Exam.Code:0940
Sub. Code: 6711

2053

B.E. (Mechanical Engineering)
Fourth Semester
MEC-401: Engineering Thermodynamics

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Use of property, steam and gas tables is permitted.

x-x-x

1)
1) What is Holzwarth Explosion Turbine?
2) Relate entropy to social aspects with real life examples
3) Differentiate between thrust and propulsive power.
4) How are stagnation properties related to static properties?
5) What is the significance of clearance volume in cylinders?

(5x2=10)

PART A

2)
1) Explain with expressions the decrease of exergy principle.
2) Show various components of total flow energy with exergy.

(5,5)

3)
1) A heat engine receives heat from a source at 1200K at a rate of 500kJ/s and rejects waste heat to a medium at 300K. Power output of the heat engine is 180kW. Determine reversible power and irreversibility rate for this process.
2) What is the role of a combustion chamber and turbine in a gas turbine cycle?

(5,5)

4)
1) A fluid undergoes reversible adiabatic compression from 0.5MPa, $0.2m^3$ to $0.05m^3$ as per the law $PV^{1.3}$=constant. Determine change in enthalpy and change in entropy.

2) Derive and compare air standard efficiencies of Otto and Diesel cycles with PV and TS diagrams

(5,5)

P.T.O.

PART B

5)

1) Use Gibbs function to determine equilibrium constant for the dissociation proves N_2->2N at 25^{0}C. Compare results with standard tabulated values.
2) Give any five conclusions regarding equilibrium constant for ideal gas mixtures.

(5,5)

6)

1) A mixture of 1kmol of H_2O and 2kmol of O_2 is heated at 4000K at 1atm. Determine the equilibrium composition of this mixture, assuming that only H_2O, OH, O_2 and H_2 are present.
2) Differentiate between Dalton's and Amagat's laws for predicting P-V-T behavior of a gas mixture.

(5,5)

7)

Write short notes on any 2 of the following:-

1) Propeller and propulsive efficiency
2) Relate entropy change of an ideal gas with changes in temperature and volume
3) Clausius inequality

(5,5)

x-x-x