

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

Subject Code: 162101**Date: 19-05-2014****Subject Name: Physical Metallurgy-I****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) Define Crystal and Crystal System? List different crystal systems. Explain FCC and BCC with sketches. **07**
- (b) Write important features of Miller Indices. Draw Different planes and directions for following systems: **07**
(1 1 2), (0 1 1), (0 0 1), [1 0 0], [0 0 1]

- Q.2** (a) What is solid solution? Discuss briefly substitutional and interstitial solid solutions. **07**
- (b) What is phase diagram? How are they classified? Draw completely labeled Cu-Ni equilibrium diagram. **07**

OR

- (b) Draw completely labeled Iron- Iron carbide equilibrium diagram. Explain various phases and transformation reactions in it. **07**

- Q.3** (a) Define steel. Write classification of steel. Explain effects of impurity elements on properties of steel. **07**
- (b) Write advantages and limitations of Plain Carbon steels. Write applications of plain carbon steels. **07**

OR

- Q.3** (a) Discuss effects of alloying elements on the properties of plain carbon steel. **07**
- (b) Explain coding systems used for designation of steel as per Indian Standard (IS) and American standard. **07**

- Q.4** (a) Write classification of cast irons. Discuss in detail about Ductile Cast iron. **07**
- (b) Draw labeled microstructure of gray cast iron. Explain effects of graphite flakes on the properties of gray cast iron. **07**

OR

- Q.4** (a) Compare white and gray cast irons. **07**
- (b) Write short note on malleable cast iron. **07**

- Q.5** (a) What is metallography? Write in detail about basic steps required to prepare metallographic specimen **07**
- (b) Differentiate between Macroscopic and Microscopic Examinations. Explain briefly Electrolytic polishing. **07**

OR

- Q.5** (a) Write a short note on Metallurgical microscope. **07**
- (b) What is Non metallic inclusion? Write sources and formation of Non Metallic inclusions. **07**
