Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U9975

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Open Elective

Chemical Engineering

21UCH975-PLASTIC MATERIALS FOR ENGINEERS

(Regulations 2021)

(Common to ALL branches)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. Plastics are widely used in packaging due to their CO1 -U

   (a) Fragility (b) Biodegradability (c) Versatility and durability (d) High cost

2. Which industry extensively utilizes plastics for molding and shaping products CO1 -U

   (a) Construction (b) Textiles (c) Automotive (d) Agriculture

3. Which industry commonly uses polyesters for the production of textiles due to their durability, wrinkle resistance, and ease of care? CO1 -U

   (a) Automotive (b) Electronics

   (c) Construction (d) Fashion and apparel

4. Which industry commonly uses polyesters for their versatility, moisture resistance, and recyclability in producing films and packaging materials? CO1 -U

   (a) Healthcare (b) Automotive (c) Construction (d) Packaging and printing

5. Phenol-formaldehyde resins are used in the production of _____ CO1 -U

   (a) Cooking utensils (b) Clothing fibers

   (c) Laminates and countertops (d) Plastic bags

6. What is the main environmental concern associated with the production of phenol-formaldehyde resins? CO1 -U

(a) The release of harmful chemicals during production

(b) High energy consumption

(c) Low recyclability

(d) Excessive water usage

7. Which plastic is commonly used in the automotive industry for making durable and lightweight parts? CO1 -U

(a) Nylon (Polyamide) (b) Polystyrene (PS)

(c) Polyethylene (PE) (d) Polyvinyl Chloride (PVC)

8. Which plastic is commonly used in making reusable water bottles due to its resistance to cracking and shattering? CO1 -U

(a) Polyethylene Terephthalate (PET) (b) Polycarbonate (PC)

(c) Polystyrene (PS) (d) Polypropylene (PP)

9. What is a major advantage of using PLA in packaging materials? CO1 -U

(a) High flammability (b) High cost

(c) Biodegradability (d) Low transparency

10. Which process is used to compost PLA under industrial composting conditions? CO1 -U

(a) Chemical recycling (b) Aerobic digestion

(c) Incineration (d) Mechanical recycling

PART – B (5 x 2= 10Marks)

11. Why are plastics advantageous in the construction industry? CO1-U

12. What are the environmental benefits of recycling PET bottles? CO1-U

13. Identify the advantage and limitation of using epoxy resins in industrial applications. CO1-U

14. What is a typical use of clear polystyrene in consumer products? CO1-U

15. What are the challenges associated with the use of biodegradable bioplastics in outdoor applications. CO1-U

PART – C (5 x 16= 80Marks)

16.	(a)	How does the plastic materials influence the choice of 3D printing technology and the quality of the printed products? Explain briefly	CO1-App	(16)
		Or		
	(b)	Evaluate the advantages and disadvantages of plastic materials in modern society	CO1-App	(16)
17.	(a)	Discuss the use of polyamide in the medical industry, including its advantages and any potential drawbacks.	CO2-Ana	(16)
		Or		
	(b)	Discuss the innovations in material development, applications, and sustainability initiatives shaping the future of plastic industry.	CO2-Ana	(16)
18.	(a)	Examine the thermal and electrical insulating properties of thermosetting plastics. How do these characteristics make them suitable for specific applications in electrical and electronic devices?	CO3-Ana	(16)
		Or		
	(b)	Discuss how thermosetting plastics resist chemicals and heat. Provide some applications where these properties are essential, and explain their importance?	CO3-Ana	(16)
19.	(a)	Discuss the advancements in the development of smart plastics. How are these materials being used in modern technology and what are their potential applications?	CO4-Ana	(16)
		Or		
	(b)	Discuss the importance of nylon in the textile industry. Identify its properties, benefits, and common applications in clothing and industrial fabrics.	CO4-Ana	(16)
20.	(a)	Examine the processing techniques used for bio-based polymers. What challenges do these techniques present compared to conventional polymer processing?	CO5-U	(16)
		Or		
	(b)	Discuss the potential for recycling and reusing bio-based polymers. What strategies can be implemented to enhance their lifecycle and sustainability?	CO5-U	(16)