UNIT 1

1. Differentiate determinate and indeterminate of structure
2. Differentiate static and kinematic indeterminacy of structure
3. What is equilibrium condition
4. Define degree of indeterminacy
5. What are the methods of structure to determining the degree of indeterminacy
6. What are all type of frames
7. Differentiate external and internal indeterminacy of structures
8. Define redundant force
9. To find degree of indeterminacy of structures as given below
10. Differentiate the method of joints & method of sections
11. What are temperature stresses? Explain.
12. Define trussed beam.
13. What is a portal frame?
14. Define rigid frame.
15. Explain a pin-jointed frame with a sketch
16. Determine the force in the members of the truss shown in figure. The cross sectional area of vertical and horizontal members is 4000mm^2 and that of the diagonal is 6000 mm^2.

al area of vertical and horizontal members is 4000 mm^2 and that of the m^2.

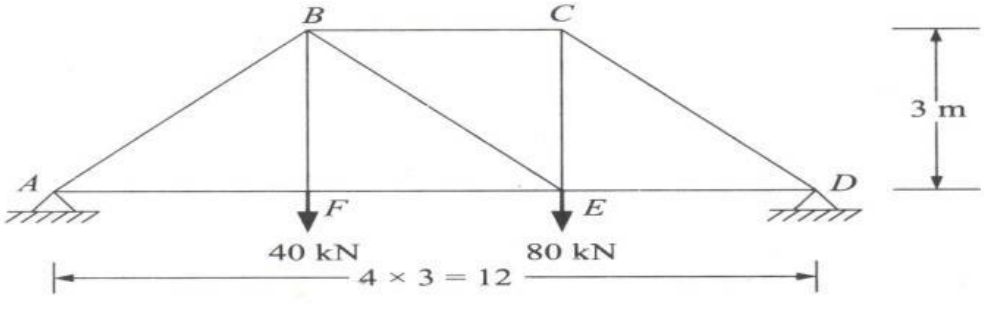
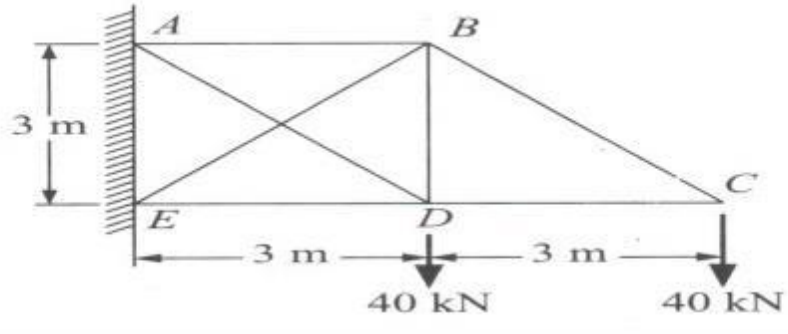


Figure 10.4(a) Example 10.1

17. Find the forces in the members of truss shown in figure. The cross sectional area and young's modulus of all the members are the same.



18. Find the forces developed in all the members of truss shown in fig, if the temperature of member AC goes up by 20°c. Take the co efficient of thermal expansion $\alpha=12X10^{-6}/°c$. Cross sectional area of all the members is $2500mm^2$ and young's modulus is $200KN/mm^2$.

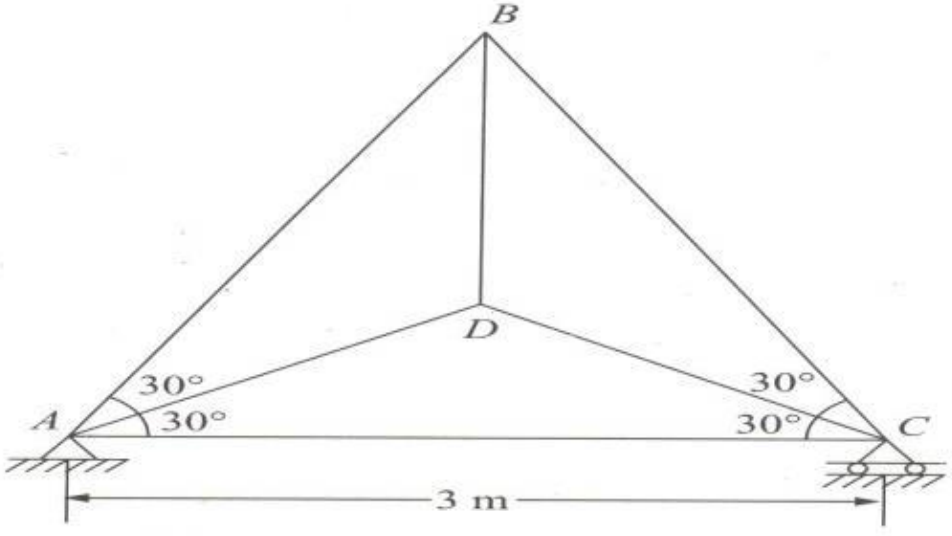


Figure 10.14(a) Example 10.7

UNIT 2

1. What is an arch? Explain.
2. What are the methods used for analysis of fixed arches?
3. Distinguish between two hinged and three hinged arches?
4. Give the equation for a parabolic arch whose springing is at different levels?
5. State Eddy"s theorem as applicable to arches?
6. Explain the effect of temperature on the horizontal thrust of a two hinged arch subjected to a system of vertical loads?
7. Indicate the positions of a moving point load for maximum negative and positive Bending moments in a three hinged arch.
8. Write down the expressions for radial shear and normal thrust in a three hinged parabolic arch?
9. Define radial shear and normal thrust.
10. Mention the examples where arch action is usually encountered?
11. What is a linear arch?
12. What is the degree of static indeterminacy of a three hinged parabolic arch?
13. Under what conditions will the bending moment in an arch be zero throughout?

