

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2024****Subject Code:3132105****Date:29-06-2024****Subject Name: Materials 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.
4. Simple and non-programmable scientific calculators are allowed.

	Marks
Q.1 (a) What is thermodynamics? List objectives.	03
(b) Differentiate between extensive and intensive properties.	04
(c) Write note on different process in thermodynamics.	07
Q.2 (a) State and explain 0 th law of thermodynamics.	03
(b) Prove that $C_p > C_v$	04
(c) Derive relation $C_p - C_v = R$.	07
OR	
(c) Derive combined expression of 1 st and 2 nd law in terms of internal energy, enthalpy and free energy.	07
Q.3 (a) State and explain 1 st law of thermodynamics.	03
(b) Define term system and classify it.	04
(c) Explain Hess' law by stating its features.	07
OR	
Q.3 (a) State and explain 2 nd law of thermodynamics.	03
(b) What is equilibrium? Explain.	04
(c) Write detailed note on Free energy.	07
Q.4 (a) Define heat capacity.	03
(b) Explain Kirchoff's law for calculating enthalpy.	04
(c) State and explain Gibb's Phase Rule. Also, explain each term.	07
OR	
Q.4 (a) Explain term activity.	03
(b) Explain Sievert's law.	04
(c) Write note on Raoult's law and Henry's Law.	07
Q.5 (a) State and explain 3 rd law of thermodynamics.	03
(b) Explain term fugacity.	04
(c) Write detailed note emphasizing salient features of Ellingham diagram.	07
OR	
Q.5 (a) What is solution? List types.	03
(b) Discuss properties of ideal and non ideal solution.	04
(c) With neat sketch explain phase diagram for binary system.	07
