

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 132102**Date: 05-01-2013****Subject Name: Metallurgical Thermodynamics****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 heat capacity (C). Derive relationship between C_p and C_v . **07**
(b) Differentiate between (i) Extensive and intensive properties (ii) Homogeneous and heterogeneous systems. **07**

- Q.2** (a) Define or explain the following: **07**
i) 0th Law of thermodynamics ii) 1st Law of thermodynamics iii) Enthalpy iv) Mole fraction
(b) Derive combined expression of 1st and 2nd law of thermodynamics in terms of dE , dH and dG . **07**

OR

- (b) Write short note on Quasistatic process. **07**

- Q.3** (a) Define free energy and explain Helmholtz and Gibb's Free Energy. **07**
(b) What is 2nd Law of thermodynamics? Define entropy and give its significance. **07**

OR

- Q.3** (a) Derive Clausius-Clapeyron equation. **07**
(b) i) Give Maxwell's relations. **07**
ii) State 3rd law of thermodynamics.

- Q.4** (a) What is Gibb's phase rule? Explain its each terminology and give its applications. **07**
(b) Write short note on applications of Ellingham diagram in metallurgy. **07**

OR

- Q.4** (a) Explain the concept of equilibrium. **07**
(b) Differentiate between exothermic and endothermic reactions **07**

- Q.5** (a) Explain the concept of Basicity Index. **07**
(b) Write short note on composition and functions of slag. **07**

OR

- Q.5** (a) Explain Raoult's Law and Sievert's Law. **07**
(b) State and explain Hess' Law and Kirchoff' Law. **07**
