

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, **07**
Particle, Fiber and explain their effect in composite materials.
(b) Explain Continuous and Discontinuous fiber alignment highlighting **07**
their effects on properties.

OR

- (b) Explain the variations in mechanical properties with respect different **07**
stages of annealing.

- Q.3** (a) Discuss the phenomena of Fatigue with neat sketch of S-N diagram for **07**
various alloys.
(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 **07**
Composition, Characteristics and applications.
(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 **07**
Nickel-base Superalloys.
(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 **07**
supercooling.

OR

- Q.5** (a) Discuss various steps of precipitation hardening of Al-4.5%Cu alloy **07**
with necessary diagram.
(b) What are different strengthening mechanisms? Explain any one. **07**
