Seat	t No.:	Enrolment No	
		GUJARAT TECHNOLOGICAL UNIVERSITY	
		B. E SEMESTER – VI • EXAMINATION – WINTER 2012	
Sul	biect	code: 162104 Date: 07/01/2013	
	•	Name: Advanced Materials and Applications	
	-	2.30 pm - 05.00 pm Total Marks: 70	
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ins		tions:	
		Attempt all questions. Make suitable assumptions wherever necessary.	
		Figures to the right indicate full marks.	
	•	rigares to the right mateure run marks.	
Q.1	(a)	What are Ni -hard and Heat resistance cast irons? Describe their properties and applications.	07
	(b)	Describe the metallurgical aspects of Titanium and its alloys including their	07
	(0)	properties and applications.	U I
Q.2	(a)	Explain different mechanism by which high strength and creep resistance are	07
	()	achieved in super alloys. Enlist the properties and applications of Co-based	
		super alloys.	
	(b)	Discuss important properties and applications of martensitic stainless steel. How	07
		hardness and wear resistance is developed in martensitic stainless steels?	
	(3.)	OR	
	(b)	Describe important characteristics & applications of free cutting steel. Why free	07
		cutting steel contain high sulphur content? Give typical composition of a free cutting steel.	
Q.3	(a)	Define Nano technology Explain the sol-gel technique for nano-material	07
	(u)	production. Give the advantages of this method.	07
	(b)	What are semi conducting and superconducting materials. Describe their	07
	` ,	properties and applications.	
		OR	
Q.3	(a)	What are Nano materials? Give some examples and applications of Nano	07
		materials. Describe the Gas Condensation Technique for Ultrafine Nano Particle	
	(b)	production. Classify the composites Discuss properties & applications of polymer metric.	07
	(b)	Classify the composites. Discuss properties & applications of polymer matrix composites.	U/
Q.4	(a)	Describe the properties of metallic glasses. Discuss the copper mold casting	07
~ ··	(44)	technique to produce the metallic glasses.	٠.
	(b)	Discuss important characteristics and applications of High speed steel. Give	07
		composition of one Tungston base & one Molybdenum base High speed steel.	
		OR	
Q.4	(a)	Discuss the melt spinning technique to produce the metallic glasses. Mention	07
0.4	(L)	applications of metallic glasses.	0.5
Q.4	(b)	What is a TRIP steel? Explain the structure and properties of these steels. Also	07
Q.5	(a)	mention important applications. Define bio-materials. What is bio-inertness and bio-functionality? Describe	07
V.2	(a)	properties and application of Co-Cr-Mo alloys as a bio-material.	U I
	(b)	What is Smart Material? Give their advantages. Write a note on shape memory	07
	` ′	alloys.	
		OR	

(a) Give the classification of bio-materials. Write a not on Ni-Ti alloy.

gas does not show Piezo character. Why?

(b) Define Piezoelectricity and write a note on Piezoelectric materials. Nacl or any 07

Q.5

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