

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Mid Semester Exam

Semester: 4th

Subject Code: 303103257/203103257

Subject Name: Thermodynamics-I

Date: (01/02/2024)

Time: (1hr: 30min)

Total Marks: 40

Sr. No.		Marks
Q.1	(A)	05
	<ol style="list-style-type: none"> 1. Define system and surrounding. 2. What do you mean by open system? 3. Name any two extensive properties. 4. Define enthalpy. 5. What do you mean by isobaric system? 	
	(B)	05
	<ol style="list-style-type: none"> 1. 1 standard atmosphere (atm) = bar 2.properties of a system do not depend on the quantity of matter contained in it. 3. Internal energy is afunction. 4. Isothermal process is known as constant..... process. 5. A system is said to be at steady state if the properties do not vary with 	
Q.2	Attempt any four(Short Questions)	12
	<ol style="list-style-type: none"> (1) A man whose weight is 600 N takes 2 min for climbing up a staircase. What is the power developed in him, if the staircase is made up of 20 stairs each 0.18 m in height? (2) Define intensive and extensive properties with examples. (3) What do you understand by homogeneous and heterogeneous systems? (4) Define steady state, uniform state and equilibrium state. (5) Define heat capacity. Show that $C_P - C_V = R$ for an ideal gas. 	
Q.3	Attempt any two questions	08
	<ol style="list-style-type: none"> (1) What do you mean by internal energy? A system consisting of some fluid is stirred in a tank. The rate of work done on the system by the stirrer is 2.25 hp. The heat generated due to stirring is dissipated to the surroundings. If the heat transferred to the surroundings is 3400 kJ/h, determine the change in internal energy. (2) Define adiabatic process. Derive the relationship between pressure and temperature in adiabatic process. (3) Discuss pressure temperature diagram of pure material. 	
Q.4	(A) Discuss heat engine and heat pump with schematic representation.	05
	(B) Calculate change in internal energy and change in enthalpy in kJ for 1 kmol water, as it is vaporised at the constant temperature of 373 K and constant pressure of 101.3 kPa. The specific volumes of liquid and vapour are 1.04×10^{-3} and $1.675 \text{ m}^3/\text{kmol}$ respectively; 1030 kJ of heat is added to water for this change.	05
	OR	
	(B) Derive mathematical statement first law of thermodynamics for flow process.	05