

Roll No.

24195

B. Tech 4th Semester (Civil Engineering)

Examination – May 2012

STRUCTURAL ANALYSIS - II

Paper : CE-202-F

Time : Three hours] [Maximum Marks : 100

Before answering the question, 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 :** (i) Attempt *five* question in all
(ii) Question no. 1 is *compulsory*.
(iii) Attempt one question from each section.
(iv) All questions carry equal marks.
(v) Assume suitable data wheresoever required or missing.

1. (a) Castigliano's first theorem is applicable for
 $5 \times 4 = 20$
(b) The theorem of three moments expresses the condition of
(i) equilibrium of forces or
(ii) Maxwell's reciprocal values.

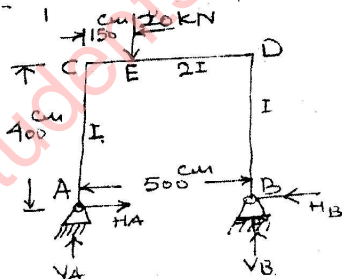
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- (c) Slope-deflection method can be used to solve
- (i) Statically determinate beams or
 - (ii) Statically indeterminate beams.
- (d) Calculate the Bending moment at the centre of a fixed beams of span L with a central Load W .
- (e) A three hinged arch is
- (i) determinate structure or
 - (ii) Indeterminate structure

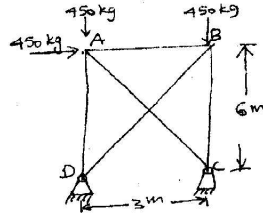
SECTION – A

2. (a) State Castigliano's first theorem and its application in terms of beams and portal frames. $6 + 14 = 20$
- (b) Determine the reactions for the portal frame shown in figure, using castigliano's 2nd theorem.



3. Figure shows a triangulated frame in which the sectional area of vertical members are 32 cm^2 each and those of all other members are 19 cm^2 each. Calculate the stresses in cell members Both supports are hinged.

20

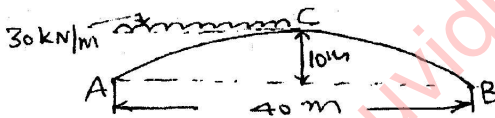


SECTION - B

4. (a) Define clearly the terms "theoretical arch" and an actual arch".

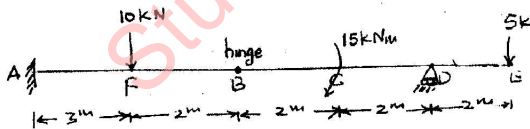
- (b) A three hinged parabolic arch of span 40m and rise 10m is carrying udl as shown below.

$$6 + 14 = 20$$



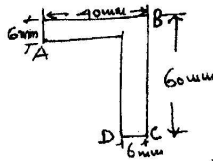
Find the horizontal thrust at the springings.

5. Draw S.F. and B.M. diagrams for the beams shown below : 20



SECTION - C

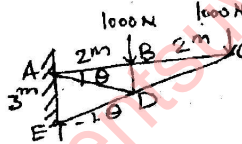
6. (a) What do you understand by product Inertia and Principal Axis for symmetric sections ? Explain.
- (b) Determine the principle axis and principal moments of inertia for unequal angle section of size $60\text{ mm} \times 40\text{ mm} \times 6\text{ mm}$ 8 + 12 = 20



7. (a) How will you calculate the tension in a suspension cable supported at same level
- (b) A suspension cable, having supports at same load, has a span of 30 m and maximum dip of 3m. The cable is loaded with uniformly distributed load of 10 kN/m throughout its length. Find the max^m tension in the cable. $10 + 10 = 20$

SECTION - D

8. Determine the forces in member of a cantilever truss by method of joints, as shown in figure. 20



9. (a) What do you understand by equilibrium of plane frame ?
- (b) Analyse the shown Warren's Girder having seven members of 3m length each by method of tension coeff. or method of section. $8 + 12 = 20$

