

Enrolment Number: _____

PARUL UNIVERSITY**FACULTY OF ENGINEERING & TECHNOLOGY****B. TECH MID SEM EXAMINATION 2022-23****SUBJECT NAME (CODE): BET (203101213)****BRANCH: AERONAUTICAL****DATE: 04/08/2022****TIME: 02:30 TO 04:00 PM****TOTAL MARKS: 40****Sr. No.****Marks****Q.1 (A) Compulsory Question (5 MCQ)****05**

1. First law of thermodynamics deals with.....
 - (a) Conservation of energy
 - (b) Conservation of mass
 - (c) Principle of increase entropy
 - (d) Thermal equilibrium
2. A system having single phase is called:
 - a) Isolated system
 - b) Closed system
 - c) Homogeneous system
 - d) Heterogeneous system
3. An open system allows the transfer of _____
 - a) only mass
 - b) only energy
 - c) both mass and energy
 - d) neither mass nor energy
4. Zeroth law of thermodynamics helped in the creation of which scale?
 - a) Temperature
 - b) Heat energy
 - c) Pressure
 - d) Internal energy
5. According to Joule's experiments,
 - a) heat can be completely converted into work
 - b) work can be completely converted into heat
 - c) both heat and work are completely interchangeable
 - d) all of the mentioned

(B) Compulsory Question (5 Fill in the Blanks)**05**

1. A system is said to be.....if it can neither exchange the mass nor energy with the surrounding.
2. Enthalpy is an.....property.
3. Heat flow to system, Q sign is
4. Steady flow means no change with.....
5. No heat engine have a thermal.....of 100 %.

Q.2 Attempt any four (Short Questions)

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1. Differentiate microscopic and macroscopic approach.
2. Derive energy equation for Boiler.
3. The atmospheric air at pressure 1.01325 bar, which rushes into an evacuated bottle when valve is opened. The 0.4 m^3 air enters in bottle. Calculate the work done by air.
4. A well-insulated tank containing 2 kg liquid which having a constant specific heat of 2.5 kJ/kg K . The liquid in tank is stirred by paddle wheel. The temperature of liquid rise by 12° C . Calculate change of internal energy and Work done for the process.
5. Discuss perpetual motion machine of second kind.

Q.3 Attempt any two

08

1. Explain thermodynamic Equilibrium.
2. A heat pump is used to heat the house in the winter. A house requires 50 kJ/s heat for heating in winter in which is delivered by heat pump from outside air. Work required to operate the heat pump is 8 kW . Calculate COP of heat pump and heat abstracted from the outside.
3. State and prove the Carnot theorem.

Q.4

1. 10 kg/s of chilled water enters a tall building with velocity of 50 m/s at an elevation of 30 m from ground The water leaves the system with velocity of 10 m/s at an elevation of 60 m . The temperature of water entering and leaving out are 7° C and 12° C respectively. The rate of work done by pump in the line is 35 kW . Calculate rate of heat removed by water.
2. State the first law for a closed system undergoing a change of state.

05

OR

2. Prove the Equivalence of Kelvin Plank and Clausius statements.

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