Roll No. | | | | | | | | | | | | | **Total No. of Pages : 03**

Total No. of Questions : 09

B.Tech.(CE) (Sem.–4)

STRUCTURAL ANALYSIS – I

Subject Code : CE-208

Paper ID : [A0609]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

(a) Define conjugate beam method.

(b) Derive an expression for volumetric change in spherical shell.

(c) Define castigiliano's first theorem.

(d) Name the various conditions for the stability of a dam.

(e) A load of 25 kN crosses a bridge AB of span 20 m. Find the values of maximum SF and BM at a section 8m from the left end support.

(f) Draw the influence line for shear forces and bending moment for a uniformly distributed load longer than span on a simply supported beam.

(g) Derive an expression for horizontal thrust in two hinged arch.

(h) *"When the cable is supported on a guide pulley the tension in suspension cable is equal to tension in the anchor cable."* Comment.

(i) Differentiate between method of sections and methods of joints.

(j) Find the deflection in a simply supported beam carrying a concentrated load at its centre.

SECTION-B

2. Determine the deflection at the free end of the cantilever beam using moment area method. Take EI = 6000kNm^2

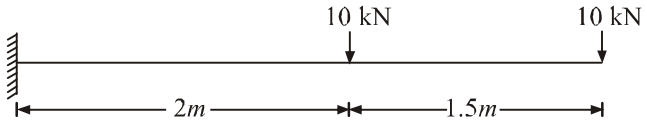


Fig.

3. Find axial forces in the members BC, BG, FG of given pin jointed frame

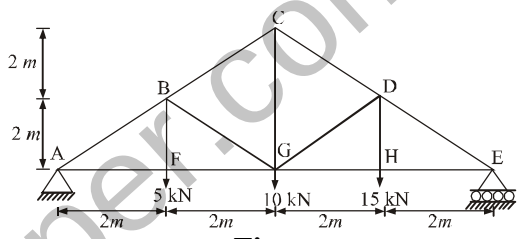


Fig.

4. A cylindrical shell 1.5 meter long, 300 mm internal diameter, having a thickness of metal 15 mm is filled with a fluid at atmospheric pressure. If an additional 2.5 × 10^4 mm^3 of fluid is pumped into the cylinder. Find the pressure exerted by the fluid on the cylinder.

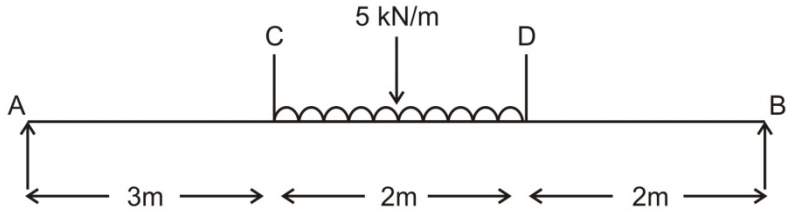
5. A two hinged parabolic arch of span L and rise h carries a concentrated load W at the crown. Show that the horizontal thrust equal $\frac{25}{128}\frac{WL}{h}$ at each support.

6. Two wheel loads 100 kN and 180 kN, spaced 3 m apart move on a girder of span 25 meters. Find maximum positive and negative shear force at a section 8 meters from the left end. Any wheel load can lead the other.

SECTION-C

7. A suspension bridge cable hangs between two points A and B separated horizontally by 100 meter and with A is 30 meter above B. The lowest point in the cable is 4 meter below B. The cable supports a stiffening girder which is hinged vertically below A, B and the lowest point of the cable. Find the position and magnitude of the largest BM which a point load of 10 kN can induce in the girder together with the position of the load.

8. Find the maximum deflection for the beam loaded as shown below using Macaulay's method.



Fig

9. A masonry dam of trapezoidal section has a vertical water face and a height of 30 meters. Determine the widths at the top and bottom if the normal pressure on the base varies from zero pressure at one side to 1080 kN/m^2 at the other side. The depth of water impounded is 32 meters. Take the weight of water and masonry as 9810 N/cum and 22560 N/cum respectively.