

Printed Pages – 7

Roll No. :

320451(20)

B. E. (Fourth Semester) Examination, 2020

APR-MAY 2022

(New Scheme)

(Civil Engg. Branch)

STRUCTURAL ANALYSIS-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

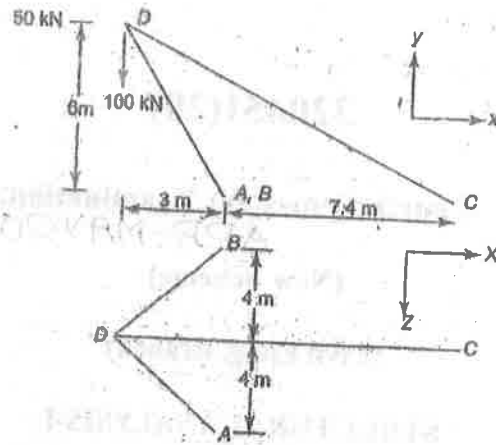
Note : All questions are compulsory and carry equal marks. Assume suitable data, if any data is missing. *Attempt 16 marks from each Unit.*

Unit-I

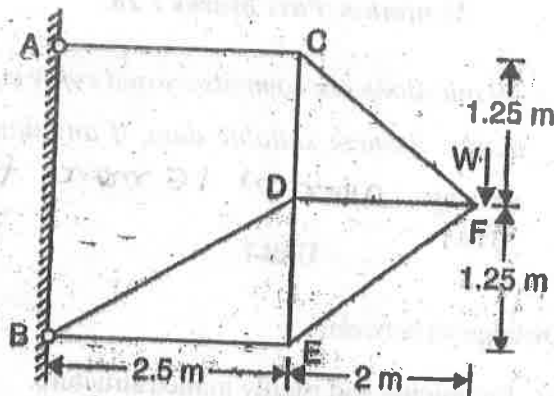
1. (a) Distinguish between : 6
- (i) Pin jointed and rigidly jointed structure
 - (ii) Determinate and indeterminate structure

[2]

- (b) Using tension coefficient method analyze the member forces in shear legs as shown in figure : 10



- (c) Using tension coefficient method analyze the member forces in truss as shown in figure : 10



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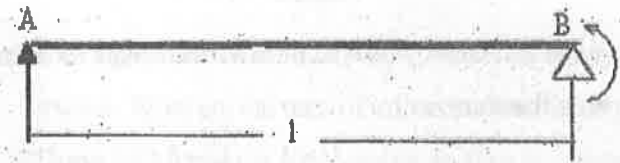
[3]

Unit-II

2. (a) Define slope and deflection. 2

- (b) A simply supported beam AB of span L is loaded with couple at the right hand end B. Determine if $EL = \text{constant}$.

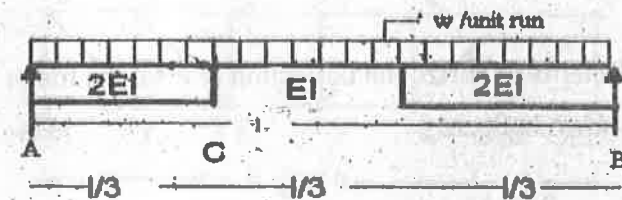
- (i) Equation for elastic curve
 (ii) Maximum deflection
 (iii) Slope at supports 7



- (c) Using moment area method :

Find :

- (i) Slope at A
 (ii) Deflection at C and at mid span 7



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PTO

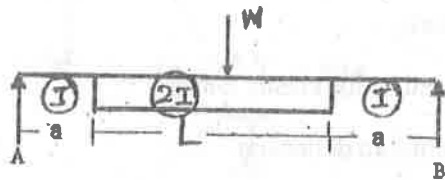
[4]

(d) Using conjugate beam method :

Find :

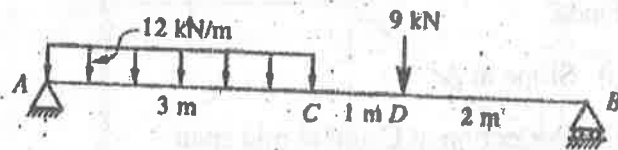
- (i) Slope at A
- (ii) Deflection at C at mid span

