SC - 39

Total No. of Pages : 2

Seat No.	

S.E. (Civil) (Part-I) (Semester-III) (Revised) Examination, November-2019

STRENGTH OF MATERIAL - I

Sub. Code :63340

Day and Date : Thursday, 28 - 11 - 2019 **Total Marks : 100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) **All the questions are compulsory.**
2) **Figures to the right indicate maximum marks for the question.**
3) **Neat sketches should be drawn whenever necessary.**
4) **Use of Non-Programmable calculator is allowed.**
5) **Assume any suitable data. if required and state it clearly.**

SECTION-I

Q1) a) Derive relationship between young's modulus, Bulk modulus and modulus of rigidity. **[4]**

b) A Circular Bar having 200mm^2 area is subjected to axial loads shown in fig. find the value of 'P' and total elongation take E=2×10^5 N/mm^2. **[12]**

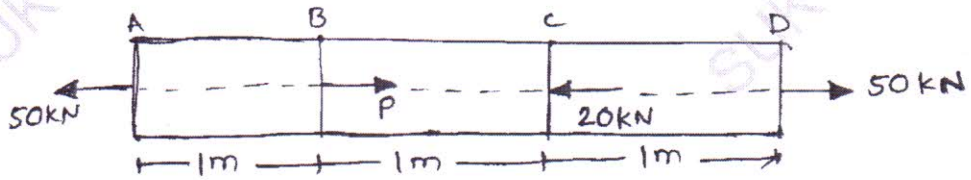

Fig. 1.1

OR

b) A steel rod 70mm diameter and 8m long is connected to 2 grips and the rod is maintained at a temperature of 120 °C. Determine the stress and pull exerted when temperature falls to 30 °C. If
i) the ends do not yield ii) The ends yield by 3mm
Take E= 200Gpa and $\alpha = 12\times10^{-6}$ /°C **[12]**

Q2) a) Explain term point of contraflexture **[4]**

b) Draw shear force and bending moment diagram for the beam shown in fig. also locate point of contraflexture. Refer fig.2.1. **[13]**

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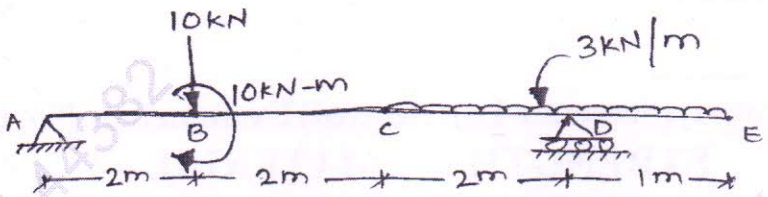

Q3) a) Define following terms. **[4]**
i) Hoop stress ii) Longitudinal stress

b) A steel shaft of 950mm diameter is required to transmit 220Kw power at 225 rpm and maximum torque is 40% greater than the mean torque. Find the maximum allowable shear stress in the shaft. **[12]**

SECTION-II

Q4) a) Write assumption made in theory of pure bending. **[4]**

b) A Cast iron beam of T-section having flange 200mm × 40 mm and web 20mm×180mm. the beam carries UDL of 2.5 KN/m on the entire 10m simply supported span. Determine maximum tensile and compressive stresses due to bending. **[13]**

OR

b) A Pipe having internal diameter 500mm and metal thickness 50mm is simply supported at its end over a span of 4m. find the intensity of maximum bending stress when it full of water the metal weights 70KN/m^3 and water weight 10KN/m^3. **[13]**

Q5) a) Draw shear stress distribution diagram for following section
i) L-Section ii) T-Section **[4]**

b) The I– Section beam having flanges 200×40 mm each and web 20 × 250 mm. It is subjected to shearing force of 150KN at a section. Find the shear stress distribution across the section. **[12]**

Q6) a) Explain i) Resilience ii) Proof Resilience **[4]**

b) A load of 500N falls through a height of 150mm on to a collar attached to the end of the vertical rod of 50mm Dia, And 2m long the upper end of the rod is fixed to the ceiling. calculate maximum instantaneous extension of the rod and the maximum stress induced in the rod. Take E= 200 Gpa. **[12]**

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