CBCS SCHEME

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15CT42

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021
Structural Analysis

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Define statically determinate and indeterminate structure with example. **(06 Marks)**

b. Find forces in members of truss shown in below Fig.Q1(b). Using methods of joints and tabulate member forces.

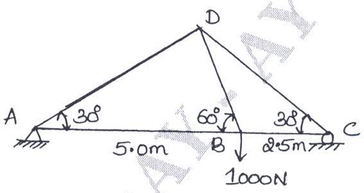

Fig.Q1(b) **(10 Marks)**

OR

2 a. What are the assumptions made in the analysis of trusses? **(06 Marks)**

b. Determine the rotation and deflection at the free end of a cantilever beam shown in Fig.Q2(b), by moment area method.

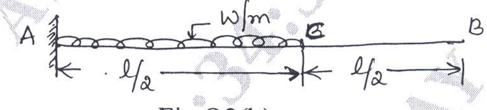

Fig.Q2(b) **(10 Marks)**

Module-2

3 a. Derive the strain energy stored in a beam due to bending. **(06 Marks)**

b. Compute the deflection and rotation [slope] at the free end C of cantilever beam by unit load method. Shown in Fig.Q3(b). Take E = 200GPa, $I = 8 \times 10^7 mm^4$.

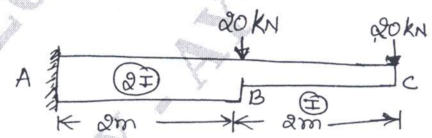

Fig.Q3(b) **(10 Marks)**

OR

4 a. Determine the reaction at propped cantilever beam carrying UDL of w/m run throughout its span using strain energy method. Take EI constant. **(08 Marks)**

b. Analyse the fixed beam shown in Fig.Q4(b) by strain energy method and draw SFD and BMD.

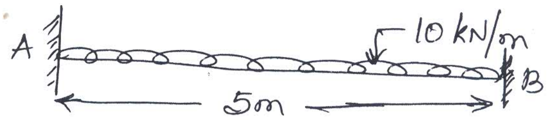

Fig.Q4(b) **(08 Marks)**

Module-3

5 A three hinged parabolic arch at the supports and at the crown has a span of 24m and central rise of 4m. It carries a concentrated load of 50kN at 18m from the left support and UDL of 30kN over the left half span. Determine the bending moment, normal thrust and radial shear at a section 6m from the left support. **(16 Marks)**

OR

6 A cable of span 120m and dip 10m carries a load of 6kN/m of horizontal span. Find the maximum tension in the cable and inclination of cable at the support. Find he forces transmitted to the supporting pier if the cable passes over smooth pulleys on top of pier. The Anchor cable is at 30° to the horizontal. Determine the maximum bending moment for the pier if height of pier is 15m. **(16 Marks)**

Module-4

7 a. Determine the reaction components of propped cantilever, subjected to uniformly distributed load by consistent deformation method. **(06 Marks)**

b. Determine the reaction components in the beam as shown in Fig.Q7(b). EI is constant throughout by consistent deformation method.

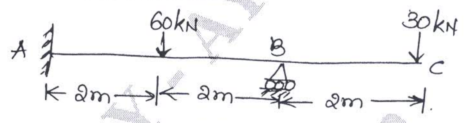

Fig.Q7(b) **(10 Marks)**

OR

8 Analyse the continuous beam shown in Fig.Q8, by theorem of three moments. Draw BMD and SFD.

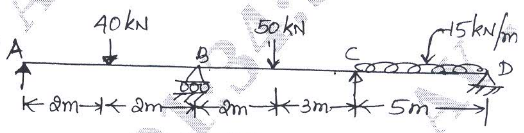

Fig.Q8 **(16 Marks)**

Module-5

9 Analyse the frame shown in Fig.Q9, by slope deflection method.

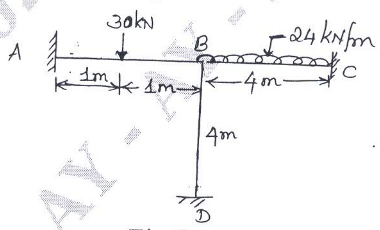

Fig.Q9 **(16 Marks)**

OR

10 Find support moments. Draw SFD and BMD for continuous beam shown in Fig.Q10 by moment distribution method.

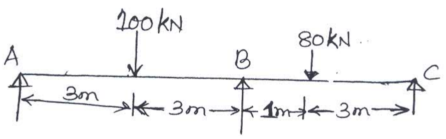

Fig.Q10 **(16 Marks)**

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