Seat No.: _____ Enrolment No._____

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 Cp and Cv.	**07**
	(b)	Differentiate between (i) Extensive and intensive properties (ii) Homogeneous and heterogeneous systems.	**07**
Q.2	**(a)**	Define or explain the following: i) 0th Law of thermodynamics ii) 1st Law of thermodynamics iii) Enthalpy iv) Mole fraction	**07**
	(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. ii) State 3rd law of thermodynamics.	**07**
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)**	Expali Raoults' Law and Sievert's Law.	**07**
	(b)	State and explain Hess' Law and Kirchoff' Law.	**07**

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