Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: 172104 **Date: 28-11-2013**

Subject Name: Alloy Design

Time: 10:30 TO 01:00 **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 Engineering design activities. Explain steps in alloy design.	**07**
	(b)	Explain briefly single phase, dual phase and multiphase materials.	**07**
Q.2	**(a)**	What is composite material? What is matrix? What is dispersed phase? Explain with example.	**07**
	(b)	With figure explain continuous and discontinuous alignment of fibers in composite materials.	**07**
		OR	
	(b)	Discuss classification of composite materials.	**07**
Q.3	**(a)**	Explain effects of size, shape and distribution of second phase on mechanical properties of composite materials.	**07**
	(b)	Explain precipitation hardening in Al-4.5 % Cu alloy.	**07**
		OR	
Q.3	**(a)**	Briefly discuss recovery, Recrystallization and grain growth.	**07**
	(b)	Discuss strain hardening.	**07**
Q.4	**(a)**	Explain homogeneous and heterogeneous nucleation.	**07**
	(b)	Draw and explain S-N curve for steel and aluminium alloy. What is fatigue limit.	**07**
		OR	
Q.4	**(a)**	Draw and explain creep curve. Explain its importance in design.	**07**
	(b)	What are High Strength Low Alloy (HSLA) steels? Write their classification and explain.	**07**
Q.5	**(a)**	Discuss briefly High Speed steels and discuss their applications.	**07**
	(b)	Discuss the advantages of high strength aluminium powder metallurgical alloys.	**07**
		OR	
Q.5	**(a)**	What is maraging steel? Discuss their properties and applications.	**07**
	(b)	Briefly discuss superalloys.	**07**

****