

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 162101****Date: 24-05-2013****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) Draw and explain Iron-Iron Carbide equilibrium diagram. Label it properly. **07**
(b) Explain the meaning of crystal planes and crystal directions. With neat diagram indicate directions of BCC and FCC materials. **07**

- Q.2** (a) What do you mean by phase? Explain followings: **07**
1.Cementite 2.Ferrite 3.Austenite
(b) Briefly explain the Eutectic, peritectic, and eutectoid reactions with reference to Iron-Iron Carbide equilibrium diagram. **07**

OR

- (b) Draw and explain cooling curves for pure metal, binary solid solution alloy and binary eutectic alloy. **07**
- Q.3** (a) Write and explain the Hume-Rothery Rules of solid solution formation giving suitable examples. **07**
(b) Draw and briefly explain the Copper-Tin binary phase diagram. **07**

OR

- Q.3** (a) Explain the nucleation and growth mechanism for the solidification of metals. **07**
(b) Define equilibrium diagram. What information may be obtained from an equilibrium diagram? Explain its role in the development of alloys. **07**

- Q.4** (a) Give classification of steel. Mention the effect of Ni, Cr and Mn on the properties of steel. **07**
(b) Discuss the effect of impurities on the properties of steels. Enumerate the properties and applications of stainless steels. **07**

OR

- Q.4** (a) Define austenitic grain size? Explain the method of grain size measurement. **07**
Q.4 (b) What do you mean by Coding of steel? Discuss about American Standard for steel (AISI). **07**

- Q.5** (a) State the principle of optical microscope. Draw optical microscope and describe the function of the different parts of the same. **07**
(b) Explain how malleable cast iron produce from white cast iron. **07**

OR

- Q.5** (a) Draw the microstructure of Malleable cast iron. Mention properties and applications of Malleable cast iron. **07**
(b) Define mounting and explain its objective. List different mounting methods and explain any one. **07**
