

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2018****Subject Code: 2182115****Date: 02/05/2018****Subject Name: Alloy Design (Department Elective -III)****Time: 10:30 AM to 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.

		MARKS
Q.1	(a) What is Alloy Design ? List the activities involved.	03
	(b) Draw neat sketch of stress strain curve for ductile and brittle materials giving suitable example & explain proof stress.	04
	(c) Define the terms: System, Phase, Components and degree of freedom relationship giving suitable examples.	07
Q.2	(a) Explain Continuous and Discontinuous fiber alignment? What is their effects on properties?	03
	(b) Define the terms: Matrix, Dispersed phase, Particle, Fiber, whiskers	04
	(c) Explain in brief with examples of each: Particle reinforced, Fiber reinforced and Structural composites.	07
	OR	
	(c) What is Dual-phase Steel (DPS)? Discuss the various advantages offered by DPS compared to Plain Carbon (PC) steel. List its applications.	07
Q.3	(a) State the difference between Alloy & Composites.	03
	(b) Explain briefly effect of size, shape and distribution of second phase on mechanical properties of alloys	04
	(c) Explain with the neat schematic variations in mechanical properties with respect to recovery, recrystallization and grain growth.	07
	OR	
Q.3	(a) Explain factors to be considered for selection of materials for the design of Static structure.	03
	(b) Write Composition, Characteristics and applications of HSLA	04
	(c) What is Creep? With a neat diagram explain mechanism of Creep deformation. What is Equi-cohesive temperature in context with Creep Phenomena?	07
Q.4	(a) What is Fatigue? Show S-N diagram for various ferrous & Non ferrous alloys	03
	(b) Which are the principal alloying elements of group-M HSS? List the effects of these elements on properties of	04

- group-M HSS.
- (c) Summarize in a tabular form wear applications for different class of materials **07**
- OR**
- Q.4** (a) Suggest the ways of reducing wear on materials. **03**
- (b) State fundamental criteria for selection of materials for wear applications **04**
- (c) Write the role of various elements on Iron-base, Cobalt-base and Nickel-base Super alloys. **07**
- Q.5** (a) What are Superalloys? List their applications **03**
- (b) Write Properties and Applications of Maraging Steels. **04**
- (c) With suitable example explain the phenomena of Precipitation Strengthening. **07**
- OR**
- Q.5** (a) Suggest the materials for High dynamic loading conditions. **03**
- (b) State the composition, Properties and application of Hadfield Steel **04**
- (c) Explain how of computer-based methods are designing alloys. **07**