

Model Question  
Mahatma Gandhi University  
Eighth Semester B Tech Degree Examination  
Polymer Engineering  
**PO 010 801: Polymers & Environment**

Max Marks : 100

Time : 3 Hrs

**Part A**

(Answer All)

1. Name commodity plastics commonly used for packaging.
2. Write on the difficulties associated with recycling of municipal waste.
3. What is meant by WTR. Write its significance?
4. Define enzyme mechanism associated with plastic biodegradation.
5. Compare recycling of Industrial and consumer plastic waste.

(5 X 3=15)

**Part B**

( Answer All)

6. Distinguish between chemical and physical recycling .
7. What is meant by SPI coding for plastic Identification?
8. Which are the factors that affect the functioning and activity of enzymes?
9. Explain the major resources for synthesis of plastic materials.
10. Compare the features of intracellular and extracellular biodegradation.

(5 X 5= 25)

**Part C**

**( Answer all)**

11. (a) Explain various advantages of using polymer products in comparison with metals and ceramics.

**OR**

(b) Explain major global environmental issues with its causes and remedies.

12. (a) Explain various methods for sorting and segregation of mixed Plastic materials.

**OR**

(b) Compare and contrast between Physical and Chemical recycling. Explain with examples.

13. (a) Explain Rubber reclamation, main features and applications.

**OR**

(b) Explain the scope of PET bottle recycling with all machinery required .

14. (a) Explain synthesis, processing and properties of Biopolyesters.

**OR**

(b) What are the advantages and disadvantages of using Biodegradable plastics .

15. (a) Explain different test methods used to evaluate Plastic Biodegradation.

**OR**

(b) Write notes on i) Starch based plastics ii) Intracellular and Extracellular biodegradation.

(5 X 12= 60)

**MODEL QUESTIONS**  
**MAHATMA GANDHI UNIVERSITY**  
**POLYMER ENGINEERING**  
**VIII SEMESTER B.TECH DEGREE EXAMINATION**  
**PO 010 802: Rubber Products- Design & Testing (PO)**

Time :3 hrs

Maximum Marks : 100

**Part A**

Answer all the questions  
Each questions carries 3 marks

1. What is the significance of neutral angle in hose design
2. What are the important dynamic properties of rubber
3. Distinguish static and dynamic seals
4. Explain working principles of TGA
5. What are the special design adopted for giving rubber to metal bonding.

(5X 3= 15)

**Part B**

Answer all the questions  
Each questions carries 5 marks

6. Discuss the various type of bridge bearing.
7. What are the important requirements for a rubber mounting.
8. What are the construction difference between a conveyor belt and V-belt.
9. Differentiate between material damping and structural damping.
10. Explain Chromatographic technique for analysis of a rubber compound.

(5 X 5 = 25)

**Part C**

Answer all the questions  
Each questions carries 12 marks

11. a. Compare important design features to be considered while making a compound with NR, CR and EPDM

**OR**

- b. Explain important rubber product design features.

12. a. Discuss the different types of flexible coupling.

**OR**

- b. Write short notes on (i) Critical damping , (ii) Torsional Vibrations ,  
(iii) Forced Vibrations (iv) Transmissibility.

13. a. Explain in detail the manufacture of a rubber hose.

**OR**

- b. Explain the important parameters to be considered for designing a static seal.

14. a. Write a formulation for heat resistant conveyor belting. Justify your selection  
Explain the manufacture of V-belt

**OR**

- b. Explain the manufacture of cables.

15. a. Explain important spectroscopic methods used for the analysis of rubber  
Vulcanizates

**OR**

- b. Explain different thermal analysis used for the evaluation of rubber vulcanizates.

(5 X 12 = 60)

**Model Question Paper**  
**VIII Sem. B. Tech. Polymer Engineering Degree Examination**  
**Mahatma Gandhi University**  
**PO 010 803: Speciality Polymers**

**Time: 3Hours**

**Maximum Marks: 100**

**Part A**

(Answer *all* questions)  
(Each question carries **3** marks)

1. What are the structural requirements for high temperature resistance of polymers?
2. With an example define conducting polymers
3. Define photoresist with its importance
4. With an example define ionic polymers
5. What is meant by liquid crystalline behavior? What type of polymers exhibit this phenomenon?

**(3x5 =15)**

**Part B**

(Answer *all* questions)  
(Each question carries **5** marks)

6. What are the general methods to improve the high temperature resistance of polymers?
7. Briefly define the conduction mechanism in polymers
8. Define the nonlinear optical properties of polymers
9. Briefly mention on the classification of ionic polymers
10. What are the different types of LCPs

**(5x5 =25)**

**Part C**

(Answer either *a* **OR** *b*)  
(Each question carries **12** marks)

11(a) Discuss on:

(i) Burning mechanism of polymers (ii) fluoropolymers (iii) polysulfones **(6+3+3)**

**OR**

(b) Write notes on:

- (i) Need for high temperature resistant polymers
- (ii) LOI
- (iii) Polyimides

12(a) Discuss on the major electrical and electronic properties of polymers

**OR**

(b) Write notes on:

- (i) Applications of conducting polymers
- (ii) Polypyrrole
- (iii) Piezoelectric polymers

