Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VI • EXAMINATION – WINTER • 2014

Subject Code: 162101

Subject Name: Physical Metallurgy-I

Date: 26-11-2014

Total Marks: 70

Instructions:

1. Attempt all questions.

Time: 02:30 pm - 05:00 pm

- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- **Q.1** Draw Iron -iron carbide equilibrium diagram indicating all important temps., 07 **(a)** phases, and composition. What is phase diagram? How are they classified? Draw completely labeled Cu-**(b)** 07 Ni equilibrium diagram. Q.2 Give classifications of steel. Mention the effect of Cr, C, Mo, and W on the **(a)** 07 properties of steel. Classify alloy steels. Discuss duplex stainless steels in detail. **(b)** 07 OR Write advantages and limitations of plain carbon steels. Write applications of **(b)** 07 plain carbon steel. **Q.3** (a) What is metallography? Write in detail about basic steps required to prepare 07 metallographic specimen. **(b)** Explain electrolytic polishing. State the name and applications of different 07 etchant. OR Differentiate between Macroscopic and Microscopic Examination. Define Non Q.3 **(a)** 07 metallic inclusion. Write a short note on Metallurgical Microscope. 07 **(b)** Q.4 Compare White and Grav cast irons. 07 (a) State and explain the Hume Rothery rules of solid solution formation with **(b)** 07 suitable example. OR Explain the nucleation and growth mechanism for the solidification of metals. 07 **Q.4 (a)** Explain Malleable cast iron production method. 07 **(b)** Draw and explain the cooling curves for pure metal, binary solid solution alloy Q.5 (a) 07 and binary eutectic alloy. Explain the meaning of crystal planes and crystal directions. With neat sketch 07 **(b)** indicate directions of BCC and FCC material. OR What do you mean by coding of steel? Discuss about American Standards for **(a)** Q.5 07
- Q.5 (a) What do you mean by coding of steel? Discuss about American Standards for 07 Steel.
 - (b) Define miller indices. Explain the procedure for finding miller indices. Draw 07 planes: (1 1 1) and direction: [1 1 1]
