

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC SEM-III Examination-Dec-2011****Subject code: X31902****Date: 15/12/2011****Subject Name: Material science & 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) Define Material science and Metallurgy. Give classification of Engineering materials. **07**

(b) Define Corrosion. Explain difference of dry type and Wet type corrosion. **07**

Q.2 (a) Explain the following terms : **07**
(i) Toughness (ii) Stiffness (iii) Malleability (iv) Resistivity

(b) What do you mean by Non destructive testing? Explain 'Dye penetration testing'. **07**

OR

(b) State and derive an expression for Bragg's law used in x-rays diffraction. **07**

Q.3 (a) What is atomic packing factor? Calculate the same for BCC and FCC structures. **07**

(b) Explain the following by giving their differences Pearlite, Ferrite and austenite. **07**

OR

Q.3 (a) Enlist the properties of Engineering materials. Explain any two thermal properties. **07**

(b) What is Powder metallurgy? State advantages and limitations of powder metallurgy. **07**

Q.4 (a) Give difference between Ductile and Brittle structures. **06**

(b) Explain the following in brief : **08**
(i) Grey cast Iron (ii) Wrought Iron

OR

Q.4 (a) Explain Aluminium and its alloys **06**

(b) Explain the concept of Heat treatment of steel. List various steel heat treatment methods. Explain any one briefly. **08**

Q.5 (a) Discuss Engineering requirements of materials. **04**

(b) Write short note on "Corrosion control". **03**

(c) Draw Iron-carbon phase diagram. **07**

OR

Q.5 (a) Discuss 'Magnetic particle testing.' **04**

(b) Represent planes (1 0 1) and (0 0 1) in a cubic unit cell. **03**

(c) Classify Copper alloys and discuss them in brief. **07**
