

CBCS Scheme

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15CT42

Fourth Semester B.E. Degree Examination, June/July 2018 Structural Analysis

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Differentiate between statically determinate and statically indeterminate structures with examples. (04 Marks)
- b. Find degree of static indeterminacy and kinematic indeterminacy for the following Fig. Q1 (b) (04 Marks)

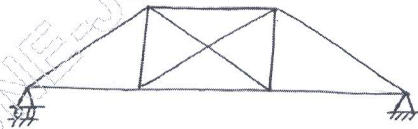


Fig. Q1 (b)



Fig. Q1 (b)

- c. Analyse the truss shown in Fig. Q1 (c), by method of joints and indicate the member forces. (08 Marks)

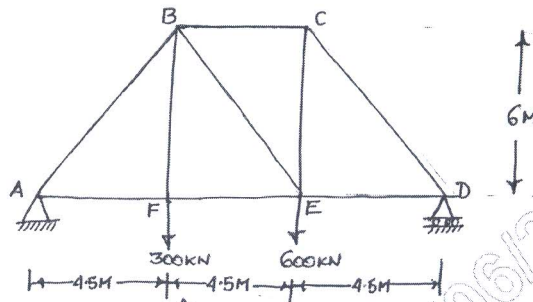


Fig. Q1 (c)

OR

- 2 a. Find the slope and deflection at the free end of a cantilever beam by moment area method as shown in Fig. Q2 (a). Take $EI = 3000 \text{ kNm}^2$ (04 Marks)

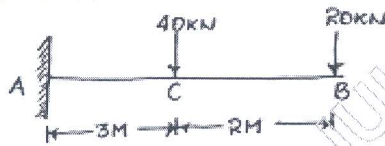


Fig. Q2 (a)

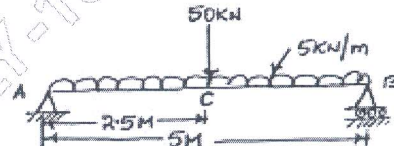


Fig. Q2 (b)

- b. Find the slope at supports and deflections at mid-span by moment area method as shown in Fig. Q2 (b). (04 Marks)
- c. Determine the maximum slope and maximum deflection for a given simply supported beam by conjugate method as shown in Fig. Q2 (c). (08 Marks)

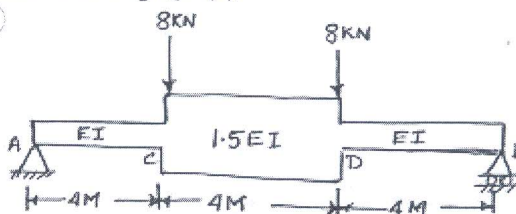


Fig. Q2 (c)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-2

- 3 a. Obtain the expression for strain energy method in a member when it is subjected to axial load. (08 Marks)
 b. Determine the deflection at the point load for the beam shown in Fig. Q3 (b) by strain energy method. (08 Marks)

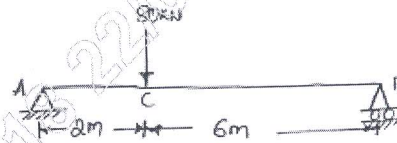


Fig. Q3 (b)

OR

- 4 a. Determine the vertical deflection at joint 'C' of the truss as shown in Fig. Q4 (a) by unit load method. (10 Marks)

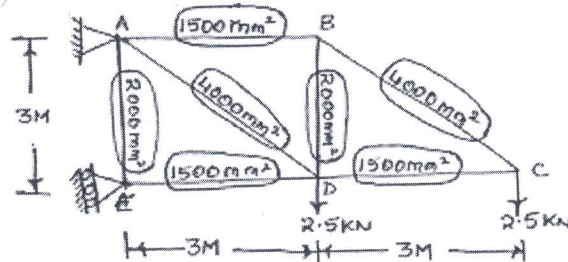


Fig. Q4 (a)

- b. Determine the vertical deflection at free end 'D' in the frame as shown in Fig. Q4 (b) by Castigliano's theorem. (06 Marks)

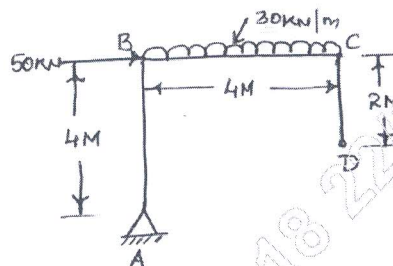


Fig. Q4 (b)

Module-3

- 5 A three hinged symmetrical arch of span 24 m, rise 6 m with hinges are provided at supports and at crown point. Arch subjected to a point loads of 50 kN and 150 kN at a distance of 8 m and 20 m at left supports. Determine
 a. Reaction at supports.
 b. Resultant reactions and its inclination at supports.
 c. Draw B.M.D.
 d. Normal thrust and radial shear at a distance of 6 m both from left and right supports. (16 Marks)

OR

- 6 A cable of 20 m and dip 4 m carries a udl of 20 kNm over entire span. Find
 a. Maximum tension in cable.
 b. Minimum tension in cable.
 c. length of the cable. (16 Marks)

Module-4

- 7 Analyse the propped Cantilever beam as shown in Fig. Q7. Use consistent deformation method and draw BMD and SFD. $EI = \text{constant}$. (16 Marks)

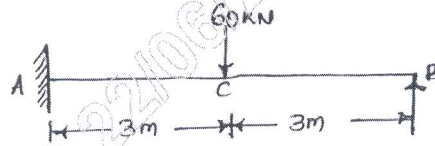


Fig. Q7

OR

- 8 Analyse the Continuous beam shown in Fig. Q8 using three moment equation and draw BMD and SFD. (16 Marks)

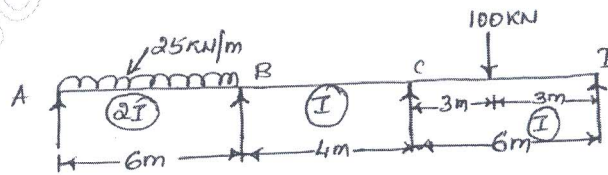


Fig. Q8

Module-5

- 9 Analyse the continuous beam by slope deflection method and draw B.M.D and S.F.D as shown in Fig. Q9. (16 Marks)

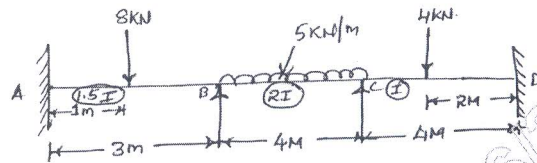


Fig. Q9

OR

- 10 Analyse the frame by moment distribution method and draw BMD as shown in Fig. Q10. (16 Marks)

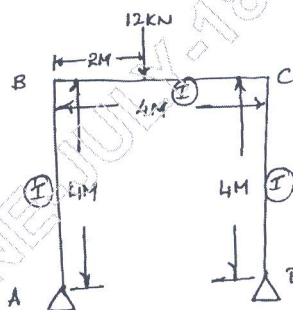


Fig. Q10
