Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2132102 Date:21/12/2015

Subject Name: Metallurgical Thermodynamics

Time: 02:30pm to 05:00pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is meant by phase?	
	2	Fugacity is _____ of substance.	
	3	Define mole fraction.	
	4	Define Heat capacity (C).	
	5	Entropy of substance can be taken as zero at absolute zero temperature. True or False	
	6	Entropy is measure of _____.	
	7	If value of dH is positive than the reaction is endothermic or exothermic.	
	8	If pressure remains constant the thermodynamic process is isothermal. True or False	
	9	dE+PdV= _____.	
	10	If no of phases in thermodynamic system is three than based on phase is _____ system.	
	11	Give equation of state.	
	12	Sharp change in slope of line in Ellingham diagram indicates _____.	
	13	Element having lower position of line in Ellingham diagram is poor reducing agent. True or False	
	14	If system allows transfer of only heat than it is _____ system.	
Q.2	**(a)**	Differentiate between extensive and intensive properties.	**03**
	(b)	What are objectives of thermodynamics and give applications of thermodynamics.	**04**
	(c)	Derive relationship between Cp and Cv.	**07**
		OR	
	(c)	State Hess's and Kirchoff's Law and give its significance.	**07**
Q.3	**(a)**	State zeroth law of thermodynamics and give its importance.	**03**
	(b)	What is equilibrium? Explain different type of equilibrium.	**04**
	(c)	Give different classification of System and give suitable example.	**07**
		OR	
Q.3	**(a)**	If heats of complete and incomplete combustion of carbon are -97 Kcal/mol and – 65 Kcal/mol. Calculate heat of formation of CO_2 from CO combustion.	**03**
	(b)	State 1st law of thermodynamics and give its importance.	**04**
	(c)	Explain reversible and irreversible processes.	**07**

Q.4	**(a)**	Prove that Cp>Cv.	**03**
	(b)	Explain concept of quasistatic process.	**04**
	(c)	Derive combined expression of 1^{st} and 2^{nd} law of thermodynamics in terms of dE, dH, dG and dA	**07**
		OR	
Q.4	**(a)**	Write in brief about thermodynamic solutions.	**03**
	(b)	Explain 2^{nd} and 3^{rd} Law of thermodynamics.	**04**
	(c)	Discuss the importance of Ellingham diagram.	**07**
Q.5	**(a)**	State Sievert's Law and explain it.	**03**
	(b)	Explain Hernry's and Raoult's Law.	**04**
	(c)	Explain phase rule and give its applications.	**07**
		OR	
Q.5	**(a)**	What are functions of slag?	**03**
	(b)	Explain the concept of basicity index.	**04**
	(c)	Discuss the effect of pressure on phase transformation.	**07**

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