Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER • 2014

Subject Code: 162104 **Date: 28-05-2014**

Subject Name: Advanced Materials and Applications

Time: 10:30 am - 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Discuss important characteristics of Aluminum that makes it attractive for engineering applications.	**07**
	(b)	Give the classification, properties and applications of Fe-based super-alloys.	**07**
Q.2	**(a)**	What do you mean by alloy cast Iron? Write the composition, properties and applications of Ni-hard cast iron.	**07**
	(b)	Define bio-materials. Explain bio-inertness and bio-functionality. Write applications of Biomaterials.	**07**
		OR	
	(b)	Describe properties and application of Ni-Ti alloy as important bio-material.	**07**
Q.3	**(a)**	What is Electro-rheological fluid? Describe the Properties and applications of Electro-rheological fluid.	**07**
	(b)	Discuss important characteristics and applications of High speed steel. Give composition of one Tungston base & one Molybdenum base High speed steel.	**07**
		OR	
Q.3	**(a)**	Define Smart Materials. Write a note on shape memory alloys.	**07**
	(b)	What do you mean by tool steel? Discuss its requirements, properties and applications.	**07**
Q.4	**(a)**	Describe the properties and applications of Austenitic stainless steel. Give the composition of 304L and 347 Stainless steel.	**07**
	(b)	Explain role of Glass Transition temperature in glass formation. Compare metallic glasses with crystalline alloys.	**07**
		OR	
Q.4	**(a)**	What is Hadfield steel? Describe the Properties and applications of Hadfield steel. Give composition.	**07**
	(b)	What are metallic glasses? Describe the properties and applications of metallic glasses.	**07**
Q.5	**(a)**	Describe Sol-gel technique for nano-material production. Write its advantages.	**07**
	(b)	Define composites. Discuss properties & applications of ceramic matrix composites.	**07**
		OR	
Q.5	**(a)**	Define Nanotechnology. Write a note on carbon nanotubes.	**07**
	(b)	Define superconductivity. What are type I and type II super conductors. Describe properties and applications of superconductors.	**07**

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