13 (a) Discuss on semiconductor fabrication by the use of negative working and positive working photoresist

**OR**

(b) Write notes on:

- (i) electron beam lithography
  - (ii) optical fibre telecommunication cable
- (6+6)

14(a) Discuss on the important physical properties and major industrial applications of ionic polymers

**OR**

(b) Write notes on:

- (i) ionomers based on polystyrene
- (ii) elastomeric ionomers
- (iii) ionomers based on PTFE

15(a) why polymers show liquid crystalline behavior? What are the important properties and applications of LCPs

**OR**

(b) Write notes on LCPs based on:

- (i) organometallic polymers
- (ii) inorganic polymers

**(12x5 =60)**

**Model Question Paper**  
**VIII Sem. B. Tech. Polymer Engineering Degree Examination**  
**Mahatma Gandhi University**  
**PO 010 804 L 01: Adhesive Technology**

**Time: 3Hours**

**Maximum Marks: 100**

**Part A**

(Answer *all* questions)  
(Each question carries **3** marks)

1. Explain the thermodynamic concept of wettability in adhesives
2. With an example define primer
3. Define hot melt adhesives. What are the advantages and limitations?
4. Define structural adhesives with examples
5. Mention the different types of adhesive joints

**(3x5 =15)**

**Part B**

(Answer *all* questions)  
(Each question carries **5** marks)

6. Differentiate between adhesive failure and cohesive failure of the adhesive
7. Differentiate between high energy and low energy surfaces
8. Define pressure sensitive adhesives
9. Briefly mention on the use of adhesives in electrical industry
10. Mention the general principles followed in the design of adhesive bonds for optimum bond strength

**(5x5 =25)**

**Part C**

(Answer either *a* **OR** *b*)  
(Each question carries **12** marks)

- 11(a) What are the advantages and disadvantages of adhesive bonding over other conventional methods of joining

**OR**

- (b) Write notes on:  
(i) Work of adhesion (ii) Rheology of adhesion  
(iii) Effect of  $T_g$  on adhesion

12(a) Discuss the various surface preparation techniques prior to adhesive bonding

**OR**

- (b) Discuss on the various theories of adhesion

13 (a) Write notes on:

- (i) classification of adhesives based on the method of cure  
(ii) Natural adhesives

**OR**

- (b) Write notes on:

- (i) cyanoacrylate adhesive (ii) anaerobic adhesives  
(iii) polyvinyl acetate adhesives

14(a) (i) Formulate an epoxy resin adhesive with the function of each ingredient

- (ii) use of adhesives in automobile industry

**OR**

- (b) What are structural adhesives? Discuss the preparation, properties and applications of phenolic resin adhesives

15(a) (i) What are the standard test methods for determining the strength of adhesive joints?

- (ii) what precautions should be taken for maximum effectiveness of adhesive bonds

(8+4)

**OR**

- (b) Compare the different joint geometries in adhesive bonds

**(12x5 =60)**



**MODEL QUESTION**  
**MAHATMA GANDHI UNIVERSITY**  
**POLYMER ENGINEERING**  
**VIII SEMESTER B.TECH DEGREE EXAMINATION**  
**PO 010 805 G01: FIBRE TECHNOLOGY(ELECTIVE-IV) (PO)**

Time :3 hrs

Maximum Marks : 100

**Part A**

(Answer all the questions  
Each question carries 3 marks)

- 1 What is tenacity? How is it expressed?
- 2 How does molecular orientation affect the strength of fibers?
- 3 Give the characteristics of nylon
- 4 What do you mean by bonding and weaving?
- 5 Give an account of properties of yarns.

(5X 3= 15)

**Part B**

(Answer all the questions  
Each question carries 5 marks)

- 6 What are various fibers used in rubber industry? Mention the characteristics of any two
- 7 Explain any two methods of determination of fiber structure.
- 8 Write short note on dyeing of fibers.
- 9 Explain the terms:-  
(a) Spinning                      (b) Knitting
- 10 Explain the following terms  
(a) Friction                      (b) twist

(5 X 5 = 25)

**Part C**

(Answer all the questions  
Each question carries 12 marks)

11. (A) Discuss the uses of fibers in polymer industry

**OR**

(B) Discuss the present status and future prospects of fiber manufacturing industries in India

12. (A) Discuss the uses of the following natural fibers:-

(i) Flax (ii) Jute (iii) Cotton (iv) Silk (v) Linen (vi) Coir

**OR**

(B) Explain the mechanical, electrical and optical properties of fibers

13. (A) How polyesters are made? Discuss the properties of ester based fibers

**OR**

(B) Discuss the production, properties and uses of aramid fibers

14. (A) Discuss the spinning and drawing of fibers

**OR**

(B) Write notes on:-

(i) Lacing (ii) Felting (iii) Spinning of cotton yarns and blends

15. (A) Explain the following yarn properties:-

(i) Fatigue (ii) Evenness (iii) Appearance (iv) Abrasion

**OR**

(B) Explain the following fabric properties:-

(i) Abrasion resistance (ii) Air permeability (iii) Thermal properties

(5 X 12 = 60)