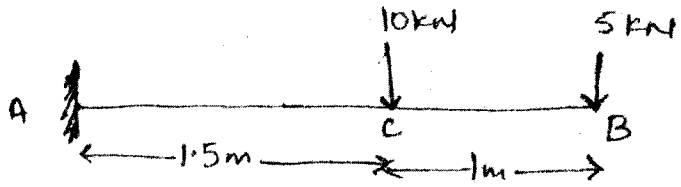
9. Determine the scope and deflection at the free end and of a cantilever beam as shown in figure by Moment Area Method. 20



Roll No. .....

24064

B. Tech. 3rd Sem. (Civil) Examination – December, 2018

STRUCTURAL ANALYSIS - I

Paper : CE-201-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is ***compulsory***. Attempt any ***four*** questions from the rest of paper choosing one, from each Section.

1. (i) Define Modular Ratio. $10 \times 2 = 20$

(ii) Define relation between E, C and K.

(iii) Define Maxwell law of Reciprocal theorem.

(iv) Define End conditions of the Column.

(v) Define principal stress and principal strains.

(vi) Differentiate between determinate and Indeterminate structures.

(vii) Explain the principle of least work.

(viii) Define thermal stresses of thermal strains.

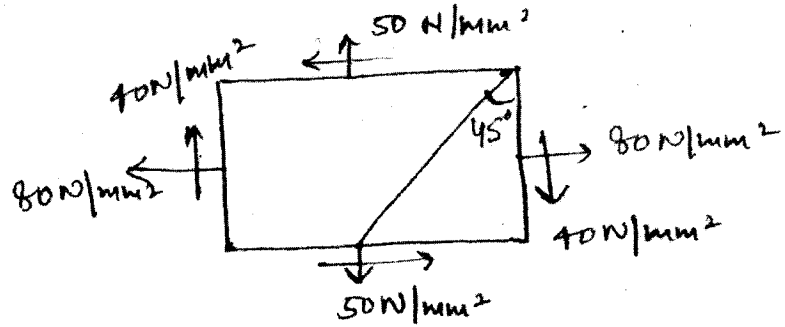
(ix) Explain conjugate beam theorem.

(x) Define Torsional Rigidity.

SECTION – A

2. Three parallel wires in the same vertical plane pointy support a load of 15KN. The middle wire is of steel and is 1m long. While the outer ones of brass, the length of each being 1.05m. The area of Cross section of each wire is 200 mm². After the wires have been so adjusted as to carry one kind of the load, a further load of 35KN is added. Find the stress in each wire & fraction of the whole load carried by the steel wire. 20

3. A point is a strained material is subjected to stresses as shown in figure using Mohr's Circle method, determine the normal and tangential stresses across the oblique plane. Check the answer analytically. 20



SECTION – B

4. Prove that P-n case of Rectangular cross-section, the maximum shear stress at the NA is 50% more than the mean value. 20

5. An I-section with rectangular ends has the following dimensions : 20

Flanges – 150mm x 20mm Total depth = 340mm

Web – 300mm × 10mm

Determine the maximum shearing stress developed in the beam for the shearing force of 35KN.

SECTION – C

6. Determine the maximum stress induced in a horizontal strut of length 3.5m rectangular cross-section 45mm wide and 85mm deep when it carries an axial thrust of 150 KN and a vertical load of 9kN/m length. The strut is having pin joints at its ends. Take E = 210 GN/m². 20

7. Derive Euler's Formula for crippling load. When an end of column is fixed and outer end is hinged. Write down the limitations of Euler's theory. 20

SECTION – D

8. Construct the Bending moment and shear force diagram for the beam as shown in figure. 20