Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III EXAMINATION – SUMMER 2015

Subject code:132101 **Date: 09/06/2015**

Subject Name: Elements of Metallurgy and Material Science

Time:02.30pm-05.00pm **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 MaterialScience. What are the various fields of Metallurgical Engineering? List down the role of Metallurgist in industry?	**02 +03+02**
	(b)	Give a brief Classification of engineering materials and explain Engineering requirements of materials.	**07**
Q.2	**(a)**	Discuss structure, property & Application relationship in Engineering Materials with suitable example.	**07**
	(b)	Define and explain: (1) Resilience (2) Toughness (3) Hardness	**07**
		OR	
	(b)	What is imperfection? Discuss different crystals imperfections in metallic material in brief	**02 +05**
Q.3	**(a)**	What do you mean by deformation? Differentiate in Elastic and Plastic Deformation.	**07**
	(b)	Explain the effects of grain size, heat treatment and alloying elements on properties of single phase material.	**07**
		OR	
Q.3	**(a)**	Write classification of refractory and discuss the general requirements of a Refractory material with examples	**07**
	(b)	What is a foundry? List the advantages of casting process over otherFabrication processes. Draw a flow chart showing major foundry activities.	**01+ 03+ 03**
Q.4	**(a)**	What are the different types of metallic materials? What is the difference between an alloy and a composite material?	**07**
	(b)	What is powder metallurgy? List down the steps of Powder Metallurgy Process. Also list the components produced by P/M Process.	**03+ 02+ 02**
		OR	
Q.4	**(a)**	What is corrosion? Explain any one corrosion prevention method	**04+03**
	(b)	Differentiate between cold working and hot working	**07**
Q.5	**(a)**	What do you mean by Non-destructive testing? Explain any one NDT test method.	**07**
	(b)	What are the ceramic materials? Write short note on various applications of ceramic materials.	**07**
		OR	
Q.5	**(a)**	What are polymers? Discuss the different Polymerization mechanisms with sketch.	**07**
	(b)	Explain principle used in soldering and brazing.	**07**