Roll No.

B.E / B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

CIVIL ENGINEERING

Second Semester

PTCE281/PTCE236/PTCE9251 Strength of Materials - II

(Regulation 2002/2005/2009)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Derive an equation for strain energy due to torsion.
2. State Maxwell's reciprocal theorem.
3. Define indeterminacy.
4. Write the three moment equation, stating all the variables used.
5. What is meant by critical load?
6. Differentiate a long column and a short column.
7. State distortion energy theory.
8. What are interaction curves?
9. What do you understand by the term Unsymmetrical bending?
10. Define Fatigue.

Part – B (5 x 16 = 80 marks)

11. Determine the maximum deflection of a simply supported beam of length 'l' carrying a uniformly distributed load of intensity w per unit length , throughout the span using principle of virtual work method.

12. a) Draw the shear force and bending moment diagrams for the beam shown in Fig.Q12a.

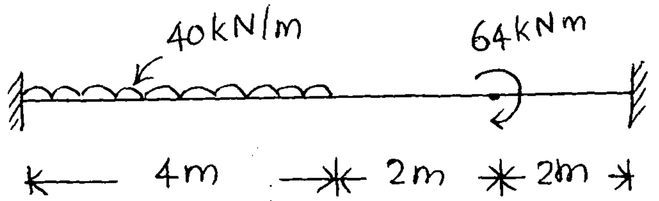

Fig Q 12a

(OR)

b) Draw the shear force and bending moment diagrams for the beam shown in Fig.Q12b.

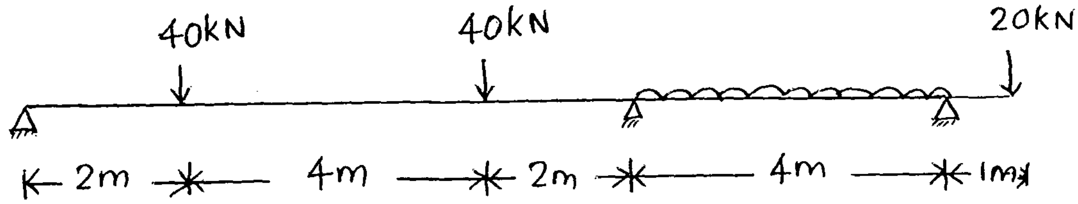

Fig Q12b

13. a) Compare the ratio of the strength of a solid steel column to that of a hollow of the same cross sectional area. The internal diameter of the hollow column is ¾ of the external diameter. Both the columns have the same length and are pinned at both ends.

(OR)

b) An hollow circular column whose outside diameter is 200mm and has a thickness of 20mm is 4.5m long and is fixed at both ends. Calculate the safe load by Rankine's formulae using s factor of safety of 2.5.find the ratio of Euler's to Rankine's loads. Take E=1X10^5 N/mm^2 and Rankine's constant =1/1600 for both ends pinned case and f_c=550N/mm^2.

14. a) Determine the principal stresses and principal directions for the following 3D-stress field. The stresses are in MPa..

$$[\sigma]=\begin{bmatrix} 42 & 10 & 25 \\ 10 & 30 & 22 \\ 25 & 22 & 42 \end{bmatrix}$$

(OR)

b) A solid circular shaft is subjected to a bending moment of 40kN.m and a torque of 10kN.m.design the diameter of the shaft according to
   (i) Maximum principal stress theory
   (ii) Maximum shear stress theory
   (iii) Maximum strain energy theory (5+5+6)

15. a) Find the centroidal principal moments of inertia of an unequal angle section 60mmx40mm x6mm.

(OR)

b) A beam of circular section of diameter 24mm has its centre line curved to a radius of 60mm.Find the maximum stresses in the beam, when subjected to a moment of 8kN.mm