GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER- VI • EXAMINATION – SUMMER 2015

Subject Code: 162104Date: 14/05Subject Name: Advanced Materials and ApplicationsTime: 10:30 am to 01:00 pmTime: 10:30 am to 01:00 pmTotal MarInstructions:Total Mar			15
			70
	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Discuss the characteristics of Titanium that makes them attractive for certain	07
	(b)	What are alloy cast irons? Describe properties and applications of Ni -hard and Heat resistance cast irons.	07
Q.2	(a)	Explain mechanism by which high strength and creep resistance are achieved in super alloys. Enlist the properties and applications of Co-based super alloys	07
	(b)	What are Nano materials? Write a note on carbon nanotubes.	07
	(b)	Explain the mechanism of mechanical alloying technique for nano-material production. Give the factors affecting mechanical alloying.	07
Q.3	(a) (b)	Write a note on shape memory alloys. Describe properties and application of Ni-Ti alloy as a useful bio-material.	07 07
Q.3	(a) (b)	What is Smart Material? Write a note on Electro-rheological fluids. Define bio-materials. Discuss about bio-inertness and bio-functionality with suitable examples.	07 07
Q.4	(a)	Discuss important properties and applications of martensitic stainless steel. How	07
	(b)	Describe important characteristics & applications of free cutting steel. Give typical composition. Why free cutting steel contain high sulphur content?	07
Q.4	(a)	What is TRIP steel? Explain the structure and properties of these steels. Also	07
	(b)	What is Maraging steel? Explain the Heat treatment cycle for it. Also give properties and applications.	07
Q.5	(a)	Define and classify the composites. Discuss properties & applications of ceramic matrix composites	07
	(b)	Explain melt spinning technique to produce the metallic glasses. Discuss about glass forming ability (GFA).	07
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Q.5	(a) (b)	what are cryogenic materials? Discuss their properties and applications. Define metallic glasses. Describe the properties of metallic glasses and Compare it with crystalline alloys. Write their applications.	07 07
