

320451(20)

B. E. (Fourth Semester) Examination,
April-May 2019

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ANALYSIS-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two part from parts (b), (c) and (d) of each questions [for questions 1 to 4]. Solve any one from part (b) and (c) of question 5. Assume suitable data if required with relevance.

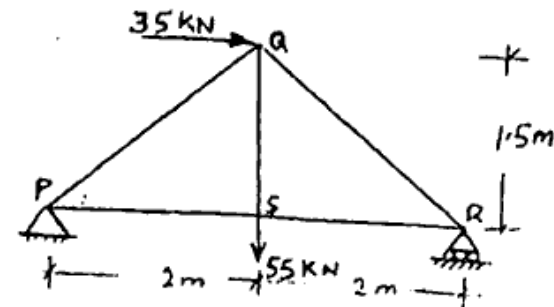
Unit-I

1. (a) What do you understand by Indeterminate structures?

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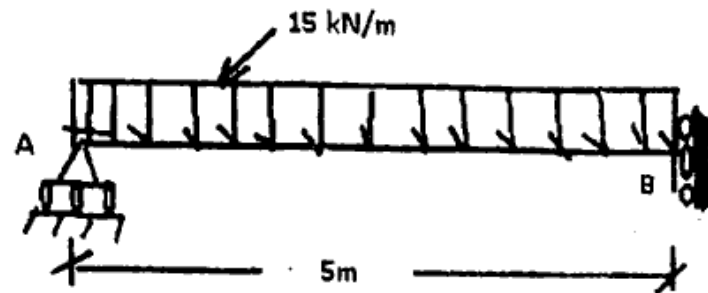
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Unit-II

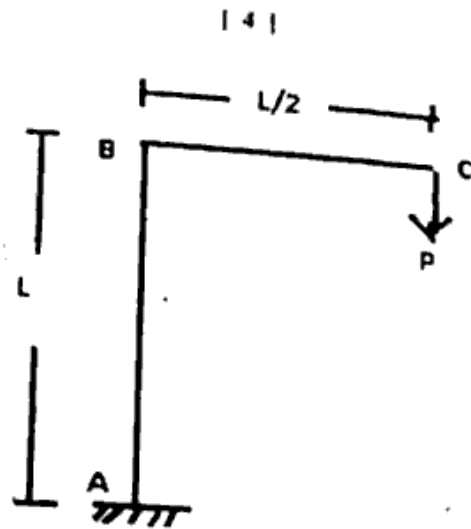
2. (a) What is conjugate beam method? 2
- (b) Determine the slope at A and deflection of B of the beam shown in figure below using the conjugate beam method. 7



- (c) Calculate the vertical deflection and slope at free end of the rigidly fixed frame at A as shown in the figure: 7

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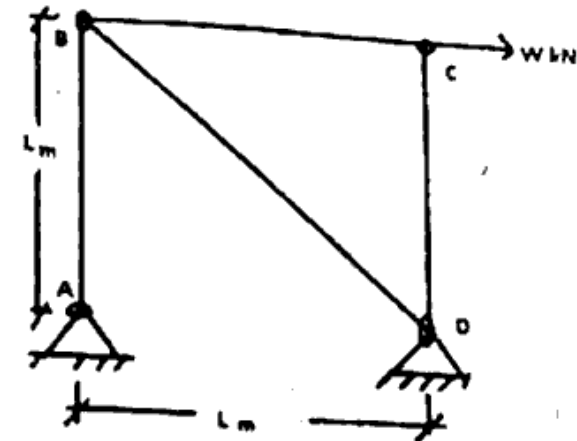
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- (ii) Maxwell's reciprocal theorem
- (iii) Castigliano's theorem
- (iv) Strain energy due to Torsion

(c) Find the horizontal deflection at joint C of the pin-jointed frame as shown in Figure. AE is constant for all members.

