



## SECTION-B

2. The quadrantal ring AB shown in Fig. 1 is of radius  $r$ . It supports a concentrated load  $P$  at the free end A. Find the vertical and horizontal deflections of A. Assume uniform flexural rigidity.

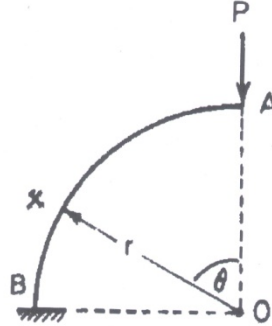


Fig.1

3. A suspension cable is supported at two points 25 m apart. The left support is 2.5 m above the right support. The cable is loaded with a uniformly distributed load of 10 kN/m throughout the span. The maximum dip in the cable from the left support is 4 m. Find the maximum and minimum tensions in the cable.
4. A three hinged symmetric circular arch is loaded as shown in Fig. 2. Determine the bending moment, normal thrust and radial shear at 9 m from the left support.

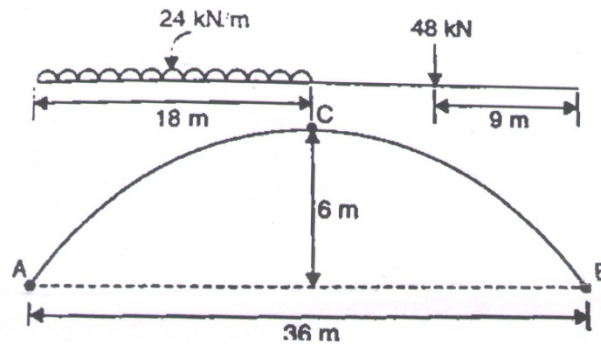


Fig.2

5. Draw influence lines for
- Reaction at A ( $R_A$ )
  - Reaction at B ( $R_B$ )
  - Shear force at D ( $F_D$ )
  - Bending moment at D ( $M_D$ )
  - Shear force at E ( $F_E$ ) and
  - Bending moment at E ( $M_E$ )

The beam is overhanging at both ends as shown in following figure 3.

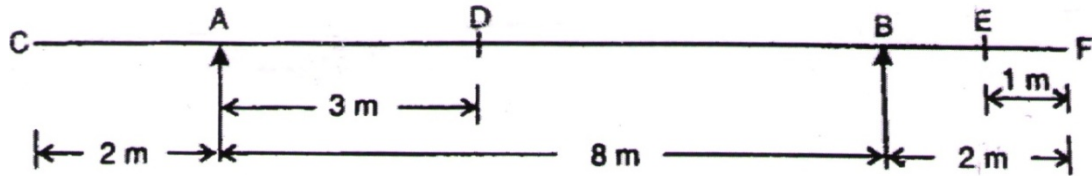


Fig. 3

6. A retaining wall 6.5 m high has a smooth vertical back. The back fill has a horizontal level surface, level with the top of the wall. The soil surface is subjected to an external vertical load of  $45 \text{ kN/m}^2$ . The soil has an angle of internal friction of  $30^\circ$  and its cohesion is zero. The back fill has a specific weight of  $19 \text{ kN/m}^3$ . Find the magnitude and the point of application of active pressure on the wall per metre run of the wall.

### SECTION-C

7. Using the method of tension coefficients, determine the forces in the members of the frame shown in Fig. 4.

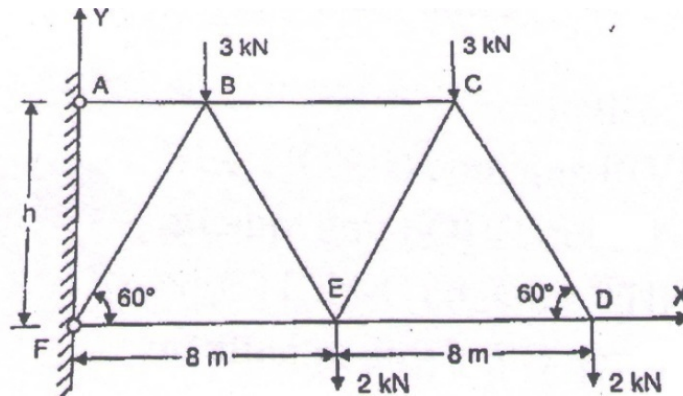


Fig.4

8. The truss shown in Fig. 5 carries vertical loading uniformly divided between the panel points of the lower chord while the cross-section of the members are such that all loaded ties are stressed to  $135 \text{ N/mm}^2$  and all loaded struts to  $90 \text{ N/mm}^2$  under the loading. All joints are pin-joints and value of  $E$  for the material of the truss is  $2.02 \times 10^5 \text{ N/mm}^2$ . Find the vertical deflection of the point A.

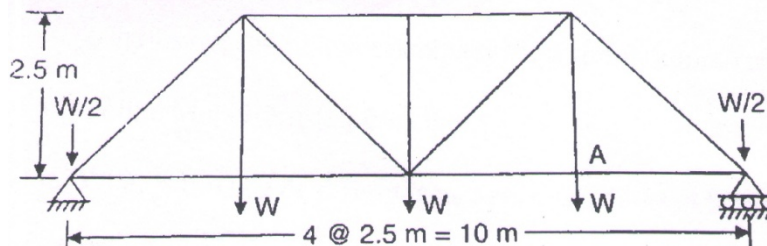
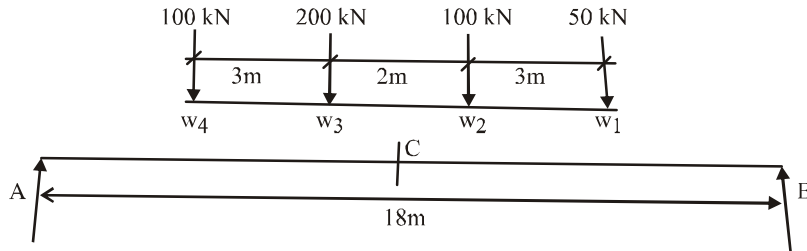


Fig.5

9. A girder having a span of 18 m is simply supported at the ends. It is traversed by a train of loads as shown in Fig. 6. The 50 kN load is leading. Find the maximum bending moment which can occur
- Under the load 200 kN load.
  - Under 50 kN load.

**Fig.6**