7



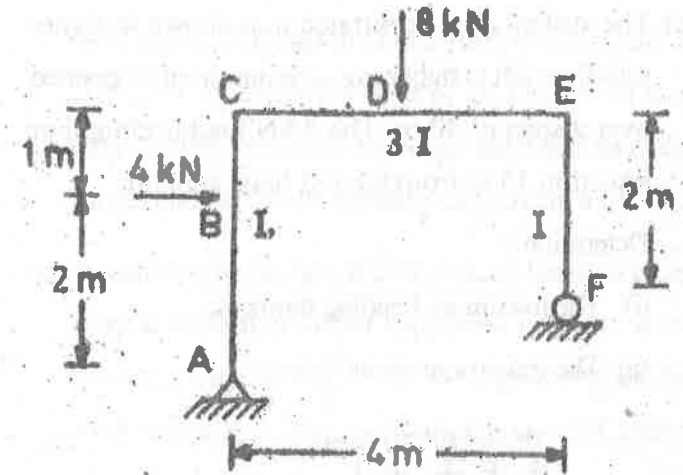
Unit-III

- 3. (a) What is meant by lack of fit in a truss? State moment area theorem. 2+4
- (b) Using strain energy principle determine slope at A and deflection at C in the beam shown in figure : 10



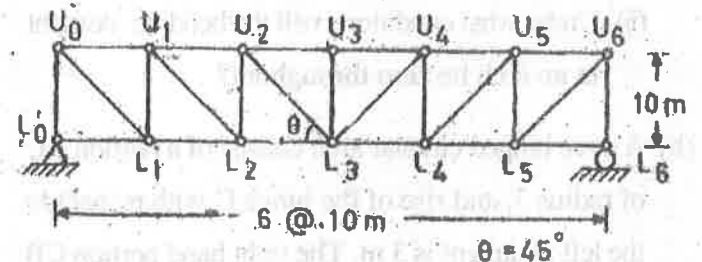
- (c) Determine horizontal deflection at F for the frame shown in figure : 10

[5]



Unit-IV

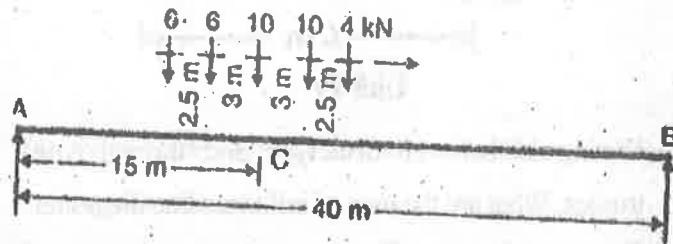
- 4. (a) Distinguish between 'deck type' and 'through type' trusses. What are the uses of influence line diagrams? Draw ILD for shear force at any section in a simply supported beam. 2+2+2
- (b) Draw influence line diagram for members L_2L_3 , U_2L_3 , U_2U_3 , U_3L_3 of the N truss shown in figure when load moves along top chord. 10



(c) The system of concentrated loads shown in figure rolls from left to right across a beam simply supported over a span of 40 m. The 4 kN load leading. For a section 15 m from the left hand support.

Determine :

- (i) The maximum bending moment
 - (ii) The maximum shear force
- 10



Unit-V

- 5. (a) (i) What is the difference between the basic action of an arch and a suspension cable? 2
- (ii) Under what conditions will the bending moment in an arch be zero throughout? 2
- (b) A three hinged circular arch consist of a portion AC of radius 3, and rise of the hinge C with respect to the left abutment is 3 m. The right hand portion CB

is of radius 8 m and the horizontal distance BC is 7 m. If a concentrated load of 10 kN acts at 6 m from the left hand end, determine the reactions at the hinges and maximum bending moment on the arch. 12

- (c) A suspension bridge of 250 m span has two three hinged stiffening girder supported by two cables having a central dip of 25 m. The width of the roadways is 8 m. The roadways carries a DL of 0.5 kN/m² extending over the whole span, and a live load of 1 kN/m² extending over the left hand half of the bridge. Find the B.M. and S.F at point 60 m and 200 m from the left hinge. Also calculate maximum tension in the cable. 12