R19

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Regular Examinations October-2020
STRENGTH OF MATERIALS-I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1 **a** Draw Stress – Strain for mild steel bar subjected to tensile loading and mark salient points on the graph.   **6M**

b A hollow cast iron cylinder 5 m long, 350 mm outer diameter, and thickness of metal 50 mm is subjected to a central load on the top when standing straight. The stress produced is 75×10^3 kN/m^2. Assume Young's Modulus for cast iron as 1.5×10^8 kN/m^2 and find (i) magnitude of load (ii) longitudinal strain produced, and (iii) total decrease in length.   **6M**

OR

2 Two vertical rods, one of copper and the other of steel, jointly carry a load of 70kN, the distance between the rods being 2000mm. Each rod is 20mm in diameter and 3m long. If the cross bar connecting the rods at their lower ends and carrying the load is to remain horizontal, determine the point on the cross bar at which the load should be placed Take E_s=200kN/mm^2 and E_{cu}=100kN/mm^2.   **12M**

UNIT-II

3 **a** How do you find the shear force and bending moment in a beam?   **6M**

b List of the different types of loading acts on a beam and explain any two of them with the help of neat sketchs.   **6M**

OR

4 A cantilever of 14 m span carries loads of 6 kN, 4 kN, 6 kN and 4 kN at 2 m, 4 m, 7 m and 14 m respectively from the fixed end. If also has a uniformly distributed load of 2 kN/m run for the length between 4 m and 10 m from the fixed end. Draw the shear force and bending moment diagrams.   **12M**

UNIT-III

5 A timber beam of rectangular section supports a load of 25 kN uniformly distributed over a span of 3.6 m. If depth of the beam section is twice the width and maximum stress is not to exceed 7 MPa, find the dimensions of the beam section.   **12M**

OR

6 **a** Derive the formula for horizontal shearing stress flexural stress.   **6M**

b Draw the shear stress distribution for a rectangular section of width'b' and depth'd'.   **6M**

UNIT-IV

7 Define an elastic curve. Derive the basic differential equation of the elastic curve. **12M**

OR

8 A cantilever of length 6 m carries a uniformly distributed load of 10 kN/m over the whole length. If $E = 200 \times 10^6$ kN/m^2 and $I = 30 \times 10^{-5}$ m^4, determine the following, using conjugate beam method: (i) Slope at the free end (ii) Deflection at the free end. **12M**

UNIT-V

9 **a** What are the assumptions made in Euler's theory? **6M**

b Find the ratio of buckling strength of a solid column to that of a hollow column of the same material and having the same cross –sectional area. The internal diameter of the hollow column is half of its external diameter. Both the columns are hinged and the same length. **6M**

OR

10 Explain the failure of different types of columns. **12M**

*** END ***