

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III • EXAMINATION – WINTER 2013****Subject Code: 133403****Date: 30-11-2013****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)** Write the Nitriding process and explain the advantages and disadvantages of Nitriding. **07**
- (b)** How do you measure the hardenability of Steel by using Jominy end quench method with sketch? **07**
- Q.2 (a)** Write the various micro constituents of Iron and Steel. Draw and explain the Iron Carbon equilibrium diagram. **07**
- (b)** Why Iron is called allotropic metal? Define Gibb's phase rule. Explain the interpretation of phase diagram with any one suitable diagram. **07**
- OR**
- (b)** Explain in brief about Super conductors and its properties. **07**
- Q.3 (a)** Define fatigue test. Explain the fatigue testing procedure with sketch. **07**
- (b)** How do you measure Hardness by using Brinell Test? Write the procedure of Brinell Hardness Testing. **07**
- OR**
- Q.3 (a)** Write the objectives and test procedure of Creep Testing with neat sketch. **07**
- (b)** Explain about the Ductile – Brittle Transition and draw the temperature curve. **07**
- Q.4 (a)** Define Cyaniding. Write the cyaniding process, characteristics and uses. **07**
- (b)** Define Normalizing and write the Normalizing procedure. Write any four quenching medium. **07**
- OR**
- Q.4 (a)** Define polymer. Write any three polymer materials for Commodity, Engineering and Specialty materials with corresponding applications. **07**
- (b)** Write short notes about Bio degradable materials and its advantages. **07**
- Q.5 (a)** Write the effect of Molybdenum and Vanadium as an alloying element addition on Steel. **07**
- (b)** Write the any four Nickel alloy. Explain the properties and applications of Nickel alloy. **07**
- OR**
- Q.5 (a)** Write the classification of Cast Iron. Explain any one cast iron characteristics and its applications. **07**
- (b)** Write the effect of Silicon and Titanium as an alloying element addition on Steel. **07**

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