CBCS SCHEME

USN

15CT42

Fourth Semester B.E. Degree Examination, June/July 2019

Structural Analysis

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably

Module-1

1 a. Explain degree of freedom, static and kinematic indeterminacy with examples. **(06 Marks)**

b. Analyze the truss shown in Fig Q1(b) by "method of joint" Indicate the force on truss.

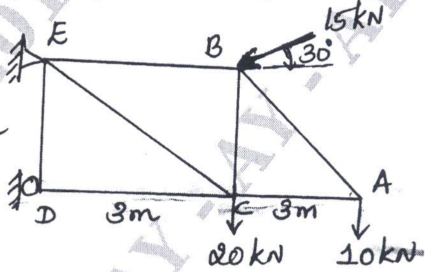

Fig Q1(b) **(10 Marks)**

OR

2 a. Determine slope and deflection at free end by moment area method. Ref Fig. Q2(a)

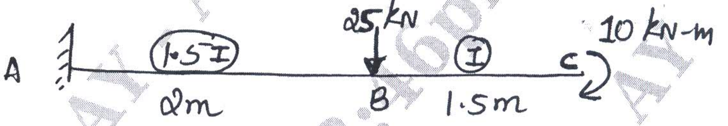

Fig Q2(a) **(08 Marks)**

b. Determine the slope at the support and defection under point loads as shown in Fig Q2(b). using conjugate beam method.

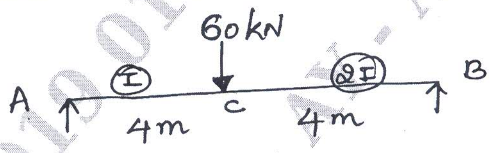

Fig Q2(b) **(08 Marks)**

Module-2

3 a. Derive an expression for strain energy in an elastic member due to bending. **(08 Marks)**

b. Determine the vertical and horizontal deflection at the free end of the bent shown in Fig Q3(b). Assume uniform flexural rigidity EI thought-out.

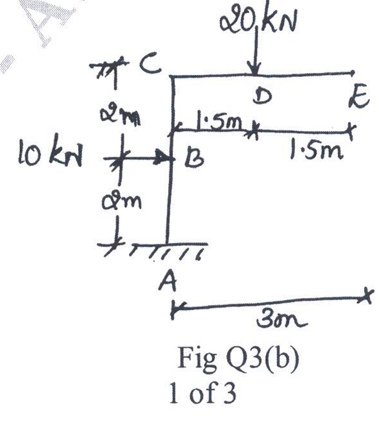

Fig Q3(b) **(08 Marks)**

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.

OR

4 a. State Castigliano's first theorem and give the procedure for finding deflection using Castiglianos theorem. **(06 Marks)**

b. Determine the deflection and rotation at free end of the beam shown using unit load method. Take E = 2 × 10^5 N/mm^2. and I = 2 × 10^6mm^4 [Refer Fig Q4(b)].

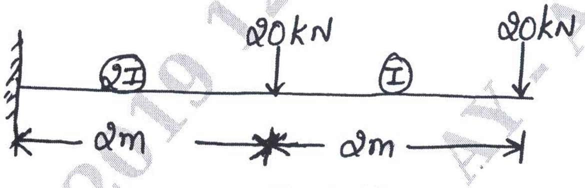

Fig Q4(b) **(10 Marks)**

Module-3

5 A three hinged symmetrical parabolic arch has span of 30m and centre rise of 6m. The arch carries a uniformly distributed load of intensity 30kN/m over left half portion and a concentrated load of 60kN at 9m from right hand support. Compute the bending moment, Normal thrust and radial shear at 9m from left hand support. **(16 Marks)**

OR

6 A suspension bridge of 120m span has a central dip of 12m end supports a UDL of 15k/m of span. Evaluate

i) The minimum and maximum tension in a cable
ii) The size of cable if the permissible stress of the cable material is 200 N/mm^2
iii) The length of the cable
iv) Calculate forces in the tower when, cable passes over pulley, take inclination of Anchar cable 25°. **(16 Marks)**

Module-4

7 a. Determine reaction components in the propped cantilever beam as shown in Fig Q7(a). EI is constant throughout.

