Total No. of Questions : 4]

SEAT No. : ____

PC-440

[Total No. of Pages : 2

[6359]-561

S.E. (Automobile & Mechanical Engineering/Mechanial Sandwich) (Insem.)

ENGINEERING THERMODYNAMICS

(2019 Pattern) (Semester - III) (202043)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates :

1) ***Solve two questions Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume the suitable data, if necessary.***

Q1) a) What do you understand by a system and the surrounding? What is microscopic approach and macroscopic approach? **[6]**

b) What is thermodynamic equilibrium? What is a reversible process and Irreversible process? **[4]**

c) With the help of a neat diagram, explain the Joule's experiment. State the first law of thermodynamics. **[5]**

OR

Q2) a) Define **[6]**

i) State

ii) Process

iii) Cycle

b) Derive Steady flow energy equation for following devices : **[9]**

i) Nozzles

ii) Hydraulic Turbines

iii) Compressors

P.T.O.

Q3) a) Explain **[6]**

i) Boyle's Law

ii) Charle's Law

iii) Avagadro's Law

b) What are Limitations of First law of thermodynamics? What is the concept of thermal reservoir, heat engine and heat pump? State Kelvin-Plank and Clausius Statement of Second law of thermodynamics **[9]**

OR

Q4) a) What is Coefficient of Performance (COP) of heat pump and refrigeration cycle? State and prove the relationship between COP of heat pump and COP of refrigeration. **[7]**

b) 0.2 kg of air with P_1 = l.5 bar and T_1 = 300K is compressed to a pressure of 15bar, according to the law $PV^{1.25}$ =constant. **[8]**

Determine;

i) Initial and final parameters of the air.

ii) Workdone on or by the air.

iii) Heat flow to or from the air.

iv) Change in the entropy stating whether it is an increase or decreases.

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