

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III EXAMINATION – SUMMER 2025****Subject Code:3132105****Date:31-05-2025****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) What is thermodynamics? Give classification of thermodynamics.	03
	(b) What is meant by equilibrium? Discuss different type of system equilibrium.	04
	(c) What are the objectives of thermodynamics study? List its applications and state advantages and limitations of thermodynamic approach.	07
Q.2	(a) What is equation of state? Explain.	03
	(b) Define or Explain following: isothermal, isobaric, isochoric and adiabatic processes.	04
	(c) Explain following thermodynamic processes: reversible, irreversible and quasi-static.	07
	OR	
	(c) With reference to thermodynamics explain system and surrounding. Give classification of system based on different criteria with suitable example.	07
Q.3	(a) State and explain law used for temperature measurement.	03
	(b) Differentiate between intensive and extensive properties of system.	04
	(c) Derive relationship $C_p - C_v = R$.	07
	OR	
Q.3	(a) What is heat capacity? Give its units.	03
	(b) State 1 st law of thermodynamics and give your comment on its significance.	04
	(c) Derive combined expression of 1 st & 2 nd law of thermodynamics in terms of internal energy, enthalpy, Helmholtz free energy & Gibb's free energy.	07
Q.4	(a) State 2 nd law of thermodynamics.	03
	(b) Explain Krichoff's law.	04
	(c) Explain Hess' law with its features using suitable example.	07
	OR	
Q.4	(a) State 3 rd law of thermodynamics.	03
	(b) Write short note on Free Energy.	04
	(c) Explain Raoult's law, Henry's law and Sievert's law.	07
Q.5	(a) Explain term fugacity and activity.	03
	(b) Define solution. Explain ideal and non-ideal solution.	04
	(c) State and explain Gibb's phase rule with suitable example.	07
	OR	
Q.5	(a) State equation for C_p and C_v . Prove that $C_p > C_v$.	03
	(b) Explain different thermodynamic processes in term of of 1 st law of thermodynamics.	04
	(c) Write detailed note on Ellingham diagram emphasizing its significance in metallurgy.	07
