No. of Printed Pages : 3

**ET-502(B)**

02582

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

## Term-End Examination

## December, 2011

## 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.** A three hinged arch of span '*l*' and rise '*h*' carries a uniformly distributed load of 'w' per unit runover the whole span. Show that the horizontal thrust is $\frac{w l^2}{8h}$. **14**

**2.** A fixed beam of span 'L' is subjected to a uniformly distributed load as shown in figure - 1. Calculate the fixed end moments MA and MB by three moment equation. **14**

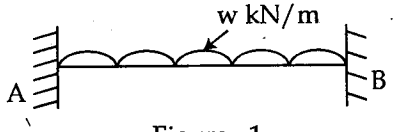


Figure - 1

**3.** A live load of 10 kN per meter moves on a simply supported girder of span 12 metres. Length of load is more than the span of girder. Find the maximum bending moment which can occur at a section 4 meters from the left end. **14**

4. Analyse the portal frame shown in fig. 2 by moment distribution method. EI = constant **14**

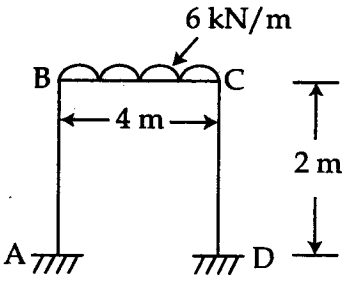


Fig. 2

5. The frame is fixed at A and D and has rigid joints at B and C. Draw the bending moment diagram. Using Euler's theory, compare the buckling strength of two long columns of the same length, material and weight. One of the columns is of a solid circular section 20 mm in diameter while the other one is of solid square section. Both columns are hinged at the ends. **14**

6. A propped cantilever beam of span 'L' carries a uniformly distributed load of intensity w over the full span as shown in fig. 3. Determine the value of w at collapse. The plastic moment of resistance of the beam is Mp. **14**

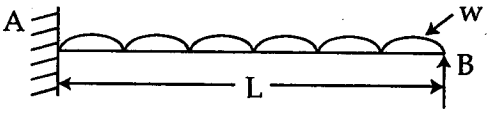


Fig. 3

7. Compute the strain energy stored in the bar as shown in figure-4. All portions are circular in cross section. **14**

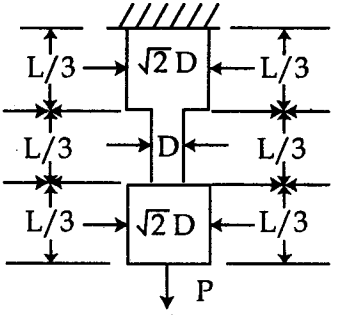


Figure - 4

8. A uniform beam of length L is simply and symmetrically supported on a span '*l*' as shown in fig. 5. Find the ratio L/*l* so that the upward deflection at each end equals the downward deflection at mid span, due to a central point load 'w'. **14**

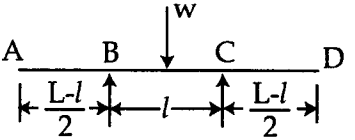


Fig. 5