TME-101   1557

Odd Semester Examination 2018-19

B.TECH (SEMESTER-I)

BASIC MECHANICAL ENGINEERING

Time: 03:00 Hours   Max. Marks: 100

Note: Attempt **all** the questions. Marks are shown against each question. Assume any missing data suitably.

1. Attempt **any four** of the following :   (5x4=20 Marks)

    (a) What is the Zeroth law of thermodynamics ? Why it is so called ?

    (b) Explain reversible and irreversible processes with the help of a neat diagram.

    (c) What do you understand by PMM-1 & PMM-2 ?

    (d) Show that the COP of a heat pump is greater than the COP of refrigerator by unity.

    (e) List various types of load which the beam can be subjected.

    (f) A member LMNP is subjected to point loads as shown in figure 1. Calculate: (a) Force P necessary for equilibrium, (b) Total elongation of the bar. Take E = 210 GN/m²
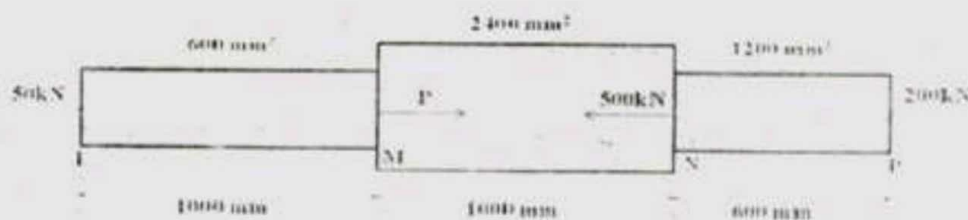
(Figure 1)

2. Attempt **any four** of the following :   (5x4=20 Marks)

    (a) Explain first law of thermodynamics.

TME-101/1440   (1)   [P.T.O.]

(b)   Differentiate between two-stroke and four-stroke engines.

(c)   Define the following terms : (i) stress, (ii) ductility, (iii) ultimate tensile strength and (iv) yield strength.

(d)   With the help of a suitable example explain the method of section in Trusses.

(e)   Explain triple point and critical point.

(f)   What are the two statements of second law of thermodynamics ?

3.   Attempt **any two** of the following :   (10x2=20 Marks)

(a)   Sketch stress-strain diagram for ductile and brittle material. Also explain its salient features.

(b)   What do you understand by shear force and bending moment ? Draw the Shear force and bending moment diagram for cantilever carrying uniformly distributed load (UDL) over the whole length.

(c)   Differentiate between :

(i)   Path function and point function.

(ii)   Intensive and extensive properties.

(iii)   Open, closed and isolated system.

4.   Attempt **any two** of the following :   (10x2=20 Marks)

(a)   Differentiate between SI and CI engine. Derive an expression for the efficiency of Otto cycle.

(b)   Derive the bending equation and write down all the assumptions.

(c)   What do you mean by adiabatic process ? Explain thermodynamic equilibrium.

5.   Write short notes on **any four** of the following :   (5x4=20 Marks)

      (a)   Quasi static process

      (b)   Concept of continuum

      (c)   Otto Cycle

      (d)   Free body diagrams

      (e)   Principle stress and strain

      (f)   COP of heat pump and refrigerator

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