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Total No. of Questions : 09] [Total No. of Pages : 02

Paper ID [ME101]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 1st&2nd)

ELEMENTS OF MECHANICAL ENGINEERING (ME-101)

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Five** questions from Section - B & C.
3) Select atleast **Two** questions from Section - B & C.

Section - A

Q1) *(10 × 2 = 20)*

a) Explain thermodynamic system.

b) What is zeroth law of thermodynamics?

c) Define internal energy.

d) What do you understand by closed system?

e) What is isobaric process?

f) What is the concept of heat pump?

g) What do you mean by air standard cycles?

h) Define mean effective pressure.

i) What is the elastic limit?

j) What is the use of oldham's coupling?

Section - B

(Marks : 8 each)

Q2) Differentiate between reversible and irreversible processes.

Q3) Define enthalpy, why does the enthalpy of an ideal gas depends only on temperature? Discuss.

Q4) 1 kg of air at 3.5 bar and occupying 0.35 m^3 is heated at constant volume until its temperature has resin to 316°C. Find

(a) initial temperature of air,

(b) the final pressure of air,

(c) heat added

(d) gain in internal energy per kg. Take $C_v = 0.715$ kJ/kgK.

Q5) What is Carnot cycle? What are the four processes which constitutes the cycle? Explain.

Section - C

(Marks : 8 each)

Q6) An air standard Otto cycle operates with a compression ratio of 8 : 5. At the beginning of the compression the air is at 1 bar and 32°C and during the heat addition process the pressure is tripled. Calculate

(a) the thermal efficiency of the cycle and

(b) the efficiency of the Carnot engine operating between the same overall temperature limits.

Q7) Explain longitudinal strain. Poission's ratio, yield point and bulk modulus.

Q8) Compare the Otto Diesel and Dual cycle.

Q9) Write notes on:

(a) Differential wheel and axle.

(b) Lifting machines.

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