Register Number :

Name of the Candidate :

3 1 0 3

B.E. DEGREE EXAMINATION, 2009

(CIVIL ENGINEERING / CIVIL AND STRUCTURAL ENGINEERING)

(FOURTH SEMESTER)

CLEC - 404 / CSEC - 404 / PCSEE - 202.
MECHANICS OF SOLIDS - II

(Old Regulations)

(Common with Part - Time - Structural Engineering - Second Semester)

(For the students joined during 2006 - 07 and before)

November] [Time : 3 Hours

Maximum : 60 Marks

Answer any ONE full question from each Unit.
All questions carry equal marks.

UNIT - I

1. Determine the magnitude and nature of forces in all the members of the cantilever truss shown in figure - (i). (12)

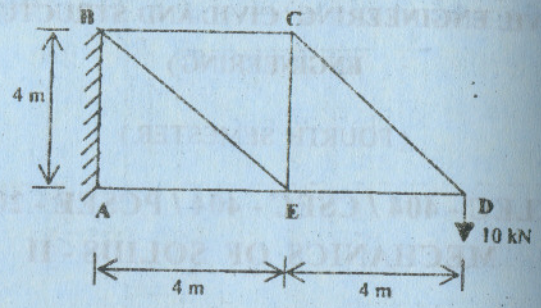

Figure - (i)

2. Find the force in the member BC of the frame loaded as shown in figure - (ii). All members have the same cross sectional area. (12)

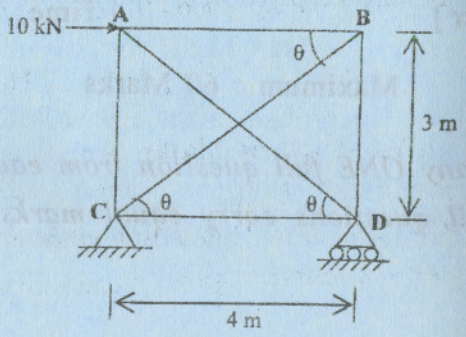

Figure - (ii)

UNIT - II

3. Determine the principal moment of inertia of the equal angle section 30 mm × 30 mm × 10 mm as shown in figure - (iii). (12)

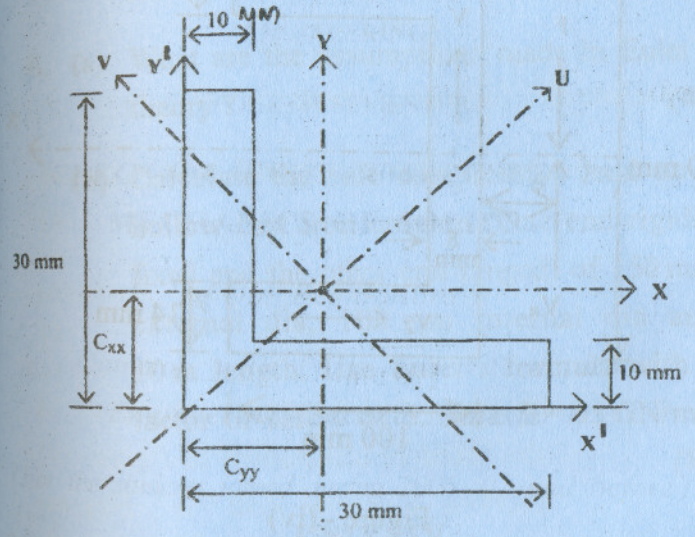

Figure - (iii)

