Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 132101 **Date: 10-01-2013**

Subject Name: Materials Science AND Metallurgy

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)**	Give a brief Classification of engineering materials and explain Engineering requirements of materials.	**07**
	(b)	Define and explain: (1) Creep (2) Toughness (3) Hardness.	**07**
Q.2	**(a)**	Define composite. Discuss detailed classification of composite materials. Differentiate in polymer matrix and ceramic matrix composites.	**07**
	(b)	Give the classification of polymers and discuss polymerization mechanism.	**07**
		OR	
	(b)	What is ceramic? Give a detailed classification of ceramics and write a note on covalent bond in ceramics.	**07**
Q.3	**(a)**	Explain the effects of grain size and alloying elements on material properties with suitable examples.	**07**
	(b)	Define Piezoelectricity and write a note on Piezoelectric materials.	**07**
		OR	
Q.3	**(a)**	What do you mean by deformation? Differentiate in Elastic and Plastic Deformation.	**07**
	(b)	Write a note on various fields of metallurgical engineering.	**07**
Q.4	**(a)**	"Material Testing is an important task for industry." Justify the statement and classify material testing methods.	**07**
	(b)	Write the ores of aluminum and explain the principle of production of aluminum.	**07**
		OR	
Q.4	**(a)**	What do you mean by non destructive testing? Explain any one NDT test method.	**07**
	(b)	What is a foundry? List the advantages of casting process over other fabrication processes. Draw a flow chart showing major foundry activities.	**07**
Q.5	**(a)**	Describe various advantages, limitations and applications of powder metallurgy.	**07**
	(b)	Define corrosion. Give the types of corrosion. Briefly discuss different damages due to corrosion.	**07**
		OR	
Q.5	**(a)**	Define soldering. Explain basic steps of soldering. Give applications.	**07**
	(b)	Enlist different methods of corrosion prevention. Justify the role of design aspects in corrosion protection with suitable examples.	**07**

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