SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL NO : | | | | | | | | | | | | Total number of pages:[2]

Total number of questions:09

B.Tech. -ME/ 1st Sem | 2nd sem

ELEMENTS OF MECHANICAL ENGINEERING

Subject Code :ME-101

Paper ID : M|18 (RP)

Batch: 2010 batch

Time allowed: 3 Hrs Max Marks:60

Important Instructions:

- Section A is compulsory.
- Attempt any five questions from section B and C taking minimum two from each section.
- Assume any missing data.

PART A (2×10)

Q. 1. Answer in brief:

a) Differentiate between cycle and process.
b) Discuss the cocept of Quasistatic Process.
c) What is P.M.M1?
d) What do you mean by Cp and Cv?
e) What is energy of isolated system
f) Give the relationship between COP of heat pump and refrigerator ?
g) Draw the P-V and T-S diagram of Otto cycle
h) State law of a machine.
i) What is poisson ratio.
j) Write down the relationship between Young modulus and bulk modulus of elasticity.

PART B (8×4)

Q.2 a) Define the concept of System.Classify different types of system. (3)

b) A non flow reversible process occurs for which pressure and volume are correlated by the expression p = (V^2 + 6V), where p is in bar and V is in m^3. What amount of work will be done when volume changes from 2 to $4m^3$? (5)

Q. 3. a) Explain first law of Thermodynamics (3)

b) 3kg of an ideal gas is expanded from pressure of 7bar and volume 1.5m^3 to pressure 1.4 bar and volume 4.5 m^3. The change in internal energy is 525KJ . The specific heat at constant volume for the gas is 1.047 KJ/Kg.K Calculate (i) Gas constant(ii) Change in enthalpy (5)

Q.4. a) What is polytropic process ? Calculate the work done and pv diagram for this process (3)

b) Prove that the heat absorbed or rejected during polytropic process is $\frac{\gamma - n}{\gamma - 1}$ x polytropic work done. (5)

Q. 5. a) Derive the expression for the efficiency of carnot cycle (3)

b) What are pulleys and its types ? Explain the system of pulleys. (5)

PART C (8×4)

Q. 6. Drive the efficiency of otto cycle.

Q. 7. Explain the working of four stroke petrol engine with help of neat actual and ideal P-V diagram.

Q. 8. An effort of 50N is required by a machine to lift a load of 500N. The distance moved by effort is 63 cm and the corresponding load movement is 6cm .Make calculation for the mechanical advantage, velocity ratio and efficiency of the machine.

(4x2)

Q. 9. Write short notes on the following :

a) Velocity ratio and Mechanical advantage
b) Creep
c) Poisson ratio
d) Yield point