

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(New) • EXAMINATION – WINTER 2016****Subject Code:2132102****Date:04/01/2017****Subject Name:Metallurgical Thermodynamics****Time:10:30 AM to 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.

		MARKS
Q.1	Short Questions	14
	1 Ellingham diagram is _____ vs temperature.	1
	2 Internal energy can not be measured an absolute terms. True/False	1
	3 Give equation of state.	1
	4 Phase is homogenous part of system. True/False	1
	5 Enthaply of substance do not change with temperature. True/False	1
	6 Energy can be transferred from low temperature to high temperature without any aid. True/False	1
	7 Entropy is function of temperature. True/False	1
	8 Thermodynamics can give idea about rate of reaction. True/False	1
	9 Degree of freedom for non variant point in phase diagram is ____ .	1
	10 Isobaric process involve constant _____ .	1
	11 Temperature is system is extensive property. True/False	1
	12 For any reaction at given temperature $dG = dG_{PROD} + dG_{REACTANT}$. True/False	1
	13 Partial pressure of substance is not proportional to mole fraction. True/False	1
	14 Theoretically entropy of a substance can be zero at _____ temperature.	1
Q.2	(a) Differentiate between extensive and intensive properties.	03
	(b) In terms of thermodynamics define system and give different classification of system with suitable examples.	04
	(c) Briefly explain different type of thermodynamic processes.	07
	OR	
	(c) Write brief note on functions of slag and basicity.	07
Q.3	(a) Derive equation for 1 st law of thermodynamics in terms of enthalpy.	03
	(b) State phase rule and explain its each term.	04
	(c) State 1 st law of thermodynamics, give its significance. Also explain thermodynamic processes in reference of 1 st Law.	07
	OR	
Q.3	(a) Prove that $C_P > C_V$.	03
	(b) Explain temperature composition diagram for binary alloy system.	04
	(c) With suitable example explain Hess' law and its features.	07
Q.4	(a) Explain internal energy and enthalpy.	03
	(b) State 0 th and 2 nd law of thermodynamics.	04
	(c) Explain thermodynamic solution and differentiate between ideal and non ideal solutions.	07

OR

- Q.4** (a) Explain entropy and Gibb's free energy concept. **03**
(b) Explain Sivert's and Raoult's law. **04**
(c) Derive combined expression of 1st and 2nd law of thermodynamics in terms of internal energy, enthalpy, Helmholtz free energy and Gibb's free energy. **07**
- Q.5** (a) If heat of combustion of carbon and carbon monoxide to form carbon monoxide and carbon dioxide is -64 and -32 Kcal/mol. Calculate heat of combustion of carbon to form carbon dioxide. **03**
(b) Explain equilibrium and its types. **04**
(c) Derive relationship $C_P - C_V = R$. **07**
- OR**
- Q.5** (a) Explain objectives, advantages and limitations of thermodynamics. **03**
(b) Explain fugacity, activity and mole fraction. **04**
(c) Discuss important features of Ellingham diagram. **07**
