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**5573**

Register Number:

Name of the Candidate:

**B.Sc. DEGREE EXAMINATION December 2014**

**(CONSTRUCTION MANAGEMENT)**

**(FOURTH SEMESTER)**

**420: STRENGTH OF MATERIALS-II**

Time: Three hours

Maximum: 75 marks

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**Answer ONE FULL question from each UNIT**

**(5 × 15 = 75)**

**UNIT-I**

1. The principal tensile stress at a point across two perpendicular plane are  $80\text{MN/m}^2$  and  $40\text{MN/m}^2$ . Find the normal, tangential and resultant stresses and its obliquity on a plane at  $20^\circ$  with the major principal plane.  
(OR)
2. Explain strain energy theory.

**UNIT-II**

3. What must be the length of a 5mm diameter aluminium wire so that it can be twisted through one complete revolution without exceeding shearing stress of  $42\text{MN/m}^2$ ? Take  $C=27\text{GN/m}^2$ .  
(OR)
4. A hollow shaft subjected to a torque of  $40\text{KNm}$  and a bending moment of  $30\text{KNm}$ . The internal diameter of the shaft is one -half the external diameter. If the maximum shear stress is not to exceed  $80\text{MN/m}^2$  find the diameter of the shaft.

**UNIT-III**

5. Explain Euler's theorem for long column?  
(OR)
6. Calculate the safe compression load on a hollow cast iron column (one end rigidly fixed and the other hinged) of 150mm external diameter, 100mm internal diameter and 10m length. Use Euler's formula with a factor of safety of 5,  $E=95\text{GN/m}^2$

**UNIT-IV**

7. A cylindrical chimney 2m high of uniform circular section is of 5m external diameter and 3m internal diameter. The intensity of horizontal wind pressure is  $1.5\text{KN/m}^2$ . Find max and min normal stress. Take  $\gamma=20\text{KN/m}^2$ ,  $K=2/3$ .  
(OR)
8. A angle  $80\times 80\times 10\text{mm}$  having  $I_{xx}=I_{yy}=87.36\times 10^{-8}\text{m}^4$ . It is used as a freely

supported beam with one leg vertical. The bending moment in the vertical plane  $yy$  the mid-section of the beam deflects in the direction  $AA'$  at  $30^\circ 15'$  to the vertical.

- (i) Calculate the second moment-of area of the section about its principal axis.
- (ii) What is the bending stress at the corner B if the bending moment is 1.5 KNm.

#### UNIT-V

9. A ring D made of round steel bar 25 mm diameter and the mean of the ring is 150mm. Calculate the maximum tensile and compressive stresses in the material of the ring if it is subjected to a pull of 10KN.

(OR)

10. Find the forces in the members of the truss shown in figure.

