Printed Pages : 4

NCE401

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 100409

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15

STRUCTURAL ANALYSIS - I

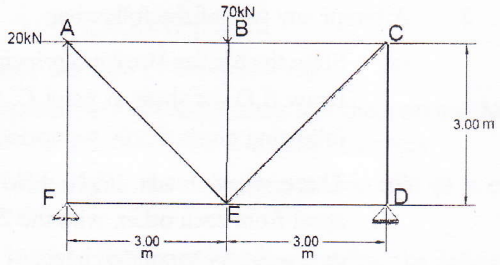
Time : 3 Hours] [Total Marks : 100

Note: Attempt all questions

1 Attempt any four of the following:

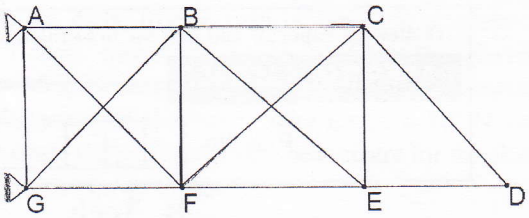
(a) What are the different methods of analysis of trusses? Explain any one with example.

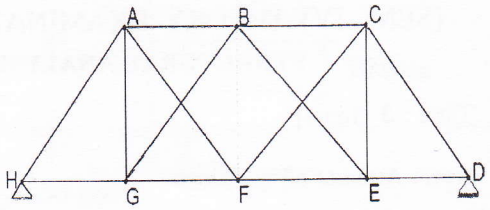
(b) Find the member forces in the trusses :-



(c) What is the difference between statically determinate and statically indeterminate structure?

(d) Find the external and internal degree of redundency of the structures as shown in fig:





(e) Enumerate the different types of pinned jointed determinate truss with suitable example and sketches.

(f) Define the term tension coefficient method for plane truss with example.

2 Attempt any two of the following:

(a) State the Muller-Breslau's principle of influenece line. Draw ILD for shear at point C, support reactions for following given simply supported beam

(b) Three wheel loads 20kN, 80kN, 80kN spaced 4m apart from each other, with the 20kN in the lead, pass over a simply supported beam of span 20m. Determine the absolute maximum shear force and moment. Consider that loading can move in either direction.

(c) A single load of 100kN moves on a girder of span 20m. Construct the influence line for shear force and bending moment for a section 5m from the left support.

3 Attempt any two of the following:

(a) A three hinged parabolic arch has a span 40m and rise of 10m. Draw influence line diagram for the following: horizontal thrust, B M at 8m from the left support, Normal thrust at the above section, radial shear at the above section

(b) A three hinged semicircular arch of radius R carries a udl of w per run over the whole span. Find

i. Horizontal thrust.

ii. Location and magnitude of max. Bending moment.

(c) A three hinged parabolic arch of span 50m and rise 9m carries a load whose intensity varies 25kN/m at the crown to 50kN/m at the ends. Find the following at a section D, 10m from left end

1. BM
2. NORMAL THRUST
3. RADIAL SHEAR

4 Attempt any two of the following:

Write statement of Castigliano's first theorem and Maxwell's reciprocal theorem.Prove Maxwell's theorem.

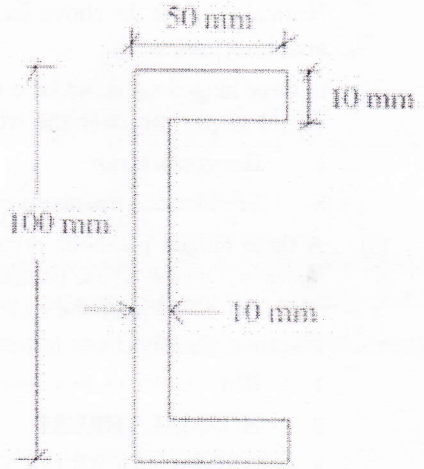
(a) Determine the deflection at free end of a cantiliver beam.

(b) Using conjugate beam method find the deflection of a simply supported beam at point C, AB of length 10m, loaded by an udl of intensity 20kN per unit run.

5 Attempt any four of the following:

(a) A 60mmx40mmx6mm unequal angle is placed with the longer leg vertical and is used as a simply supported at the ends, over a span of 2m. if it is carries udl of such magnitude as to produce the maximum bending moment of 0.12kN-m. Determine the maximum deflection of the beam. Take $E=2.1 \times 10^5$ N/mm^2.

(b) Locate the position of the shear centre for the channel section shown in fig.



(c) What do you mean by bending of curved bars? Derive the relevant expression for the bending of curved basis with small initial curvature.

(d) Define shear centre. Write down the principle of second moments of area with proof .

(e) "Discuss about the Mohr's circle with respect to unsymmetrical bending."

(f) Explain WINKLER-BACH theory.