CBCS SCHEME

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

21CV44

Fourth Semester B.E. Degree Examination, June/July 2024
Analysis of Structures

Time: 3 hrs. Max. Marks: 100

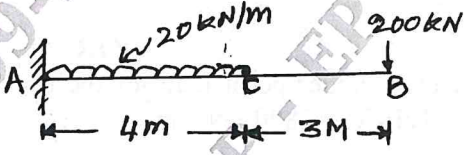
Note : 1. ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Any missing data assume suitably.***

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-1

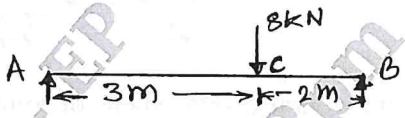
1 a. Determine the slope and deflection of the cantilever loaded beam shown in Fig. Q1(a) at the free end by Moment Area method. Take EI is constant. **(10 Marks)**

Fig. Q1(a)



b. Determine the slope at supports and deflection under point load for the beam shown in Fig. Q1(b) using Moment Area method. Take EI = Constant. **(10 Marks)**

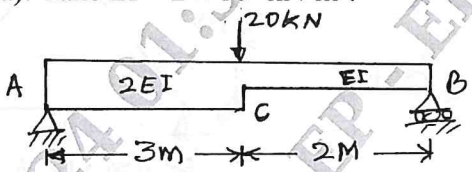
Fig. Q1(b)



OR

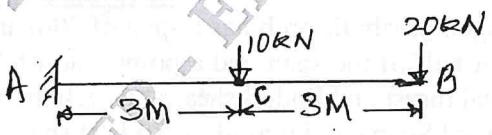
2 a. Determine the deflection under the point load and slope at A, using Conjugate Beam method for the shown in Fig. Q2(a). Take EI = 2×10^4 kN-m^2. **(10 Marks)**

Fig. Q2(a)



b. Determine the slope and deflection at the free end of a cantilever beam shown in Fig. Q2(b) by Conjugate Beam method. Take EI = 4×10^4 kN-m^2. **(10 Marks)**

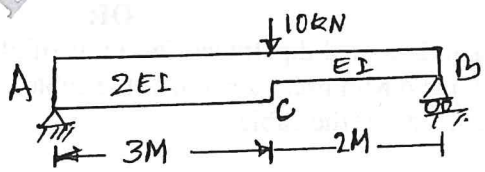
Fig. Q2(b)



Module-2

3 a. Determine the deflection for a simply supported beam shown in Fig. Q3(a) under the point load by Strain Energy method. Take EI = 5000 kN-m^2. **(10 Marks)**

Fig. Q3(a)



b. Determine the vertical deflection at 'C' in the frame shown in Fig. Q3(b) using Strain Energy method. Take EI = 6000 kN-m^2. **(10 Marks)**

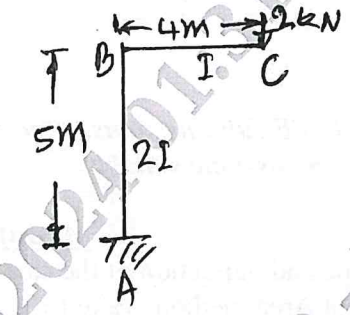


Fig. Q3(b)

OR

4 a. Find the deflection under point load for the beam shown in Fig. Q4(a) using Castigliano's First theorem. Take E = 2800 kN – m^2. **(10 Marks)**

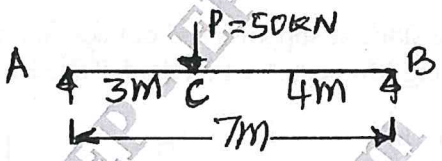


Fig. Q4(a)

b. Determine the horizontal displacement of joint 'C' of the truss shown in Fig. Q4(b). The cross – sectional area of each member of the truss is A = 400mm^2 , E = 200kN/mm^2. Use Castigliano's theorem. **(10 Marks)**

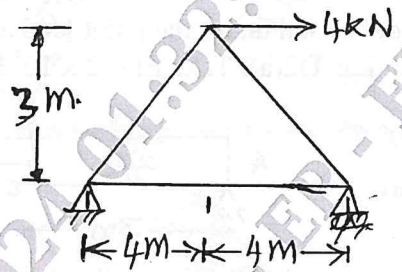


Fig. Q4(b)

Module-3

5 a. A three hinged parabolic arch has a span of 20m and rise of 5m. It carries a UDL of 25kN/m over the left half of the span and a point load of 120kN at 5m from the right end. Find the BM , Normal thrust and Radial shear at a section 4m from the left end. **(10 Marks)**

b. A three hinged Segmental (circular) Arch of span 10m and central rise of 2.5m and supports a point load of 100kN at left Quarter span and Udℓ of 20kN/m over the right half of the span. Determine the reactions , Normal thrust and Radial shear at right quarter span. **(10 Marks)**

