Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:162104 **Date:17/05/2016**

Subject Name:Advanced Materials and Applications

Time: 10:30 AM to 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)**	Classify the composites. Discuss properties & applications of metal matrix composites.	**07**
	(b)	Describe the metallurgical aspects of Titanium and its alloys including their properties and applications.	**07**
Q.2	**(a)**	Mention the properties and applications of Inconel. Give the composition of Inconel 600 and 625.	**07**
	(b)	Discuss the properties and applications of cryogenic materials.	**07**
		OR	
	(b)	What do you mean by alloy cast Iron? Give the composition, properties and applications of High silicon cast iron.	**07**
Q.3	**(a)**	Mention the properties and applications of Martensitic stainless steel. Give the composition of 410 and 431 stainless steel.	**07**
	(b)	What is sensitization? Discuss how Inter Granular corrosion is harmful for stainless steel. Suggest the methods to minimize it.	**07**
		OR	
Q.3	**(a)**	What is a TRIP steel? Explain the structure, properties and applications of these steels.	**07**
	(b)	Discuss important characteristics, composition and applications of High speed steel.	**07**
Q.4	**(a)**	Explain bio-inertness and bio-functionality. Give the classification of bio-materials with application of each.	**07**
	(b)	Compare metallic glasses with crystalline alloys. Mention advantages, limitations and applications of metallic glasses.	**07**
		OR	
Q.4	**(a)**	Define bio-materials. Describe properties and application of Co-Cr-Mo alloys as a bio-material.	**07**
	(b)	What are Metallic glasses? Discuss the melt spinning technique to produce the metallic glasses.	**07**
Q.5	**(a)**	Explain the sol-gel technique for nano-material production. Draw the necessary diagram. Give the advantages of this method.	**07**
	(b)	What is Smart Material? Write a note on shape memory alloys.	**07**
		OR	
Q.5	**(a)**	Explain the mechanism of mechanical alloying technique for nano-material production. Give the factors affecting mechanical alloying.	**07**
	(b)	Define Piezoelectricity. Discuss working of Piezoelectric materials in detail.	**07**

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