

Total No. of Pages: 2

Register Number:

Name of the Candidate:

**5534**

**B.Sc. DEGREE EXAMINATION, 2013**

**(CONSTRUCTION MANAGEMENT)**

**(FOURTH SEMESTER)**

**420 : STRENGTH OF MATERIALS - II**

December]

[Time : 3 Hours

**Maximum : 75 Marks**

**Answer ONE question from each unit**

**(5 × 15 = 75)**

**UNIT- I**

1. At a point in a strained material, the principal stresses are  $100 \text{ N/mm}^2$  tensile and  $40 \text{ N/mm}^2$  compressive. Determine the resultant stress in magnitude and direction on a plane inclined at  $60^\circ$  to the axis of the major principal stress. What is the maximum intensity of shear stress in the material at the point?

(OR)

2. A mild steel shaft 120 mm diameter is subjected to a maximum torque of 20 kNm and a maximum bending moment of 12 kNm at a particular section. Find the factor of safety according to the maximum shear stress theory if the elastic limit in simple tension is  $220 \text{ MN/m}^2$ .

**UNIT- II**

3. Derive the Torsion Equation:  $T / J = q / r = N / L$

(OR)

4. Find the maximum torque that can be applied safely to a shaft of 225 mm diameter. The permissible angle of twist is 1.0 degree in a length of 6.0 m and a shear stress is not to exceed  $35 \text{ N/mm}^2$ . Take  $C = 78.5 \text{ kN/mm}^2$ .

**UNIT- III**

5. A hollow mild steel tube 6m long 4cm internal diameter and 6mm thick is used as a strut with both ends hinged. Find the crippling load and safe load taking factor of safety as 3. Take  $E = 2 \times 10^5 \text{ kN/mm}^2$ .

(OR)

6. A hollow cast iron column 200 mm outside diameter and 150mm internal diameter, 8m long has both ends fixed. Taking a factor of safety as 6,  $f_c = 560 \text{ N/mm}^2$ ,  $a = 1 / 1600$ , determine the safe Rankine load.

**UNIT- IV**

7. A short masonry pillar is 600 mm x 600 mm in section. The pillar carries a point load of  $1 \times 10^6$  N acting on the centroidal axis of the section and at an eccentricity of 80 mm from the longitudinal axis. Find the maximum and minimum stresses on the section.

(OR)

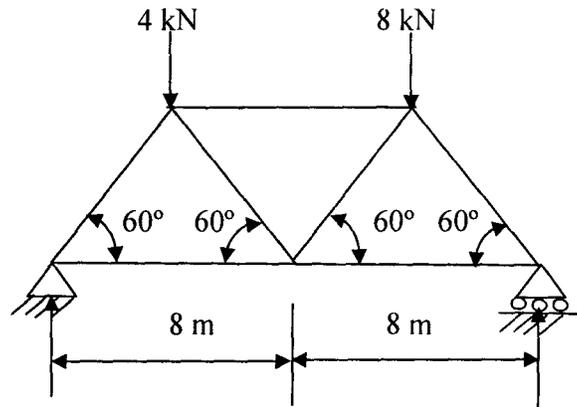
8. Derive the equations for finding neutral axis and deflection of a beam due to unsymmetrical bending.

**UNIT- V**

9. A ring is of round steel bar 30 mm diameter and the mean radius of the ring is 180 mm. Calculate the maximum tensile and compressive stresses in the material of the ring if it is subjected to a pull of 12 kN.

(OR)

10. Using method of sections, find the axial forces in the members of the truss with the loading shown in Figure 1.



**Figure 1**

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