Register Number: **3118**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2009

(CIVIL AND STRUCTURAL ENGINEERING)

(FOURTH SEMESTER)

CSEC-404. MECHANICS OF SOLIDS–II

(New Regulation)

(For the students joined during 2007-08 on wards)

November] [Time : 3 Hours

Maximum : 60 Marks

(Answer FIVE Questions, Choosing ONE from each unit)
All questions carry equal marks *(5×12=60)*

UNIT-I

1. Determine the vertical and horizontal displacements of the point C of the pin-joined frame as shown in fig(1). The cross sectional area of AB is 100sq.mm and of AC and BC 150 sq.mm each $E=2\times10^5 Nmm^2$.

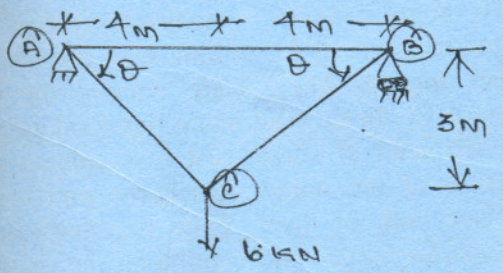

fig 1

2. A truss is loaded as shown in fig(2). Find the forces in the member by tension co-efficient method.

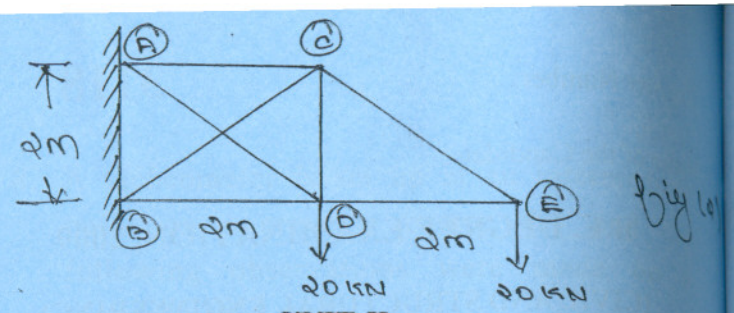

Fig (2)

UNIT-II

3. A beam of T section (flange:120×20mm; web 130×10mm) is 2.5m in length and is simply supported at the ends. It carries a load of 3.2kN inclined at 20 degree to the vertical and passing through the centroid of the section. If E=200 GPa, calculate the maximum tensile and compressive stress and deflection due to the load.

4. A timber beam 250mm wide by 300mm deep is used as simply supported beam on a span of 5m. It is subjected to a concentrated load of 30N at the mid-span section of the beam. If the plane of the load makes an angle of 45 degree with the vertical plane of symmetry, find the direction of NA and the maximum stress in the beam.

UNIT-III

5. Two 8cm × 16cm rectangular section cast iron columns are each 4.5 m long with one end fixed and other hinged. They share equally the total load carried by them. Find using the Rankine's formula, the diameter of single cast iron column of circular section of the length and same end condition to replace both of them. Take Rankine's constant as 1/1600 for hinged end conditions and crushing stress for cast irons as 500MPa.

6. Compare the crippling loads given by Rankine's and Euler's formulae for tubular strut 2.25m long having outer and inner diameters of 37.5mm and 32.5mm loaded through pin-joint at both ends. Take yield stress as 315MPa, a=1/7500 and E=200 GPa.

UNIT-IV

7. The ends of a thin cylinder, 180 internal diameter and wall thickness 3.0mm are closed by rigid plates and it is then filled with a liquid. When an axial compressive force of 33.6kN is applied to the cylinder, the pressure of the liquid rises by 72kN/m^2. If E=200GPa and Poisson's ratio=0.3, find the bulk modulus of the liquid.

8. A compound cylinder, formed by shrinking one tube to another is subjected to an internal pressure of 90MPa. Before the fluid is admitted, the internal and external diameters of the compound cylinder are 180mm and 300mm respectively and the diameter at the junction is 240mm. If after shrinking on, the radial pressure at the common surface is 12MPa, determine the final stresses developed in the compound cylinder.

UNIT-V

9. Analyse the beam as shown in fig(3) and draw the SFD and BMD.

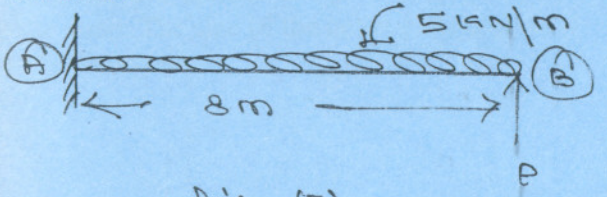

Fig - (3)

10. Calculate the support reactions and moments for the fixed beam as shown in fig(4) and draw the shear force and bending moment diagrams.

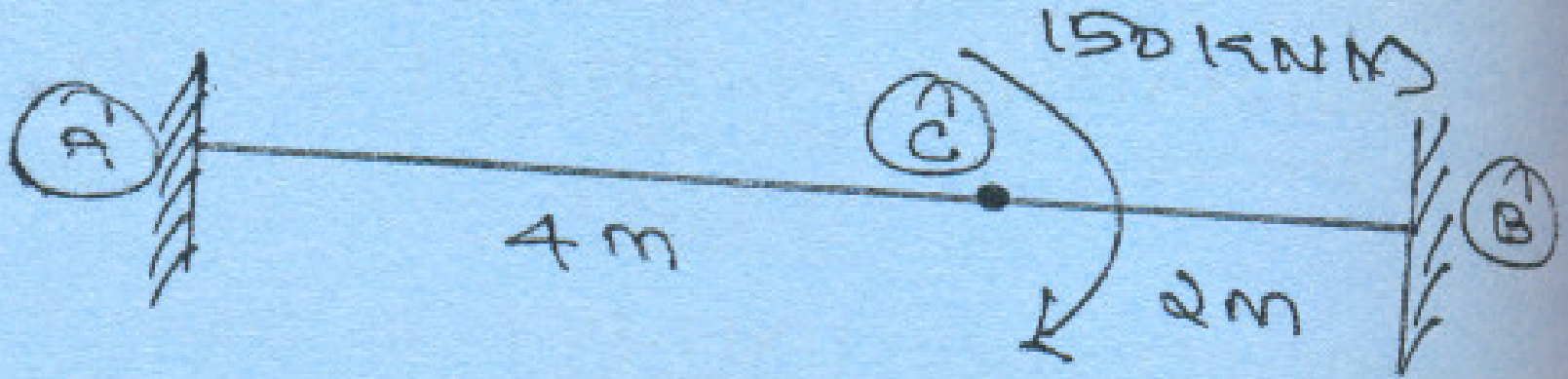

fig-(4)