01882

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

December, 2012

ET-502(B) : STRUCTURAL ANALYSIS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions. All questions carry **equal** marks. Use of scientific calculator is **permitted**.*

1. Two concentrated loads of 120 kN and 60 kN, placed 9 m apart, travel along a simply supported girder of 30 m span. Draw maximum shear force and bending moment diagrams indicating the position and magnitude of the greatest values. 60 kN load leads the other load and the loads move from left to right. **14**

2. A three - hinged symmetrical circular arch has a span of 20 m with a central rise of 5 m. The hinges are located at abutments and highest point of the arch. Draw the influence line diagram for horizontal thrust. Hence find the maximum horizontal thrust due to 8 m long uniformly distributed load of 20 kN/m. **14**

3. Analyze the rigid joint frame shown in figure - 1 by moment distribution method. Draw the bending moment diagram.. **14**

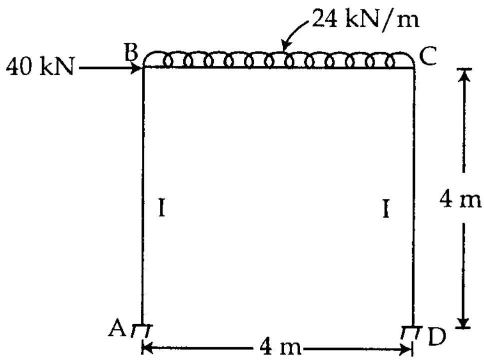

Figure - 1

4. A timber beam, 100 mm x 200 mm, carries a uniformly distributed load 6 kN/m as shown in figure - 2. Determine the deflection at every meter interval if E = 10 GPa for the timber. **14**

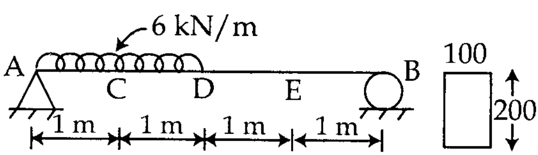

Figure - 2

5. Determine the deflections under the load P and the rotation at the internal hinge at B of the beam shown in figure - 3. **14**

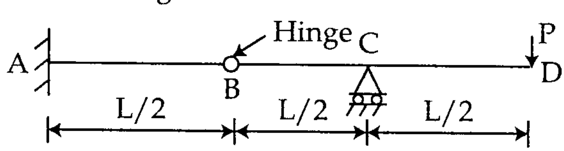

Figure - 3

6. Analyze the continuous beam shown in figure-4 by the strain energy method. **14**

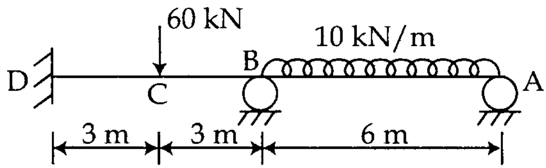

Figure - 4

7. A fixed beam of span L carries a uniformly distributed load W (total) on the left half portion. Using plastic theory, determine the value of W at collapse. The plastic moment of resistance of beam is Mp. **14**

8. A cable carrying a load of 30 kN/m horizontal distance suspends between two points which are 60 m apart. The central dip of the cable is 6 m. The coefficient of thermal expansion for the cable material is $12 \times 10^{-6}/°C$. Neglecting change of length due to change of stress, calculate the percentage increase in the maximum tension due to a fall of temp of 30°C. **14**