Seat No.:	Enrolment No.

Subject Code: X31902

GUJARAT TECHNOLOGICAL UNIVERSITY PDDC SEMESTER-III • EXAMINATION - SUMMER- 2015

Subject Name: Material Science & Metallurgy Time: 02.30pm-05.00pm **Total Marks: 70 Instructions:** 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. 0.1 (a) (a) Define (1) Toughness (2) Hardness (3) Hardenability 07 (4) Malleability (5) Creep (6) Elasticity (7) Ductility (b) What is Gibb's phase rule? Define system, phase and degree of freedom. Show **07** that the degree of freedom at eutectic point in a binary phase diagram is zero. Define Material science and Metallurgy. Give classification of Engineering 07 0.2 (a) materials. **(b)** What is atomic packing factor? Calculate the same for BCC and FCC structures. **07** OR **(b)** Define Corrosion. Explain difference of dry type and Wet type corrosion. 07 Draw and Explain Iron Carbon Equilibrium diagram. 0.3 (a) 07 What do you mean by Non destructive testing? Explain 'Dye penetration testing'. 07 **(b) Q.3** (a) Explain composition, structure, properties and use of grey cast iron. 07 **(b)** What is Wrought iron? Enlist properties and application of it. 07 (a) Explain application of Annealing, Normalizing and Spheroidizing. Explain any **07 Q.4** one of them. (b) Explain the effects of allying elements on properties of steel. **07** OR 0.4 (a) Define Critical Cooling Rate of steel and show the same on a TTT diagram with 07 complete labeling. **(b)** Give composition, properties and uses of malleable cast ron. 07 **Q.5** What are the advantages and limitations of powder metallurgy? **07** (a) **(b)** Define "Alloy". Also state composition, properties & uses of any two copper 07 alloys. (a) What are micro and macro examination? Explain steps micro examination 07 Q.5 process. **(b)** Explain Jominy End-Quench test. **07**

Date: 01/06/2015