4. Locate the shear centre of the channel section shown in figure - (iv). (12)

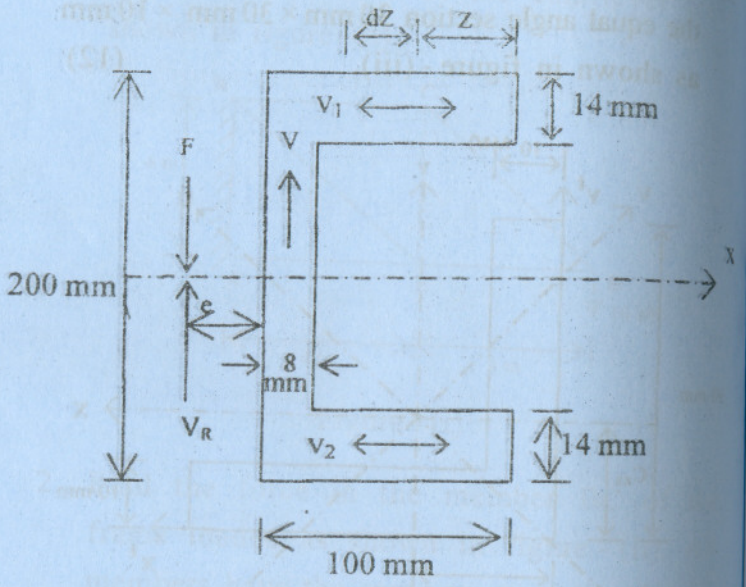

Figure - (iv)

UNIT - III

5. (a) Define eccentric loading. (2)

(b) Give some examples of structures which have to withstand both direct and bending stresses. (2)

(c) A masonry wall is 6 m high and 1·5 m thick and 4 m wide. It is subjected to a wind pressure of 1·5 kN/m^2 acting on the 4 m side. Determine the maximum and minimum stress intensities at the base of the wall. Masonry weighs 20 kN/m^3. (8)

6. (a) What are the assumptions made in Euler's theory ? (4)

(b) Calculate the safe compressive load on a hollow cast iron column (One end rigidly fixed and the other end hinged) of 150 mm external dia, 100 mm internal dia and 10 m length. Use Euler's formula with a factor of safety of 5. Take E = 95 GN/m^2. (8)

UNIT - IV

7. A thin cylindrical shell 3·25 m long, 1 m in dia is subjected to an internal pressure of 1 N/mm^2. If the thickness of the shell is 10 mm, find the circumferential and longitudinal stresses. Find also the dimensions of the shell. Take E = 2×10^5 N/mm^2 & 1/m = 0·3. (12)

8. Determine the maximum and minimum hoop stress across the section of a pipe of 400 mm internal diameter and 100 mm thick, when the pipe contains a fluid pressure 8 N/mm^2. (12)

UNIT - V

9. Define the following terms :

   (a) Natural frequency and natural period. (4)

   (b) Forced vibration and stiffness co-efficient. (4)

   (c) Determine the natural frequency of the fixed beams shown in figure - (v) carrying a central load "W". Neglect the mass of the beam. (4)

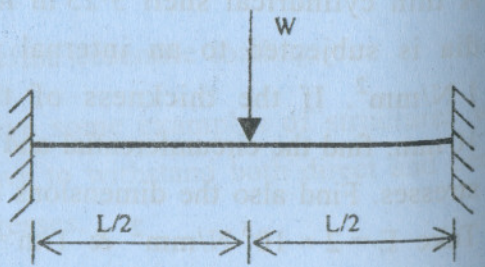

Figure - (v)

10. For a shaft shown in figure - (vi), determine the natural frequency of vibration. Assume N = 8×10^6 N/cm^2 and mass moment of inertia = 1,500 N/cm^2. Neglect the weight of the shaft. N = Modulus of rigidity. (12)

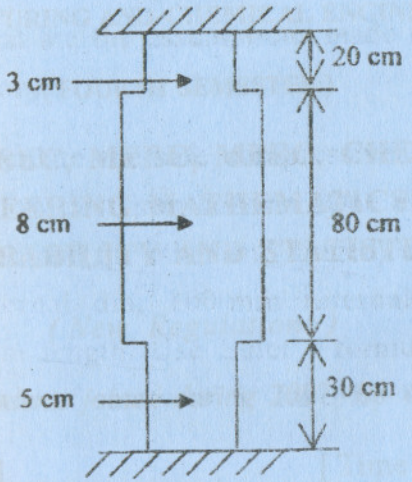

Figure - (vi)