Exam.Code:0940
Sub. Code: 6711

2014

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

Q-1)

1) Draw a generalized jet propulsion system with all critical components.
2) What is Holzwarth Explosion Turbine?
3) What is the significance of clearance volume in cylinders?
4) What is meant by compressor turbine?
5) Define Irreversibility in mathematical terms.

(5x2=10)

PART A

Q-2)

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

(5,5)

Q-3)

1) Determine ideal efficiency of a diesel engine having cylinder bore 250mm, stroke 375mm, clearance volume 1500cc, with fuel cut-off occurring at 5% of stroke.
2) Derive and compare air standard efficiencies of Otto and Diesel cycles with PV and TS diagrams

(5,5)

Q-4)

1) Explain construction, working and advantages of a Turbo prop engine.
2) Calculate decrease in exergy when 25kg of water at 95^0C mixed with 35kg of water at 35^0C, the pressure being taken as constant and temperature of the surroundings being 15^0C.

(5,5)

P.T.O.

PART B

Q-5)

1) What are the conclusions of Henry's Law?
2) 0.25kg of an ideal gas at 300kPa, 80^0C and 0.07m^3 undergoes adiabatic process to a final condition of 300kPa and 0.1m^3. During this process 25kJ of work is done on the gas. Find the value of R, C_p and C_v for the gas.

(5,5)

Q-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)

Q-7)

Write short notes on any 2 of the following:-

1) Relate mole, pressure and volume fractions in ideal gas mixtures.
2) Flow work and non-flow work
3) Clausius and Kelvin Plank statements

(5,5)

x-x-x