Code: 9A01401 **R09**

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2016

STRENGTH OF MATERIALS – II

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 A thin spherical shell of 1 m in diameter and 1 cm thick is subjected to internal pressure of 1.6 N/mm^2. Calculate circumferential stresses developed in spherical shell and increase in volume of spherical shell.

2 A compound tube is composed of 250 mm internal diameter and 25 mm thick Shrunk on tube of 250 mm external diameter and 25 mm thick. The radial pressure at the junction is 8 N/mm^2. Find the variation of hoop stress over the wall of the compound tube.

3 A solid shaft of 250 mm diameter has the same cross-sectional area as the hollow shaft of the same material with inside diameter of 200 mm.

(a) Find the ratio of power transmitted by the two shafts for the same angular velocity.

(b) Compare the angles of twist in equal lengths of these shafts, when stressed to the same intensity.

4 Design a closely coiled helical spring of stiffness 20 kg/cm deflection. The maximum shear stress in the spring material is not to exceed 800 kg/cm^2 under a load of 50 kg. The diameter of the coil is to be 10 time the diameter of the wire. Take 'C' as 0.84 X 10^6 kg/cm^2.

5 An R.S. Tee-section, 150 mm wide X 75 mm deep, thickness of flange 9 mm, thickness of web 8.4 mm, is used as a strut, 3 meters long, ends hinged. Calculate the safe axial load by Rankin's formula, using a factor of safety of 3. Rankin's constants f_c = 315 N/mm^2; a = 1/7500.

6 A short hollow cylindrical column has 300 mm external diameter and 25 mm metal thickness. It carries a vertical load of 1000 kN which is off the geometric axis by 20 mm. Calculate the maximum and minimum normal stress intensities induced in the section.

7 A rectangular section of 90 mm wide and 130 mm deep is subjected to a bending moment of 15 KNm. The trace of plane of loading is inclined at 45^0 to YY axis of the section. Locate neutral axis and find the maximum stress induced in the section.

8 A horizontal circular bow girder of radius 7 m is continuous over seven equally spaced supports. It carries a vertical u.d.l. of 100 kN/m. Obtain the B.M., Torsional moment and S.F diagrams for one span indicating the critical values.

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