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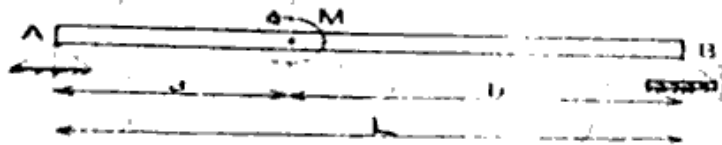


(d) A bar of uniform cross-section is bent into a quadrant of circle of radius R. One end of the bent is fixed and other is free. At the free end it carries a vertical load W. Determine the vertical and horizontal deflection at A.

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(d) Calculate the slope at supports and deflection at a distance of 'a' from left end.

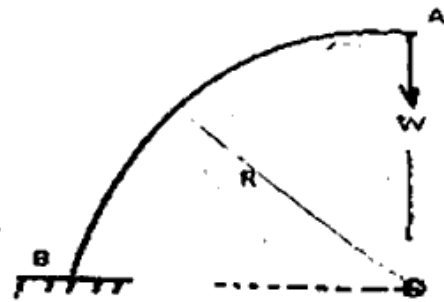
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Unit-III

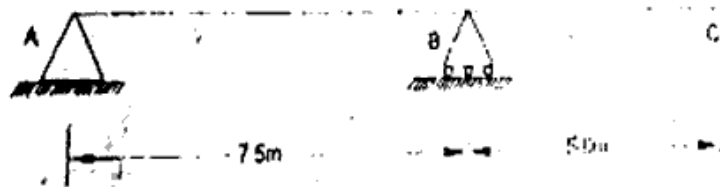
- 3. (a) State the expression for strain energy? 2
- (b) Discuss briefly about the following : 7
 - (i) Betti's theorem

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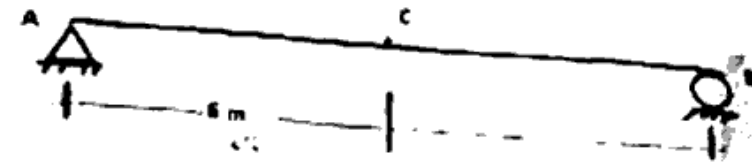
Unit-IV

4. (a) Draw the influence line diagram for reaction at left end of simply supported beam. 7
- (b) Construct the influence line for support reaction at B for the given beam as shown in Figure. 7

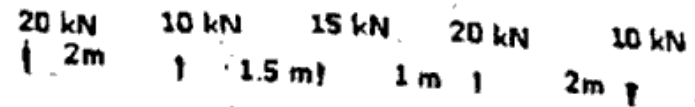


- (c) Construct the influence line for shearing point C of the beam as shown in figure. 7

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- (d) A system of concentrated load, role beam left to right, simply supported beam, span of 12 m and 10 kN load leading. Calculate absolute maximum negative and positive shear force. 7



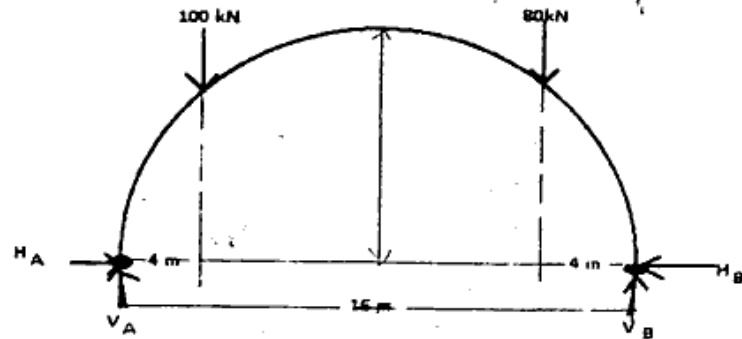
Unit-V

5. (a) Briefly explain the meaning of arches and their types generally used. 2
- (b) A three hinged circular arch of span 16 m and size 4.0 m is subjected to two point loads of 100 kN and 80 kN at the left and right quarter span points i.e. 4

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m. Find reactions, also the bending moment, radial shear and normal thrust at 6.0 m from left support figure.

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(c) A three hinged girder of a suspension bridge of 120m span and central dip of 12 m is subjected to two point loads of 250 kN at a distance of 30 m from the left support and 60 m from right support. Find the SF and BM at a distance of 40 m from the right support. Also calculate the maximum tension and its slope in the cable.

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