Paper ID [CE208]

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B. Tech. (Sem. - 4th)

STRUCTURAL ANALYSIS - I (CE - 208)

(Paper - II)

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 Castigliano's theorems.

b) State Maxwell's reciprocal theorem.

c) State middle third rule.

d) What are Spandrel braced arches.

e) Calculate the safe working pressure for a spherical Vessel, 1m in diameter and 1cm wall thickness, if the tensile stress is limited to 400 klg/cm^2.

f) What is an influence line diagram? What are its uses?

g) How will you calculate the shear force at a point for a number of concentrated loads from influence lines?

h) What is shape of the cable carrying a number of point loads?

i) Find the slope at the free end of a cantilever carrying a point load at the free end by moment area theorem.

j) Explain a Conjugate Beam.

Section - B

(4 × 5 = 20)

Q2) Find the deflection at quarter span of a simply supported beam of span 'e' and loaded with U.D.L. of intensity w/unit length throughout.

Q3) A trapezoidal masonry dam is of 18 m height. The dam is having water upto a depth of 15 m on its vertical side. The top and bottom widths of the dam are 4 m and 8 m respectively. The weight density of the masonry is given as 19.62 kN/m^3. Determine :

(a) The resultant force on the dam per metre length.

(b) The point where the resultant cuts the base.

(c) The maximum and minimum stress intensities at the base.

Q4) A uniform load of 4000 kg/m, 6 m long, crosses a girder of 30 m span. Calculate the maximum S.F. and B.M. at a section 10 m from left hand support.

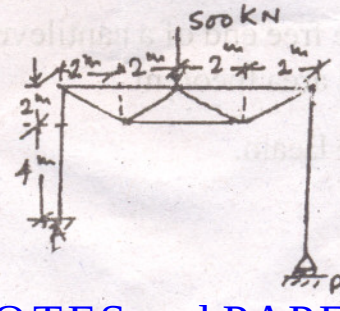
Q5) A three-pinned parabolic arch has a horizontal span of 36 m with a central rise of 8 m. It carries a uniformly distributed load of 2000 kg/horizontal metre run over left hand half of the span. Calculate the reactions at end hinges. Also calculate the values of normal thrust, S.F. and B.M. at 9 m and 27 m from left hand hinge.

Q6) A light suspension bridge is constructed to carry a pathway 3m broad over a channel 24 m wide. There are 7 equi-distant suspension rods. The central dip of the cable is 2.0 m and the platform load is 10 kN/m^2. Find the maximum tension in the cable.

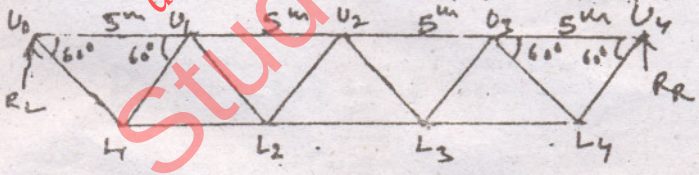
Section - C

(2 × 10 = 20)

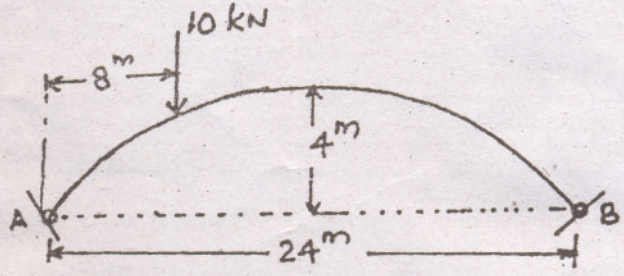
Q7) Find the horizontal movement of the roller end B of the frame shown in figure. Area of cross-section of all members is 20 cm^2. E = 2 × 10^5 N/mm^2.



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) Find the horizontal thrust for the two hinged parabolic arch shown in the figure. The moment of inertia at any section is $I_c \sec\theta$ where θ is the slope at section. I_c is moment of inertia at crown. Neglect effect of rib shortening.



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