

M. Tech. First Year First Semester (Chemical Engg.) (CBS)  
**13006 : Elective - I : Material Science : 1 CE 5**

P. Pages : 2

Time : Three Hours



**AW - 3719**

Max. Marks : 80

- Notes :
1. Answer **six** questions.
  2. Question No. **One** is compulsory and attempt **any five** out of remaining Nine questions.
  3. Due credit will be given to neatness and adequate dimensions.
  4. Diagrams and chemicals equations should be given wherever necessary.
  5. Illustrate your answer necessary with the help of neat sketches.
  6. Discuss the reaction, mechanism wherever necessary.
  7. Cell phones are not permitted.
  8. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Explain ceramic structure and it's properties. 6  
b) How will you prepare (HDPE) high density polyethylene material? discuss with the help of flow sheet. State important properties and uses of HDPE. 9
2. a) What is polymer? How will you classify polymer materials on the basis of origin, method of formation and line structure? 7  
b) What is rheology? State its significance in characteristics of polymeric materials. 6
3. a) Distinguish between HDPE, LDPE and LLDPE type polyethylene in terms of it's structure and properties. 6  
b) Describe operating procedure and significance of TGA instrument used for determination of polymer material structure. 7
4. a) Discuss preparation, properties and uses of conducting polymers. 7  
b) Discuss advances in alloy steel. 6
5. a) What is Butyl rubber? How does Butyl rubber prepared? State properties and uses of Butyl rubber. 7  
b) What do you mean by polymer composites? Differentiate between natural and synthetic type of polymer composites with suitable examples. Explain it's role in aerospace application. 6
6. a) What are the different types of glass fiber. Reinforcement? State significance of different grades of glass fiber reinforcement used in polymer composite preparation. 7  
b) Discuss hand – lay – up process used for preparation of polymer composite with the help of neat schematic diagram. 6
7. a) Discuss application of polymer composites in the field of automobile and land transportation. 8

	b)	Explain important properties and uses of polybutadiene rubber (PBR).	5
8.	a)	Explain the importance of barrier properties during selection of polymer materials as a packaging for different application.	6
	b)	Explain packaging material evaluation criteria for following properties.	7
	i)	Strength and stiffness.	
	ii)	Acid resistance.	
9.	a)	What do you mean by polymer alloy? compare it with alloy of metal. What is compatibility of polymer blend? Discuss the criteria used for polymer compatibility.	6
	b)	Discuss preparation and properties of ABS – Nylon type polymer blend. State its applications.	7
10.		Discuss the criteria used while selection of materials of construction for handling specific chemicals in brief.	13

\*\*\*\*\*