Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 172104 **Date: 27/12/2012**

Subject Name: Alloy Design

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are the activities involved in engineering design? Discuss.	**07**
	(b)	Discuss dual phase steel with microstructure and state applications.	**07**
Q.2	**(a)**	What is Composite material? Explain: Matrix, Dispersed phase, Particle, Fiber and explain their effect in composite materials.	**07**
	(b)	Explain Continuous and Discontinuous fiber alignment highlighting their effects on properties.	**07**
		OR	
	(b)	Explain the variations in mechanical properties with respect different stages of annealing.	**07**
Q.3	**(a)**	Discuss the phenomena of Fatigue with neat sketch of S-N diagram for various alloys.	**07**
	(b)	Define wear and explain different ways to reduce wear.	**07**
		OR	
Q.3	**(a)**	What is High Strength Low Alloy (HSLA) steels? State their Composition, Characteristics and applications.	**07**
	(b)	Write a detailed note on HSS.	**07**
Q.4	**(a)**	Discuss super alloys with their applications.	**07**
	(b)	What is high strength light weight alloys? Discuss their advantages.	**07**
		OR	
Q.4	**(a)**	Discuss the role of various elements on Iron-base, Cobalt-base and Nickel-base Superalloys.	**07**
	(b)	Write a note on maraging steel.	**07**
Q.5	**(a)**	With neat sketch discuss creep in detail.	**07**
	(b)	Explain different type of cooling curves with sketch and explain supercooling.	**07**
		OR	
Q.5	**(a)**	Discuss various steps of precipitation hardening of Al-4.5%Cu alloy with necessary diagram.	**07**
	(b)	What are different strengthening mechanisms? Explain any one.	**07**

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