

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – SUMMER 2013****Subject Code: 133403****Date: 29-05-2013****Subject Name: Engineering Materials & Metallurgy****Time: 02.30 pm - 05.00 pm****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) Explain briefly the Iron- carbon equilibrium diagram with a neat sketch. **07**
(b) Define Constitution of alloy. Explain the isomorphism microstructural development with a neat sketch **07**
- Q.2** (a) Briefly discuss about the heat treating methods of spheroidizing and normalizing with a neat sketch **07**
(b) Define Hardenability. Explain the Jominy end quench test method with a neat sketch. **07**
- OR**
- (b) Explain briefly about the thermo mechanically treatment process with a neat sketch **07**
- Q.3** (a) Explain the TTT diagram and CCT cooling curve with a neat sketch. **07**
(b) Explain the effect of alloying the copper and aluminum metal and its alloys. **07**
- OR**
- Q.3** (a) Explain the heat treatment method of nitriding and carburizing with a neat sketch. **07**
(b) Briefly explain the properties and applications of titanium and nickel alloys. **07**
- Q.4** (a) Discuss about the types, properties and applications of Plastics. **07**
(b) Discuss about the types, properties and applications of Thermosetting Plastics **07**
- OR**
- Q.4** (a) Explain in brief about the classification of ceramics with applications **07**
(b) Write short notes about the nanomaterials with applications **07**
- Q.5** (a) Discuss the working principle of Brinell hardness testing machine with neat sketch **07**
(b) Explain crystal imperfection and discuss the strengthening mechanisms and modulus of elasticity with a neat sketch **07**
- OR**
- Q.5** (a) Explain the mechanisms of fracture - fatigue test with neat sketch **07**
(b) Discuss the working principle of Charpy & izod impact testing machine with a neat sketch **07**
