Code No: 16025/AICTE

FACULTY OF ENGINEERING

BE III - Semester (CE) (AICTE) (Main & Backlog) Examination, July 2021

Subject: Solid Mechanics

Time: 2 Hours **Max .Marks: 70**

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions. **(5x2=10 Marks)**

1 Explain malleability and toughness.
2 Differentiate between point of inflection & point of contra flexure, and write short note with example.
3 Define Bulk modulus and shear modulus.
4 Write down any two assumption made in theory of pure bending.
5 Draw shear stress distribution diagram for an 'T' and rectangular section.
6 Define principle plane and principle stress.
7 Explain equivalent force couple system.
8 Write the uses of torsional stiffness.
9 Mention the classification of springs.
10 Write down the merits of spring index.

PART – B

Answer any four questions. **(4x15= 60 Marks)**

11 A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter, which is rigidly connected to the tube at ends. if the composite bar is free of stress at 50°c. Calculate the stress in the rod and tube when the temperature is raised to 150°c. Take $E_s=2\times10^5$ N/mm², $E_c=1\times10^5$ N/mm², $\alpha_s=12\times10^{-6}$ / °c, $\alpha_c=18\times10^{-6}$ / °c.

12 Draw shear force diagram and bending moment diagram

Fig -1

13 Draw the shear stress distribution diagram for T section as shown below for a S.F of 10KN.

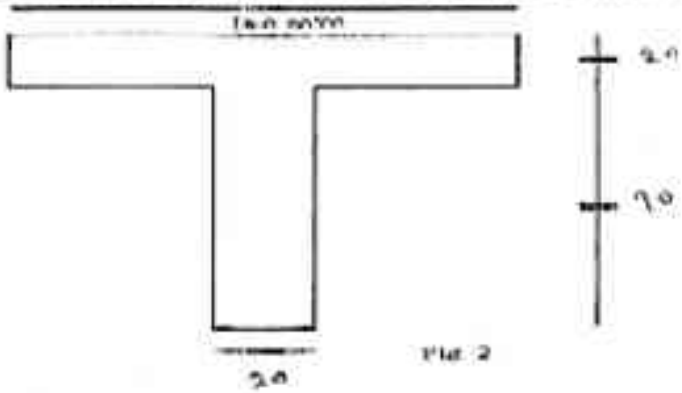

Fig -2

14 Draw pure bending equation and write any two disadvantages of this theory.

15 A laminated spring 1.5 M long is used to support central load of 6KN. if the maximum deflection of spring is not exceed 46mm and maximum stress must not exceed $3.1x10^5 KN/m^2$. Calculate

(a) The thickness of the plates.
(b) Number of plates if each plate is to be 82mm wide take $E= 200x10^3 mpa$.

16 A cylindrical shell of 800mm diameter and 3m long is subjected to an internal pressure of $4N/mm^2$. Determine the changes in diameter and volume E = 200Gpa (Take 1/m=0.3).

17 A point is subjected to tensile stress of 60mpa and compressive stress of 40mpa acting on two mutually perpendicular planes and shear stress of 10mpa on these planes. Determine normal stress, shear stress and resultant stress on a plane at 30^0c to the axis of major stress.