

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3132105****Date:28-07-2023****Subject Name:Materials Thermodynamics****Time:02:30 PM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) Temperature measurement uses which law of thermodynamics? State law.	03
	(b) State law governing relation between internal energy, heat and work.	04
	(c) Apply 1 st law of thermodynamic to examine any example and give its importance.	07
Q.2	(a) Identify enthalpy (H) and Heat (q).	03
	(b) Explain isothermal, isobaric, isochoric and adiabatic thermodynamic processes.	04
	(c) What is concept of free energy? Compare Helhotz' free energy and Gibb's free energy.	07
	OR	
	(c) Interpret Kirchoff's law and importance with suitable example.	07
Q.3	(a) Explain terms system and surrounding for thermodynamics.	03
	(b) Classify thermodynamic system and explain with suitable example.	04
	(c) Derive combined equation of 1 st and 2 nd law of thermodynamics in terms of internal energy, enthalpy and free energy.	07
	OR	
Q.3	(a) What is quasistatic thermodynamic process?	03
	(b) Explain concept of entropy and 3 rd law of thermodynamics.	04
	(c) Discuss use of Ellingham diagram in metallurgy and important characteristics.	07
Q.4	(a) With example explain extensive and intensive properties	03
	(b) Analyze possible application of 2 nd law of thermodynamics.	04
	(c) Why any chemical reaction shows enthalpy change and not internal energy change. Interpret Hess Law's with any example.	07
	OR	
Q.4	(a) Explain term slag in metallurgy.	03
	(b) Discuss functions of slag.	04
	(c) Analyze Gibb's phase rule and its terminologies	07

Q.5	(a) Explain basicity index.	03
	(b) What is thermodynamic solution? Explain its types.	04
	(c) Compare reversible and irreversible processes.	07
OR		
Q.5	(a) Interpret activity and fugacity.	03
	(b) Prove that $C_p > C_v$.	04
	(c) Derive that $C_p - C_v = R$	07