Seat No.	

Total No. of Pages : 3

S.E. (Civil) (Part - II) (Semester - III) (Revised)

Examination, May - 2017

STRENGTH OF MATERIALS - I

Sub. Code : 63340

Day and Date : Tuesday, 16 - 05 - 2017 **Total Marks : 100**
Time : 02.00 p.m to 05.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use nonprogrammable calculator is allowed.**
4) **Assume any suitable data, if required and state it clearly.**

SECTION - I

Q1) a) Define the term strain and explain the different types of strains. **[4]**

b) A hollow steel tube 3.5 m long has external dia. of 120 mm. The tube was subjected to a tensile load of 400 kN and extension was measured to be 2 mm. If the modulus of elasticity for tube material is 200 GPa. Determine internal Diameter of the tube. **[13]**

OR

a) Explain the following terms: **[4]**

i) Simple Shear.

ii) Complementary Shear.

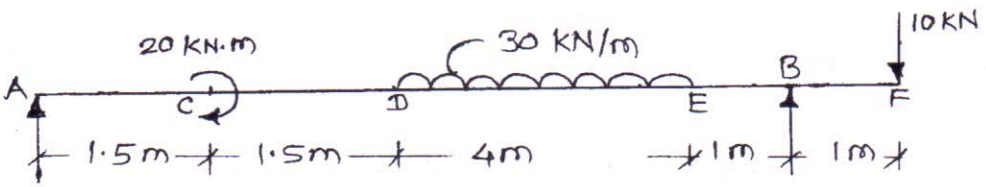
b) A bar of steel 60 mm x 60 mm in section and 180 mm long. It is subjected to a tensile load of 300 kN along the longitudinal axis and tensile load of 750 kN and 600 kN on the lateral faces of bar. Find Change in Dimensions and change in volume of the bar. **[13]**

Q2) a) Explain: **[4]**

i) Point of contra flexure.

ii) SFD and BMD.

b) Draw SFD and BMD for the beam as shown in fig. below. **[13]**



Q3) a) Derive an expression for circumferential stress and longitudinal stress. **[4]**

b) A cylindrical pressure vessel is fabricated from steel plating that has a thickness of 20 mm. The diameter of the pressure vessel is 450 mm and its length is 2.0 m. Determine the maximum internal pressure that can be applied if the longitudinal stress is limited to 140 MPa, and the circumferential stress is limited to 60 MPa. **[12]**

SECTION - II

Q4) a) State assumptions made in theory of Simple Bending. **[4]**

b) A timber beam 160 mm wide and 200 mm deep is to be strengthened by bolting two steel plates each 160 mm x 10 mm at top and bottom surfaces. A composite beam is simply supported at its ends and carries a UDL of 20 kN/m over the effective span of 4 m. Find the max. bending stress in the steel and timber at the mid span. **[13]**

Take $E_s = 2 \times 10^5$ N/mm^2 and $E_t = 10 \times 10^4$ N/mm^2.

Q5) a) Draw shear stress distribution diagram for L, T and I Section and show max. & average values. **[6]**

b) A T section beam having flange of 80 mm x 10 mm and Web 130 mm x 10 mm. Find maximum shear stress if its has to resist a shear force of 60 kN. **[11]**

Q6) a) Explain Terms: **[6]**

i) Resilance.

ii) Modulus of resilance.

b) A weight of 15 kN falls through 10 mm on a coller rigidly attached to the lower end of vertical bar of length 3 m and having area of 6 cm^2. What is the instantaneous max. Stress and corresponding instantaneous max. strain of the bar. Tale E = 200 GPa. **[10]**