

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem-II Examination May 2011

Subject code: 131904
Date: 25/05/2011Subject Name: Material science & Metallurgy
Time: 10.30 am – 01.00 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) State the importance of study of materials science and briefly. Explain Engineering requirements of materials. **07**
(b) Explain selection criteria for engineering materials. **07**

- Q.2** (a) Evaluate “After etching the micro specimen structure is visible”. Also Write a short note on macro- examination. **07**
(b) What is non destructive test? List various non destructive tests. Explain X-Ray Radiography. **07**

OR

- (b) What is Gibb’s phase Rule? Define system phase and degree of freedom so that the degree of freedom eutectic point in a binary phase diagram is zero. **07**

- Q.3** (a) What is powder metallurgy? Describe various steps involved in powder metallurgy with each step controlling properties of final sintered component **07**
(b) Which are merit and demerit and application of powder metallurgy. **07**

OR

- Q.3** (a) Give composition properties and uses of malleable cast iron **07**
(b) What are the purpose of Alloying ? Give effects of nickel as an alloying element. **07**

- Q.4** (a) What are the purposes of heat treat. Differentiate between annealing and non normalising **07**
(b) Which are various surface hardening processes? Explain induction hardening process with sketch **07**

OR

- Q.4** (a) What are the factors affecting rate of corrosion? Explain the hydrogen evolution & oxygen Absorption mechanism of corrosion. **07**
(b) Discuss the cathodic protection method of corrosion prevention For underground pipelines **07**

- Q.5** (a) Explain Ultrasonic Testing with Advantages and limitation. **07**
(b) What is “ Wrought iron “? enlist the properties and uses of It. **07**

OR

- Q.5** (a) Define critical cooling Rate of steel and show the same on a TTT diagram with complete labelling **07**
(b) I. What are the properties of bearing alloys **07**
II. What are the properties of aluminium alloys
