Q.P. Code: 16CE104 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Feb-2021

STRENGTH OF MATERIALS

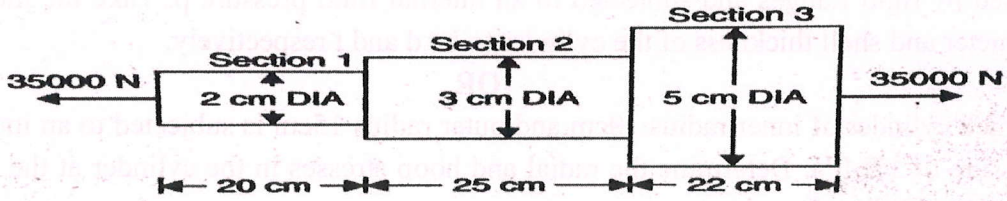
(Common to ME & AGE)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 An axial pull of 35000N is acting on a bar consisting of three lengths as shown in figure. If the young's modulus is taken as $2.1x10^5$ N/mm^2, Determine: (i) Stresses in each section and (ii) Total extension of the bar. **12M**



OR

2 Define Strain energy & resilience. A tensile load of 60KN is gradually applied to a circular bar of 4cm diameter and 5m long if E=$2x10^5$ N/mm^2. Determine: i) stretch in the rod (ii) stress in the rod and (iii) strain energy absorbed by the rod. **12M**

UNIT-II

3 Draw the SFD and BMD for the cantilever beam carrying uniformly distributed load of whole length and also derive equation for it. **12M**

OR

4 Draw the shear force and bending moment diagram for a simply supported beam AB of span 9 meters carrying a uniformly distributed load of 18KN per meter for a distance of 4 meters from the left support A. **12M**

UNIT-III

5 A timber beam of rectangular section is to support a load of 30KN uniformly distributed over a span of 4m when beam is simply supported. If the depth of section is to be twice the breadth and the stress in the timber is not to exceed 8 N/mm^2, find the dimensions of the cross section. **12M**

OR

6 A steel beam of I –section, 200mm deep and 160mm wide has 16mm thick flanges and 10m thick web. The beam is subjected to a shear force of 200KN. Determine the shear stress distribution over the beam section. **12M**

UNIT-IV

7 A beam of length 8m is simply supported at its ends and carries two-point loads of 36KN and 46KN at a distance of 1.5m and 4m from the left support. Find: (i) deflection under each load. (ii) Maximum deflection and (iii) The point at which maximum deflection occurs, given $E = 2 \times 10^5$ N/mm^2 and $I = 85 \times 10^6$ mm^4. Use Macaulay's method. **12M**

OR

8 A hollow shaft is 1m long and has external diameter 50mm. It has 20mm internal diameter for a part of length and 30mm for the rest of the length. If the maximum shear stress in it is not exceeding 80 N/mm^2, determine the maximum power transmitted by it at a speed of 300 r.p.m. If the twists produced in the two portions of the shafts are equal. Find the lengths of the two portions. **12M**

UNIT-V

9 Derive an expression for hoop stress and longitudinal stress in a thin cylinder with ends closed by rigid flanges and subjected to an internal fluid pressure p. Take the internal diameter and shell thickness of the cylinder to be d and t respectively. **12M**

OR

10 A thick cylinder of inner radius 10cm and outer radius 15cm is subjected to an internal pressure of 12MPa. Determine the radial and hoop stresses in the cylinder at the inner and outer surfaces. **12M**

*** END ***