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

Subject Code: 2132102   **Date: 03-01-2015**
Subject Name: Metallurgical Thermodynamics
Time: 02.30 pm - 05.00 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)**	With suitable example define and classify different types of systems.	**07**
	(b)	Briefly explain different types of thermodynamic processes.	**07**
Q.2	**(a)**	i) Compare intensive and extensive properties.	**04**
		ii) State zeroth law of thermodynamics and give its importance.	**03**
	(b)	State 1st and 2nd Law of thermodynamics and give its significance.	**07**

OR

	(b)	Explain Raoult's law and Sievert's law.	**07**
Q.3	**(a)**	Define Specific heat and derive relationship Cp-Cv=R.	**07**
	(b)	What is equilibrium? Explain different types of equilibrium.	**07**

OR

Q.3	**(a)**	Derive combined equation of 1st and 2nd Law of thermodynamics in terms of internal energy, enthalpy and free energy.	**07**
	(b)	Calculate heat of formation of benzene and methane if heat of combustion of carbon, hydrogen, benzene and methane are -393, -286, -1561 and -900 kJ/mol respectively.	**07**
Q.4	**(a)**	What is free energy? Derive equation for Gibb's free energy.	**07**
	(b)	Give Maxwell's relations and state 3rd Law of thermodynamics and give Nernst Heat Theorem.	**07**

OR

Q.4	**(a)**	Using suitable example explain Hess' and Kirchhoff' laws.	**07**
	(b)	Briefly explain basicity index and functions of slag.	**07**
Q.5	**(a)**	State Gibb's phase rule and explain it's each terminology and give its importance.	**07**
	(b)	Derive Clausius Clapeyron equation	**07**

OR

Q.5	**(a)**	State & explain Ellingham diagram for various metal oxides?	**07**
	(b)	Explain enthalpy, fugacity, activity and mole fraction.	**07**

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