Numerical Question Bank

STRENGTH OF MATERIAL (CE-303) Semester: 3RD

INTRUCTIONS. 1. All questions with their solution are submitted till 27 October 2014.

1. Find the diameter of circular bar which is subjected to an axial pull of 160 KN , if the maximum allowable shear stress on any section is 65 N/mm2.

2Derive the General expression for deflection of a simply supported beam of span L.and Carrying a point load W at its centre . Assume the flexural rigidity of the beam as EI.

3.A solid circular shaft is to transmit 375 KW at 150 RPM. Find the diameter of shaft if The shear stress is not to exceed 65 N/mm2.

4. A cylindrical thickness 1.5 cm has to withstand maximum internal pressure of 1.5 N/mm2. If the ultimate tensile stress in the material of the cylinder is 300 N/mm2, Factor of safety is 3.0 and joint efficiency 80% , determine the diameter of the cylinder .

5. Determine the shear centre of channel section , which has flanges of 150mmx 20mm and web of 200mmx10mm dimensions

6. Determine an expression for h 2(H SQUARE) for the circular section ?

7Derive the expression for Euler buckling load of a column having both ends hinged

8. A slender pinned ended aluminum column 2 m long is to having a thin walled Circular Cross section of outside diameter 5 cm. Calculate the wall thickness required in order To attain a factor of safety 2 against failure by buckling in actual load of 13.5 KN. Use Euler formula take E= 0.7 x 10^4 KN/m2.

9. A hallow mild tube 6m long 4 cm internal diameter and 6 mm thick used as a strut with both end hinged. Find the crippling load take E = 2x 10^5 N/mm2.

10. prove that the maximum shear stress in a circular section of a beam is 4/3 times the average shear stress

11. determine the maximum strain energy in a solid shaft of diameter 10 cm and lenth 1.25 m. if the maximum allowable shear stress is 50 N/mm2. Take G =8 x 10^4 N/mm2

12. Determine the position of neutral axis when a curved beam of circular section of diameter 100 mm is subjected to pure bending moment of 11.5 KN-m. The radius of curvature is 100mmm.

13. A rectangular beam 200 mm deep and 300 mm wide is simply supported over a span of 8 Meter. What uniformly distributed per meter the beam may carry. If the bending stress is Not to exceed 120 N/ mm2.

14. Find the rankine crushing load for a hallow cylinder column hinged at both ends with the Following data.

Length of column = 7 meters

External diameter = 200mm

Internal diameter = 170 mm

Safe crushing stress = 550 N/mm2

Modulus of elasticity = 1.2×10^5N /mm2

$\alpha = 1/1600$

15.A mild steel flat 150mm wide 20mm thick and 6m long carries an axial pull of 300KN. If the value of modulus of elasticity 2×10^7N/cm2.and poissions ratio 0.30 .Calculate the change in length , width , thickness and volume of the flat