

Roll No.

24064

B. Tech. 3rd Sem. (Civil Engg.) (Branch-XI)

Examination – December, 2013

STRUCTURAL ANALYSIS-I

(‘F’ Scheme)

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 complain in this regard, will be entertained after examination.

Note : Attempt any *five* questions. Taking *one* question from each Unit. All questions carry equal marks.
Assume suitable data if necessary.

UNIT – I

1. (a) What do you understand by degree of Static and Kinematic Indeterminacy. Explain with example.

10

(b) Draw stress-strain diagram for mild steel of explain Hook's law. 10

2. A steel bar is 900 mm long. It's two ends are 40 mm and 30 mm in diameter and length of each rod is 200 mm. The middle portion of the bar is 15 mm diameter and 500 mm length. If the bar is subjected to an axial Tensile load of 15kN. Find its total extension.

20

UNIT – II

3. (a) Drive Torsion equation for a hollow circular shaft of Radius 'R'. 10

(b) An I-Section with rectangular ends has the following dimension. 10

Flange : 15 cm × 2 cm, web 30 cm × 1 cm, find the maximum shearing stress developed in the beam for a shearing force of 10 kN.

4. Two shafts of same material and same length are subjected to the same torque. If the first shaft is of a

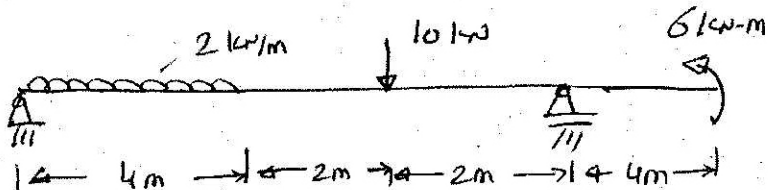
solid circular section and the second shaft is of a hollow circular section. Whose internal diameter is $\frac{2}{3}$ of outside diameter. Compare maximum shear stress develop in each shaft.

UNIT – III

5. (a) Drive Euler's formula for crippling load. When one end of column is fixed and others end is hinged. 10
- (b) Calculate the safe compressive load on a hollow cast iron column (ore end fixed and other hinged) of 150 mm external diameter, 100 mm internal diameter and 10 meter length. Take $E = 95 \text{ GN/m}^2$. 10
6. A cast iron hollow column, having 8 cm external diameter and 6 cm internal diameter, is used as a column of 2 m length. Using Rankine's formula, determine the crippling load. When both the ends are fixed. Take $\sigma_c = 600 \text{ MN/m}^2$. 20

UNIT - IV

7. Draw shear force and Bending moment diagram for the following : 20



8. Explain Maxwell Law of Reciprocal deflection with example.