

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 03

Paper ID [CE208]

(Please fill this Paper ID in OMR Sheet)

B. Tech. (Sem. - 4th)

STRUCTURAL ANALYSIS - I (CE - 208)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) State moment area theorem.
- b) What are the advantages of method of sections over method of joints.
- c) What do you mean by core of section?
- d) What is the difference between a two hinged arches and three arches.
- e) Calculate the minimum thickness of wall thickness of a thin cylinder 0.8 mm in diameter if it is to withstand an internal pressure of 18 kg/cm². The hoop stress and longitudinal stress is not to exceed 400 kg/cm² and 300 kg/cm² respectively.
- f) Draw the influence line for Shear Force for a point at a distance 'C' from a fixed support in a cantilever AB.
- g) How will you calculate bending moment at a point for a uniformly distributed load shorter than span from influence line diagram.
- h) What is the shape of a cable under its own weight?
- i) Find the deflection at the free end of a Cantilever carrying a point load at its free end by moment area theorem.
- j) Explain a Conjugate Beam.

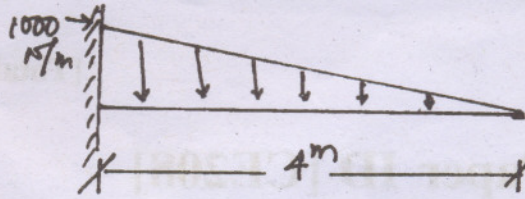
Section - B

(4 × 5 = 20)

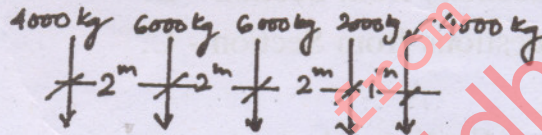
- Q2) Find the deflection at free end of the cantilever loaded with triangular load as shown by Strain Energy method.

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- Q3) A masonry retaining wall at trapezoidal section is 10 m high and retains earth which is level upto the top. The width at the top is 2 m and at the bottom 8 m and the exposed face is vertical. Find maximum and minimum intensities of normal stress at the base. Take density of earth = 15696 N/m^3 and density of masonry = 23544 N/m^3 . Angle of repose of earth = 30° .
- Q4) A train of loads shown in figure crosses a girder of 20 m span from left to right. Determine the maximum B.M. and S.F. at quarter span.

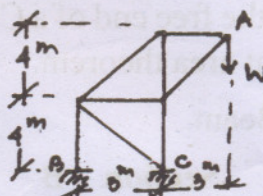


- Q5) A symmetrical three hinged arch rib of circular form has a span of 15 m and central rise of 3 m. There is a uniformly distributed load of 2000 kg/horizontal metre covering the entire span. Find the horizontal thrust and bending moment at quarter span.
- Q6) A suspension cable having supports at same level has span of 20 m and maximum dip of 2 m. It is loaded with uniformly distributed load 10 kN/m throughout its length and with concentrated loads of 20 kN and 60 kN at right hand and left hand middle third points respectively. Find the maximum tension in the cable.

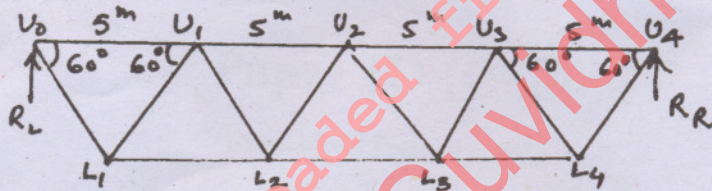
Section - C

(2 × 10 = 20)

- Q7) All the members shown in figure are so proportioned that under the given loading all compression members are stressed to 50 N/mm^2 and tension members to 100 N/mm^2 . Determine the horizontal and vertical movement of A. $E = 2 \times 10^5 \text{ N/mm}^2$.



- Q8) A warren girder having a span of 30 m consists of four equal panels shown in figure. Plot the influence line for force in members L_1L_2 , U_1U_2 and U_1L_2 .



- Q9) A two hinged parabolic arch has a span of 40 m and a central rise of 8 m. Calculate max positive and negative B.M. at a section distance 10 m from left hinge due to a single point load of 5 kN rolling from left to right.