

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III • EXAMINATION – WINTER • 2014****Subject Code: 133403****Date: 30-12-2014****Subject Name: Engineering Materials and 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 the solidification of Iron – Carbon alloys **07**  
(b) Explain the transformation of hypoeutectoid steels and hypereutectoid steels with suitable sketches **07**
- Q.2** (a) Draw and explain the CCT diagram for Eutectoid carbon steel and describe its isothermal transformations **07**  
(b) What are austempering and martempering treatments? What are their purposes? **07**
- OR**
- (b) Define nitriding. What is the procedure of nitriding, also specify its advantages and disadvantages **07**
- Q.3** (a) Discuss the characteristics of aluminium and also mention its alloys, their properties and uses **07**  
(b) Explain how a malleabilising heat treatment will convert a white cast iron to malleable cast iron **07**
- OR**
- Q.3** (a) Write short notes on composition and properties of austenitic stainless steels and high speed steels **07**  
(b) How will you classify brasses based on the composition of zinc? Explain the properties and applications of main types of brasses **07**
- Q.4** (a) Explain additional polymerization and condensation polymerizations **07**  
(b) Explain the properties and applications of any three thermosetting plastics **07**
- OR**
- Q.4** (a) Briefly explain about particle reinforced composites and fibre reinforced composites with their characteristics **07**  
(b) Describe the characteristics and applications of alumina and silicon carbide **07**
- Q.5** (a) Define creep? Using creep curve explain the different stages in creep curve and mechanism of creep fracture **07**  
(b) Briefly explain the testing procedure of tensile test **07**
- OR**
- Q.5** (a) Explain the testing procedure for Charpy impact testing of materials **07**  
(b) What does impact test signify? Explain impact Izod test with neat sketches **07**

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