CBCS SCHEME

USN | | | | | | | | | | |

17CV42

Fourth Semester B.E. Degree Examination, June/July 2023
Analysis of Determinate Structures

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain Linear and Non linear system. **(04 Marks)**

b. Explain different types of truss with neat sketch. **(04 Marks)**

c. Find the forces in all the members of the truss shown in Fig.Q1 (c) by method of joints.

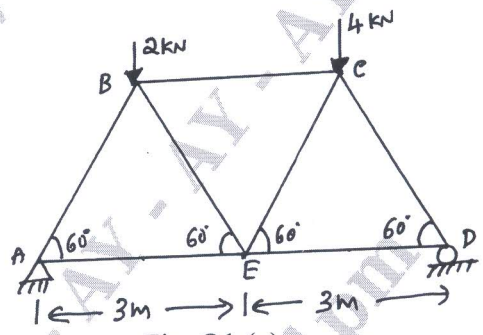

Fig. Q1 (c) **(12 Marks)**

OR

2 a. Differentiate between a statically determinate and indeterminate structure with an example. **(06 Marks)**

b. What are the assumptions made in the analysis of truss? **(04 Marks)**

c. Analyze the truss shown in Fig.Q2(c) by method of section and determine the forces in the members BC, CG and GF.

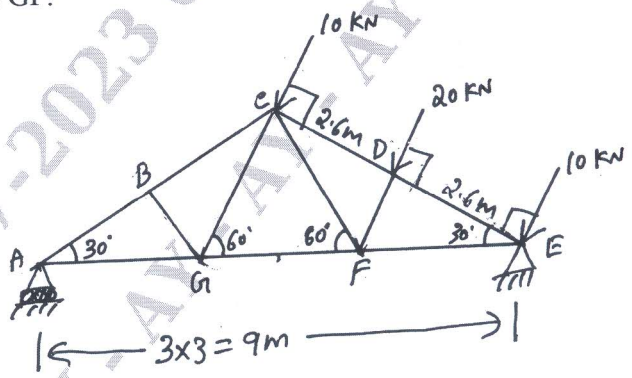

Fig. Q2 (c) **(10 Marks)**

Module-2

3 a. Derive moment curvature equations for a deflection. **(06 Marks)**

b. State moment area theorem. **(04 Marks)**

c. Using double integration method find slope at support and maximum deflection for the simply supported beam of span 'L' and carrying load 'P' at the center of span. **(10 Marks)**

OR

4 a. Find the slope and deflection at free end of cantilever beam shown in Fig. Q4 (a) using moment area theorem.

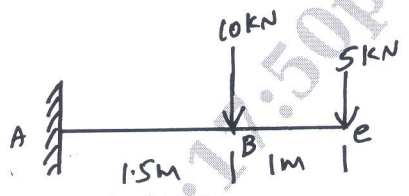

Fig. Q4 (a) **(10 Marks)**

b. Determine slope at support and deflection under point load by conjugate beam method.

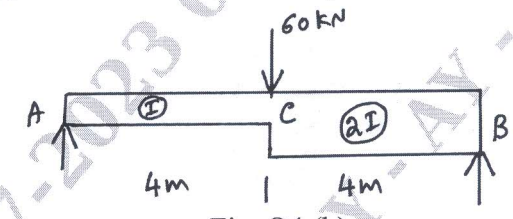

Fig. Q4 (b) **(10 Marks)**

Module-3

5 a. Derive the equation for strain energy due to axial load. **(06 Marks)**

b. Find maximum deflection for the beam as shown in Fig.Q5 (b). By strain energy method. Take EI constant. **(06 Marks)**

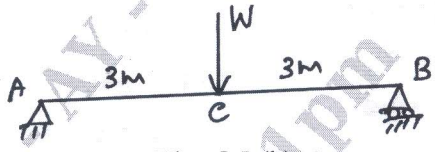

Fig. Q5 (b)

c. Find deflection at the center of beam of span L carrying a UDL of ' W ' per unit length run over the entire span. Take EI constant. By Castiglino's method. **(08 Marks)**

OR

6 a. Find rotation at 'A' in the over hang beam shown in Fig. Q6 (a) using Castiglino's theorem. Take EI constant.

Fig. Q6 (a) **(10 Marks)**

b. Find the vertical deflection under concentrated for the frame shown in Fig. Q6(b), using unit load method. Take $E = 2\times10^8$ KN/m^2 and $I = 14\times10^{-6}$ m^4.

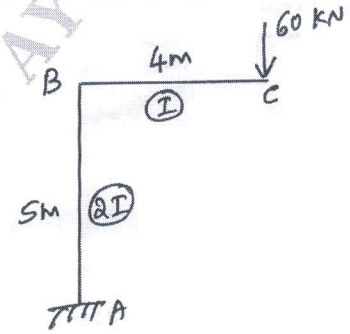

Fig. Q6 (b) **(10 Marks)**

Module-4

7 A three hinged parabolic arch hinged at abutments and at crown, has a span of 24 m and a central dia 4 m. It carries a concentrated load of 50 kN at 18 m from left support and a uniformly distributed load of 30 kN/m over left half of the span. Determine the horizontal thrust at the support. Also determine bending moment, radial shear and normal thrust at a point 6 m from right hand support. **(20 Marks)**

OR

8 A flexible cable of weight 0.0075 kN/m hangs between two vertical walls 60 m apart. The left end being attached to the wall at a point 10 m below the right end. A concentrated load of 1 kN is attached to the cable in such a manner that the point of attachment of the load is 20 m horizontal from the left end wall and 5 m below the left hand support. Show that maximum tension occurs at the right hand support and find its value. Also find the length of the cable. **(20 Marks)**

Module-5

9 a. What are the uses of influence line diagram? **(04 Marks)**

b. A uniformly distributed load of 5 kN/m and 5 m long, cross a beam of 15 m long simply supported at its both ends. Determine maximum bending moment and shear force at a section 6 m from left hand support. **(16 Marks)**

OR

10 a. Draw the influence line diagram for B.M at any given section of a simply supported beam. **(03 Marks)**

b. A train of five wheel loads crosses a span of 30 m. Calculate the maximum positive and negative shear at mid span and the absolute maximum bending moment any where in the span.

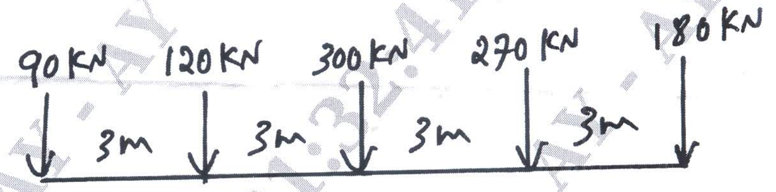

Fig. Q10 (b) **(17 Marks)**

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