Register Number :

Name of the Candidate :

**3 1 1 9**

# B.E. DEGREE EXAMINATION, 2010

**(CIVIL AND STRUCTURAL ENGINEERING)**

(FOURTH SEMESTER)

## CSEC - 404 / PCSEC - 202.
## MECHANICS OF SOLIDS - II

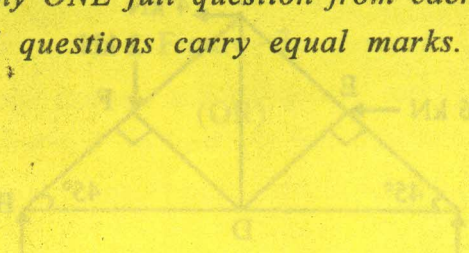
*( New Regulations )*

*( For the students joined during 2007 - 2008 and after )*

November ] [ Time : 3 Hours

Maximum : 60 Marks

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



**Turn over**

## UNIT - I

1. Determine the forces in all the members of the cantilever truss as shown in figure - 1 by method of joints.

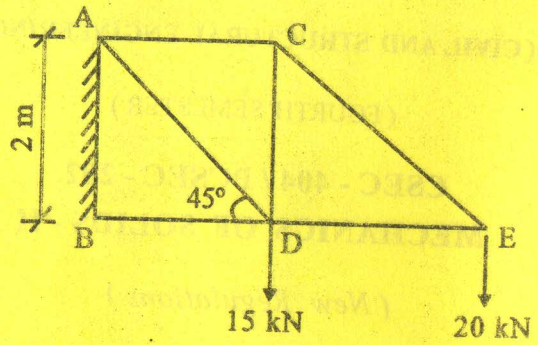



Figure - 1.

(OR)

2. Determine the forces in all the members of the truss as shown in figure - 2 by tension co-efficient method.

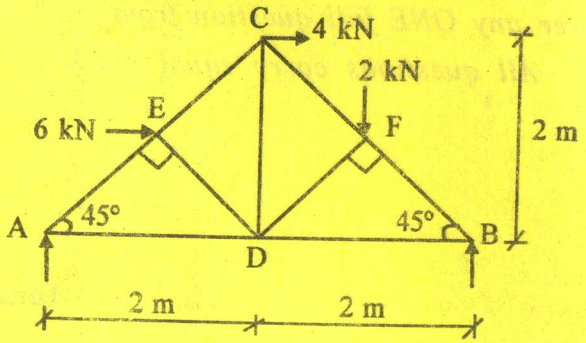



Figure - 2

## UNIT - II

3. A cantilever of I - section (shown in figure - 3) 2·4 m long is subjected to a load of 200 N at the free end. Determine the resulting bending stresses at corners A and B, on the fixed section of the cantilever.

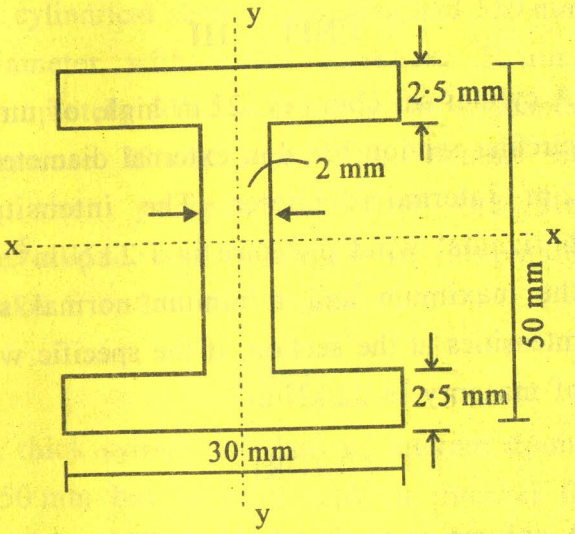



Figure - 3.

(OR)

4. A beam of rectangular section 80 mm wide and 120 mm deep is subjected to a bending moment of 12 kN.m. The trace of the plane of the loading is inclined at 45° to the Y - Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced in the section.

## UNIT - III

5. A cylindrical chimney, 22 m high, of uniform circular section has 4 m external diameter and 2 m internal diameter. The intensity of horizontal wind pressure is 1·2 kN/m$^2$. Find the maximum and minimum normal stress intensities at the section, if the specific weight of masonry is 22 kN/m$^3$.

(OR)

6. A column is made of two rolled steel joists of I section, 16 cm × 8 cm × 1 cm thick with plate 20 cm × 1 cm riveted with flanges one each on the top and on the bottom. The edges of the plates being flush with the outside



edges of joists flanges. Determine by Rankine's formula, the safe load the column of 4 m length with both ends fixed, can carry with factory of safety 3. Take $a$ = 1/7,500 and $\sigma_c$ = 500 MN/mm$^2$.

## UNIT - IV

7. A cylindrical shell 210 m long and 550 mm in diameter with metal thickness 10 mm is completely filled with water at atmospheric pressure. If additional 3,00,000 mm$^3$ water is then pumped in, find the stress developed and changes in dimensions. Take E = 2 × 10$^5$ N/mm$^2$.

(OR)

8. A thick cylindrical shell of internal diameter 150 mm has to withstand an internal fluid pressure of 50 MPa. Determine the thickness so that the maximum stress in the section does not exceed 150 MPa.

## UNIT - V

9. Analyse the beam shown in figure - 4, and hence draw the shear force and bending moment diagrams.

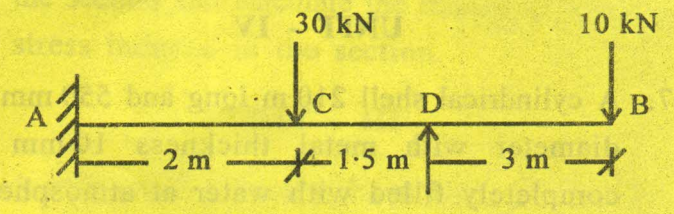



Figure - 4.

(OR)

10. Calculate the support reactions and moments for the fixed beam shown in figure - 5, and draw the shear force and bending moment diagrams.

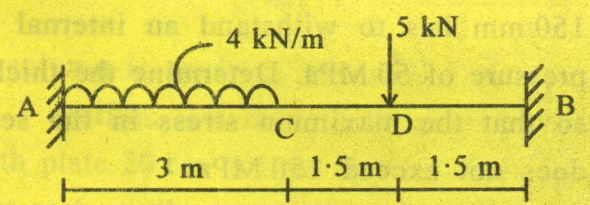



Figure - 5.