GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-III Examination-Dec.-2011

Subject code: 133403 **Date: 17/12/2011**
Subject Name: Engineering Materials and Metallurgy
Time: 2.30 pm -5.00 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 graphic representation of Iron – Carbon Equilibrium and brief how the transformation takes place? **07**
    (b) Draw and explain the cooling curve for pure iron. Define Gibb's Phase rule. **07**

Q.2 **(a)** Explain in brief about the Bain's curve (TTT) with neat sketch. **07**
    (b) Define Hardenability. Write any two factors affecting Hardenability. Write any one method to determine Hardenability. **07**
            OR
    (b) Write short notes about Carbonitriding & Induction hardening? **07**

Q.3 **(a)** Discuss in brief about effect of Mo, Mn & Si alloy addition on Steel. **07**
    (b) Write the properties, applications and types of Nickel and its alloys & cobalt and its alloys. **07**
            OR
Q.3 **(a)** Discuss in brief about effect of Ti, V & W alloy addition on Steel. **07**
    (b) Write the properties, applications and types of Aluminium and its alloys & Magnesium and its alloys. **07**

Q.4 **(a)** Discuss the common and most widely used clay product and abrasive ceramic material. Write any three mechanical properties of ceramic material. **07**
    (b) Distinguish between Engineering Plastics & Commodity Plastics, with suitable examples. **07**
            OR
Q.4 **(a)** Explain in brief about nanomaterials and its properties. **07**
Q.4 **(b)** Write short notes about Specialty plastics & Thermosetting plastics, with suitable examples. **07**

Q.5 **(a)** Discuss in brief about Elastic, Anelastic and Viscoelastic behavior. **07**
    (b) Write short notes about Modulus of elasticity & Plastic deformation. **07**
            OR
Q.5 **(a)** Define fatigue testing method. Explain the procedure with neat sketch of fatigue testing. **07**
    (b) Explain about Compression testing & Impact testing. **07**

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