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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2152109 **Date:17/05/2016**

Subject Name:Advanced Materials

Time:02:30 PM to 05:00 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)**	Define bio-functionality. Describe properties and application of Ni-Ti alloy as a useful bio-material.	**07**
	(b)	Describe the requirements of aero-space materials. Suggest some candidate materials with their properties.	**07**
Q.2	**(a)**	Using proper example discuss the characteristics of Titanium that makes it attractive for engineering applications. Also give its limitations.	**07**
	(b)	What do you mean by Silal and Nicrosilal? Give the composition, properties and applications of each.	**07**
		OR	
	(b)	Write a note on surface metal matrix composites and their applications.	**07**
Q.3	**(a)**	Discuss important characteristics and applications of High speed steel with example of composition.	**07**
	(b)	TRIP steel satisfying the requirements of automotive industry for good formable high strength steel". Justify and comment on it.	**07**
		OR	
Q.3	**(a)**	Describe the properties and applications of Ferritic stainless steel. Give the composition of 405 stainless steel.	**07**
	(b)	Explain heat treatment cycle for Maraging steel. Enlist its properties and applications.	**07**
Q.4	**(a)**	Define super alloys. Explain different mechanism by which high strength is achieved in super alloys.	**07**
	(b)	Using required figure, discuss the melt spinning technique to produce the metallic glasses.	**07**
		OR	
Q.4	**(a)**	What is Hastelloy? Mention the properties, and applications of Hastelloy. Also give composition of any one Hastelloy.	**07**
	(b)	Define metallic glasses. Compare properties of metallic glasses with their crystalline counter parts. Write their advantages, limitations and applications.	**07**
Q.5	**(a)**	Explain the sol-gel technique for nano-material production. Draw the necessary diagram.	**07**
	(b)	Write a note on Magneto- rheological fluid.	**07**
		OR	
Q.5	**(a)**	Define Nano technology. Write a note on carbon nanotubes.	**07**
	(b)	Enlist the advantages of Smart Materials. Describe about shape memory alloys.	**07**

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