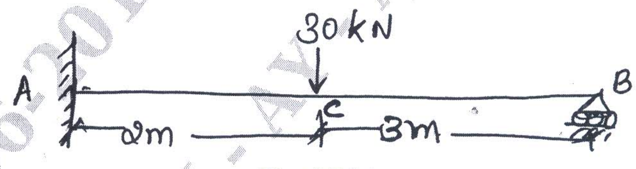

Fig Q7(a) **(08 Marks)**

b. Determine the reaction components in the beam shown in Fig Q7(b). EI is constant throughout.

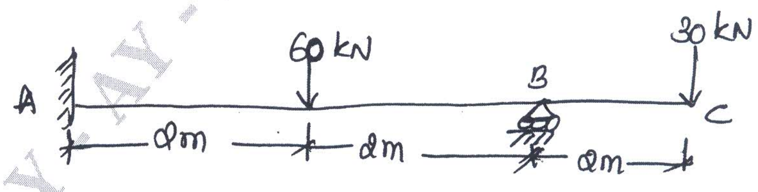

Fig Q7(b) **(08 Marks)**

OR

8 Analyze the continuous beam shown in Fig Q8. Using three moment equation and Draw SFD and BMD.

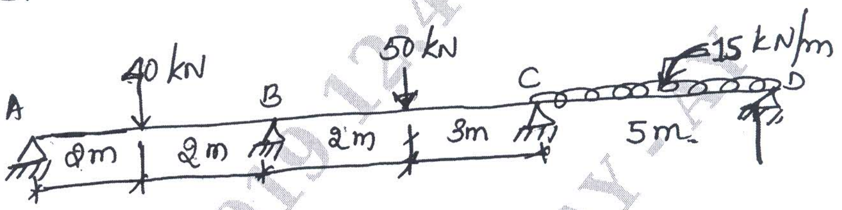

Fig Q8 **(16Marks)**

Module-5

9 Analyze the frame shown slope deflection method. Draw BMD and elastic curve. Ref Fig Q9.

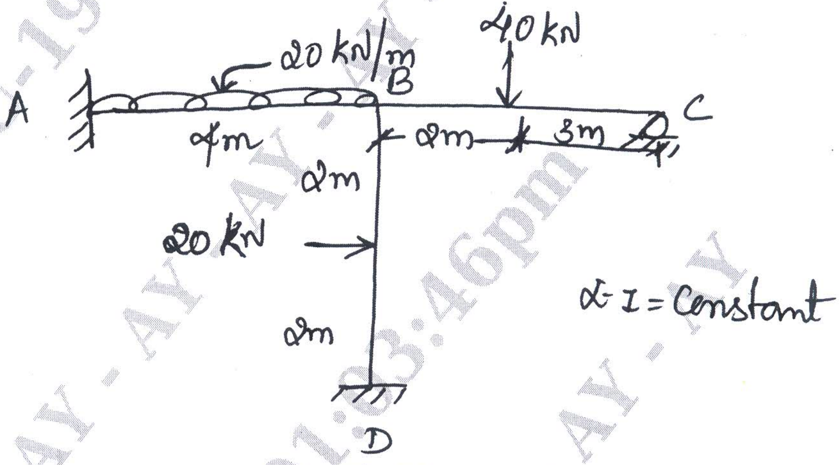

Fig Q9 **(16 Marks)**

OR

10 Analyze continuous beam shown in Fig Q10. Using moment distribution method. Draw BMD and EC.

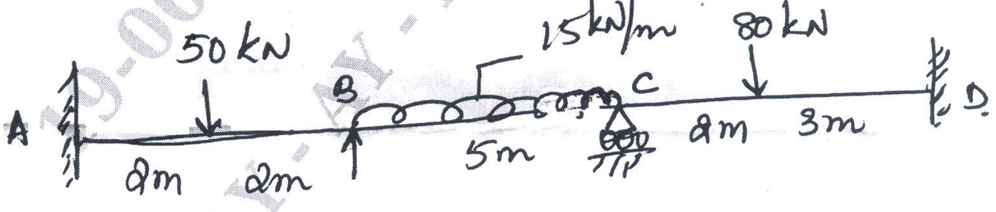

Fig Q10 **(16 Marks)**

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