

III B. Tech II Semester Regular Examinations, July -2023**ADVANCED MATERIALS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I

1. a) Write the names of metallic materials? Discuss the advantages of each material and its applications. [7M]
b) Discuss the various materials used in cryogenic applications. [7M]
(OR)
2. a) What is super alloys? Discuss the importance of super alloys. [7M]
b) Discuss the evaluation of materials for extreme environment. [7M]

UNIT-II

3. a) Discuss the difference between natural and synthetic polymers. [7M]
b) Briefly explain the step by step processing of plastics. [7M]
(OR)
4. a) Explain the procedure of powder preparation of ceramics. [7M]
b) What is sintering? Discuss the step by step process of sintering. [7M]

UNIT-III

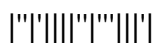
5. a) Discuss the recent advancements in Polymer Composites. [7M]
b) Explain the applications of carbon-carbon composite. [7M]
(OR)
6. a) Discuss any one closed mold FRP Process with a neat sketch. [7M]
b) Mention various phases in fibrous composites. Explain their functions [7M]

UNIT-IV

7. a) Name some shape memory alloys. Give the mechanical properties and applications of the above materials [7M]
b) Discuss the applications of functionally graded materials. [7M]
(OR)
8. a) List out the properties and applications of shape memory alloys. [7M]
b) Explain the preparation process of functionally graded materials. [7M]

UNIT-V

9. a) Describe the properties of nano-materials [7M]
b) Write a note on applications of nano-material for structural applications [7M]
(OR)
10. a) What are the advantages of Nano material in deferent application.. [7M]
b) Explain the use of nano material in medical application [7M]



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UNIT-I

1. a) List out the advantages and applications of the aluminum, magnesium and titanium alloys. [7M]
- b) Explain various materials used in space environment. [7M]
- (OR)
2. a) What is metallic foams? Discuss about the applications of metallic foams. [7M]
- b) List out the various materials used for cryogenic applications. [7M]

UNIT-II

3. a) What is polymer? Briefly discuss about synthetic polymers. [7M]
- b) State the characteristics and applications of ceramics. [7M]
- (OR)
4. a) Identify the difference between thermosets and thermoplastics. [7M]
- b) Briefly discuss about sintering finishing process. [7M]

UNIT-III

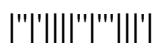
5. a) What is a Matrix? What are the various types of matrices used in the composite material? [7M]
- b) Write the specific characteristics of Kevlar and Silicon Carbide. [7M]
- (OR)
6. a) Give a brief note on Carbon Fiber-Reinforced Polymer (CFRP) Composites [7M]
- b) Discuss any one manufacturing method of Polymer matrix composite. [7M]

UNIT-IV

7. a) Name some shape memory alloys. Give the mechanical properties and applications of the above materials. [7M]
- b) Discuss the applications of functionally graded materials. [7M]
- (OR)
8. a) What do you mean by smart materials? Briefly explain shape memory alloys. [7M]
- b) What is functionally graded material? Discuss about various types of functionally graded materials. [7M]

UNIT-V

9. a) Discuss the advantages of nano materials in optical properties.. [7M]
- b) Mention the applications in comparison with bulk materials. [7M]
- (OR)
10. a) Briefly discuss the advances in Nano materials. [7M]
- b) What are nano-wires and nano-tubes? Explain. [7M]



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UNIT-I

1. a) What is intermetallic materials? Explain. [7M]
b) Discuss about various materials used for space environment. [7M]
(OR)
2. a) List out the advantages and applications of the aluminum, magnesium and Nickle based alloys. [7M]
b) Discuss about evaluation of materials for extreme environment. [7M]

UNIT-II

3. a) State the difference between synthetic polymer and natural polymer. [7M]
b) What is elastomers? Discuss. [7M]
(OR)
4. a) Explain difference Between Natural polymer and synthetic polymer. [7M]
b) Explain the importance of hot compaction and drying in ceramics. [7M]

UNIT-III

5. a) Explain the mechanism of strengthening in fiber reinforced composites with neat diagrams. [7M]
b) Define a polymer composite. Explain the classification of polymer composites. [7M]
(OR)
6. a) Write the specific characteristics of Glass and Silicon Carbide. [7M]
b) Briefly discuss about nature made composites and its applications. [7M]

UNIT-IV

7. a) Describe the phenomenology of phase transformation in shape memory alloys. [7M]
b) Describe the Fraction gradient, Shape gradient and Naturally occurred FGMs. [7M]
(OR)
8. a) How the functionally graded materials are classified? Mention at least one applications of each [7M]
b) Mention the properties of shape memory alloys. In what way these are different? Explain [7M]

UNIT-V

9. a) Mention the applications of nano materials in comparison with bulk materials. [7M]
b) Explain the various marine applications of a nano material. [7M]
(OR)
10. a) Explain the electrical properties of Nano materials. [7M]
b) Write a note on applications of nano-material for structural applications. [7M]



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UNIT-I

1. a) What is super alloys? Discuss the importance of super alloys. [7M]
b) Explain various materials used in space environment. [7M]
(OR)
2. a) Discuss the various materials used in cryogenic applications. [7M]
b) What is metallic foams? Discuss about the applications of metallic foams. [7M]

UNIT-II

3. a) What is natural polymer? List out the applications of natural polymer. [7M]
b) What are the elastomers ?What are the different applications of Elastomers [7M]
(OR)
4. a) What is ceramic? Discuss the applications and characteristics of ceramics. [7M]
b) Briefly discuss about sintering process. [7M]

UNIT-III

5. a) Briefly discuss about ceramic matrix composites. [7M]
b) Write a short note on fiber-reinforced composite and its applications. [7M]
(OR)
6. a) Describe the classification of composites? Mention at least one application of each. [7M]
b) Briefly discuss about glass fiber reinforcements. [7M]

UNIT-IV

7. a) Mention the properties of functionally graded materials. In what way these are different? Explain. [7M]
b) How the shape memory alloys are classified? Explain their composition. [7M]
(OR)
8. a) How the functionally graded materials are prepared? Explain powder metallurgy technique with neat diagram. [7M]
b) Discuss the applications of functionally graded materials. [7M]

UNIT-V

9. a) Mention the applications of nano structure in comparison with bulk materials. [7M]
b) Explain the difference between nano wire and nanotube. [7M]
(OR)
10. a) Describe the properties of nano-materials. [7M]
b) Explain the various applications of nano material in biomedical field. [7M]

