Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (2007-2010 Batches) (Sem.–1,2)

ELEMENTS OF MECHANICAL ENGINEERING

Subject Code : ME-101

Paper ID : [A0123]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C. have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B& C carrying EIGHT marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

1. **Write briefly :**

a) What are open and closed systems?

b) Name the few extrinsic properties.

c) Define enthalpy.

d) Write the SFEE for centrifugal pump.

e) Draw the PV diagram for adiabatic process.

f) Draw the TS diagram for Otto cycle.

g) Define link.

h) What is velocity ratio?

i) Define poisson's ratio.

j) Define modulus of rigidity.

SECTION-B

2. (a) Define and explain the Zeroth law of thermodynamics.

   (b) Differentiate between heat engine, heat pump and refrigerator.

3. In air compressor air enters at 1.013 bar and 27 degree centigrade having volume 5.0 m^3 /kg and it is compressed to 12 bar isothermally. Determine

   i) Work done

   ii) Heat transfer and

   iii) Change in internal energy

4. State Kelvin-Planck and Claussius statements of second law of thermodynamics? Also show equivalence between them.

5. What is Carnot Theorem? Describe Claussius inequality concept with the help of Carnot theorem.

SECTION-C

6. Derive the efficiency equation for Diesel cycle.

7. An engine working on Otto cycle has the following conditions: Pressure at the beginning of compression =1×10^5 N/m^2 Pressure at the end of compression = 10 bar. Calculate the air standard efficiency of the engine, Take y = 1.4

8. Draw and explain the stress- strain diagram for mild steel? Also describe how it is different from brittle materials.

9. (a) A circular rod of 200mm diameter and length 350mm subjected to an axial compressive load of 280kN resulted in an increase of diameter by 0.125mm and a decrease in length of 0.30mm. Calculate the value of Poisson's ratio and Young's modulus of elasticity.

   (b) Differentiate between machine and structure. Also describe with neat sketch the working of an Elliptical Trammel?