

Roll No. ....

May -08  
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Total No. of Questions : 09]

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## Paper ID [ME101]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 1<sup>st</sup>&2<sup>nd</sup>)

### 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.

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**P.T.O.**

- Q4)** 1 kg of air at 3.5 bar and occupying 0.35 m<sup>3</sup> is heated at constant volume until its temperature has risen 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 constitute 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. Poisson'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.

