Code No: R203203I **R20** SET -1

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]

Code No: R203203I **R20** SET -2

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)	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]

Code No: R203203I **R20** SET -3

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)	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]

Code No: R203203I **R20** SET -4

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)	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]