OR

6 a. A cable of span 20m and dip 4m carries a udℓ of 20kN/m over the entire span. Find the
i) Maximum and Minimum tension in the cable.
ii) Size and length of the cable. **(10 Marks)**

b. Determine the tension in the various segments of the cable as shown in Fig. Q6(b). Also determine the diameter of the cable required. If stress in the cable material is 150N/mm^2. **(10 Marks)**

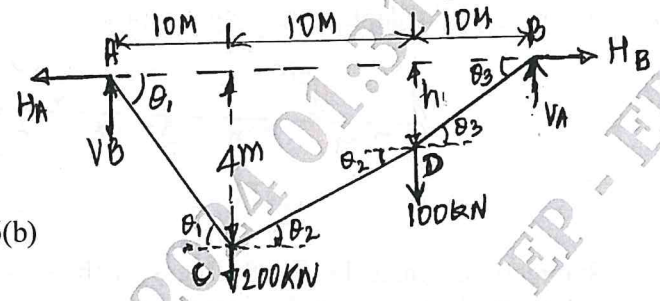


Fig. Q6(b)

Module-4

7 a. Analyse the two Span continuous beam as shown in Fig. Q7(a) by Slope deflection method and draw BMD. **(10 Marks)**

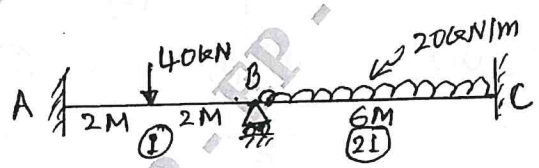


Fig. Q7(a)

b. Analyse the beam by Slope deflection method as shown in Fig. Q7(b). The support 'B' sinks by 5m. Take EI = 2.1 × 10^4 kN-m^2. Draw BMD. **(10 Marks)**

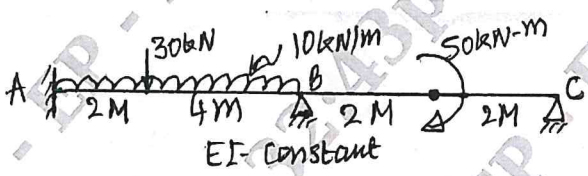


Fig. Q7(b)

OR

8 a. Anlayse the Rigid frame by the Slope deflection method as shown in Fig. Q8(a). **(10 Marks)**

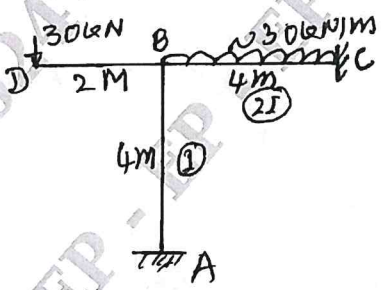


Fig. Q8(a)

b. Analyse the Portal frame shown in Fig. 8(b) by the Slope deflection method. **(10 Marks)**

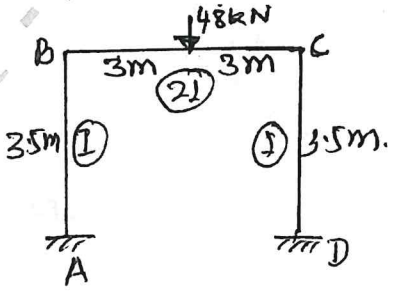
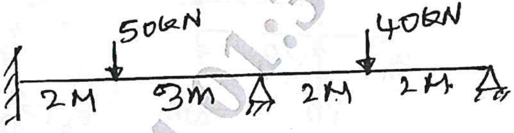


Fig. Q8(b)

Module-5

9 Analyse the Continuous beam shown in Fig. Q9, by Matrix flexibility method and draw BMD & SFD. Take moments as redundant. (Use system approach). **(20 Marks)**

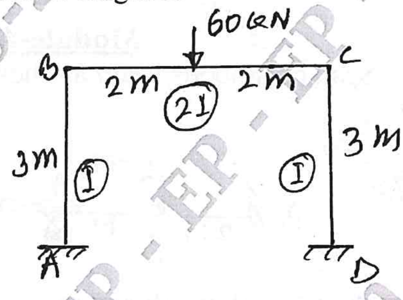
Fig. Q9



OR

10 Analyse the Symmetrical frame by the Stiffness method using system approach as shown in Fig. Q10. Draw the Bending moment diagram. **(20 Marks)**

Fig. Q10



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