Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 172104 **Date:16/12/2015**

Subject Name: Alloy Design

Time: 10:30am to 1:00pm **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)**	Discuss the activities involved in engineering design.	**07**
	(b)	Give the flow diagram/process steps of Engineering Design Process, Iterative Design Process, Iteration in Component Design & Alternative approaches for selecting material and process classes.	**07**
Q.2	**(a)**	Draw neat sketch of stress strain curve and explain stress, strain, stiffness and toughness.	**07**
	(b)	What is Dual-phase Steel (DPS)? What is the microstructure of DPS? Justify the advantages offered by DPS compared to Plain Carbon (PC) steel. Enlist its applications.	**07**
		OR	
	(b)	Explain in brief with examples of each: Ceramic Matrix Composite (CMC), Metal Matrix Composite (MMC), and Polymer Matrix Composite (PMC).	**07**
Q.3	**(a)**	Explain briefly effect of size, shape and distribution of second phase on mechanical properties of alloys.	**07**
	(b)	Discuss different types of cooling curves.	**07**
		OR	
Q.3	**(a)**	With suitable example explain the phenomena of Precipitation Strengthening.	**07**
	(b)	Explain Continuous and Discontinuous fiber alignment? What is their effects on properties?	**07**
Q.4	**(a)**	Write a short note on Hadfield Steel.	**07**
	(b)	Explain the phenomena of Recovery, Recrystallization & Grain Growth.	**07**
		OR	
Q.4	**(a)**	Explain factors to be considered for selection of materials for the design of Static structure.	**07**
	(b)	State fundamental criteria for selection of materials for wear applications.	**07**
Q.5	**(a)**	Explain briefly processing of Maraging Steels & Enlist its applications.	**07**
	(b)	Write Composition, Characteristics and applications of HSLA.	**07**
		OR	
Q.5	**(a)**	What is Fatigue? Show S-N diagram for various alloys subjected to completely reversal loading at ambient temperature.	**07**
	(b)	Explain the Application of computer-based methods for alloy designing.	**07**

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