examination B.Tech., 4th Semester MS-222: Polymer Science & Technology

Duration: 180 min

Max. Marks: 50

Note

- This question paper consists of 7 questions and two pages
- Attempt all questions
- Wherever necessary, the diagram drawn should be neat and properly labelled

1. Answer the followings

- a) Cull formation
- b) Conformations
- c) Degree of polymerization
- d) Examples of linear, branched and network polymers
- e) Different sections in the extruder
- f) Different types of moulds in thermo-forming
- g) Various forms of polymer degradation
- h) Viscoelastic polymers

2. Answer the followings

a) Plot a stress vs. strain plot depicting the behaviour of the polymers described below:
(2)

- (i) Soft and weak
- (ii) Soft and tough
- (iii) Hard and strong
- (iv) Hard and tough
- **b)** What do you understand by the crazing of polymers?
- c) Consider a thermoplastic polymer can be produced in a sheet form either by rolling (deformation/applying tensile stresses) or by continuous casting (with a rapid cooling rate). Then, which of these processing routes will give the high
- strength? Explain?
- d) Discuss the techniques to prepare following polymeric products: (6)
 (a) Disciple to prepare following polymeric products: (6)
 - (i) Rigid, transparent, and impact resistant hollow products
 - (ii) Thin polymeric sheets
 - (iii) Polymeric fibers

(12)

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- What distinguishes homogeneous polymerization from heterogeneous polymerization methods? Provide an explanation for one polymerization technique in each of these categories.
- 4. What are the available techniques for thermal analysis of polymeric samples? Elaborate one of these techniques in detail. (6)
- 5. How does temperature influence the structure and properties of thermoplastics? (6)
- 6. What do you understand by polymer processing? What are the various types of additives that can be added into the polymers and explain their individual role? (4)

Match the followings:	(4)
Group 1	Group 2
a) Gloves	i. Rotational moulding
b) Football	ii. Thermoforming
c) Structural foam moulding	iii. Blow molding
d) Rubber coating on fabrics	iv. Dipping
e) Hollow plastic bottles	v. Automobile bumpers
f) Injection Moulding	vi. Calendaring
g) Contoured skylights	vii. Extrusion
h) Die swell	viii. Trash Cans

(4)