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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**B.Tech II Year I Semester Supplementary Examinations Nov/Dec 2019****STRENGTH OF MATERIALS****(ME & AGE)**

Time: 3 hours

Max. Marks: 60

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

- 1 a Explain briefly about the stress strain diagram for mild steel. **6M**
 b A circular rod of diameter 20 mm and 500 mm long is subjected to a tensile force of 45 KN. the modulus of elasticity for the material is 2.1×10^5 N/mm². Find the stress, strain & the elongation of circular rod. **6M**

OR

- 2 Determine the changes in length, breadth and thickness of a steel bar which is 4 m long, 30 mm wide and 20 mm thick and is subjected to axial pull of 30 KN in the direction of its length. Take $E=2 \times 10^5$ N/mm² and $\mu=0.3$. **12M**

UNIT-II

- 3 A cantilever of length 3 m carries a uniformly distributed load of 1.5 KN/m run over a length of 2 m from the free end. **12M**

OR

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

UNIT-III

- 5 A timber beam of rectangular section is to support a load of 30 k N uniformly distributed over a span of 4 m 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/mm², find the dimensions of the cross section. **12M**

OR

- 6 A simply supported beam carries a uniformly distributed load of intensity 30 N/mm over the entire span of 2 m. The cross section of beam is a T-section having flange 125 x 25 mm and web 175 x 25 mm. Calculate the maximum shear stress for the section subjected to maximum shear force. Also draw the shear stress distribution. **12M**

UNIT-IV

- 7 Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 6 m, which is carrying a point load of 5 KN at a distance of 2 m from the left end. Take $E = 2 \times 10^5$ N/mm² and $I = 1 \times 10^8$ mm⁴. **12M**

OR

- 8 Derive an expression for Torque transmitted by a hollow circular shaft. **12M**

UNIT-V

- 9 A cylindrical vessel, whose ends are closed by means of rigid flange plates, is made of steel plate 3 mm thick. The length and the internal diameter of the vessel are 50 cm and 25 cm respectively. Determine the longitudinal and hoop stresses in the cylindrical shell due to an internal fluid pressure of 3 N/mm². Also calculate the increase in length, diameter and volume of the vessel. Take E as 2×10^5 N/mm² and Poisson's ratio 0.3. **12M**

OR

- 10 Derive an expression for wire winding of thin cylinder. **12M**

*** END ***