14. Distinguish between two hinged and three hinged arches?
15. In a parabolic arch with two hinges how will you calculate the slope of the arch at any point?
16. How will you calculate the horizontal thrust in a two hinged parabolic arch if there is a rise in temperature?
17. What are the types of arches according to their shapes?
18. What are the types of arches according to their support conditions?

19. Draw the influence line for radial shear at a section of a three hinged arch?
20. Write the formula to calculate the change in rise in three hinged arch if there is a rise in temperature.
21. A circular three hinged arch of span 25m with a central rise of 5m is hinged at the crown and the end supports. It carries a point load of 100 kN at 6m from the left support .Calculate
i. The reaction at the supports
ii. Moment at 5m from the left support.
22. A three hinged circular arch of span 16m and rise 4m is subjected to two point loads of 100 kN and 80 kN at the left and right quarter span points respectively. Find the reaction at the supports. Find also the bending moment, radial shear and normal thrust at 6m from left support.
23. A symmetrical three hinged arch has a span of 50 & rise 5m. Find the maximum bending moment at a quarter point of the arch caused by a uniformly distributed load of 10kN/m which occupies any portion of the span. Indicate the position of the load for this condition.
24. A three hinged parabolic arch of span 30m and rise 5m carries a uniformly distributed load of 40kN per meter on the whole span and a point load of 200kN at a distance of 5m from the right end. Find the horizontal thrust, resultant reaction, bending moment and normal thrust at a section 5m from the left end.

UNIT 3

1. State importance of ILD.
2. State Muller Breslau‟s principle?
3. What are the types of connections possible in the model of begg‟s deformeter?
4. What is the influence line diagram?
5. Draw influence lines for support reactions in a simply supported beam?
6. What do you understand by an influence line for bending moment?
7. When a series of wheel loads move along a girder, what is the condition for getting maximum bending moment under any one point load?
8. Draw a qualitative influence line diagrams for the support reactions of a simply supported beam of span L?
9. What is meant by absolute maximum bending moment in a beam?
10. What is the absolute maximum bending moment due to a moving udl longer than the span of a simply supported beam?

11. What are the three types of connections possible with the model used with Begg‟s deformeter?
12. What is Begg‟s deformeter?
13. Where do you get rolling loads in practice?
14. Name the type of rolling loads for which the absolute maximum bending moment occurs at the mid span of a beam?
15. Define similitude?
16. What is the principle of dimensional similarity?
17. Where do you have the absolute maximum bending moment in a simply supported beam when a series of wheel loads cross it?
18. State the location of maximum shear force in a simple beam wit h any kind of loading?
19. What is meant by maximum shear force diagram?
20. State Maxwell-Betti‟s theorem?

21. A system of four loads 80, 160, 160 and 120 kN crosses a simply supported beam of span 25m with the 120 kN load leading. The loads are equally spaced at 1m. Determine the values of the following using influence lines.
i. Maximum bending moment at a section 10m from left support and
ii. Absolute maximum shear force and bending moment in the beam.
22. A beam has a span of 24m, draw the influence line diagram for the bending moment and shear force at a section 8m from the left and also determine maximum bending moment and shear force at this section due to two point loads of 10kN and 6kN at a fixed distance of 2m apart rolling from left to right with 6kN load leading
23. Two point loads of 100kN and 200kN spaced 3m apart cross a girder of span 12 meters from left to right with the 100kN leading. Draw the ILD for shear force and bending moment and find the values of maximum bending moment and find the values of maximum shear force and bending moment at a section 4m from the left hand support. Also evaluate the absolute maximum bending moment due to the given loading system.
24. A simply supported beam has a span of 16m,is subjected to a UDL(dead load) of 5kN/m and a UDL(live load) of 8kN/m(longer than the span) travelling from left to right. Draw the ILD for shear force and bending moment at a section 4m from left end. Use

UNIT 4

1. A curved beam in the form of a quadrant of a circle of radius R and having a uniform cross section is in a horizontal plane. It is fixed at A and free at B as shown in the figure. It carries a vertical concentrated load W at the free end B. Compute the shear force, bending moment and twisting moment values and sketch variations of the above quantities. Also determine the vertical deflection of the free end B.
2. A curved beam AB of uniform cross section is horizontal in plan and in the form of a quadrant of a circle of radius R .The beam is fixed at A and free at B. It carries a uniformly distributed load of w/unit run over the entire length of the beam as shown. Calculate the shear forces, bending moment and Twisting moment value,at A and B and sketch the variations of the same. Also determine the deflection at the free end B.
3. Diagram shows a curved beam, semi-circular in plan and supported on three equally spaced supports. The beam carries a uniformly distributed load of w/unit of the circular length. Analyse the beam and sketch the bending moment and twisting moment diagrams.
4. Summarize the assumptions made in the analysis of curved bars
5. Write the formula for stress using Winkler-Bach theory
6. Write the concept behind unsymmetrical bending.
7. Illustrate the reasons for unsymmetrical bending
8. How will you calculate the stress due to unsymmetrical bending?
9. How will you calculate the distance of neutral axis from centroidal axis?
10. How will you calculate the angle of inclination of neutral axis with respect to principal axis?
11. How will you calculate the resultant stress in a curved bar subjected to direct stress and bending stress?
12. How will you analyse resultant stress in a chain link.?
13. What do you infer from shear center or angle of twist?

14. Who postulated the theory of curved beam?
15. What is the shape of distribution of bending stress in a curved beam?
16. Where does the neutral axis lie in a curved beam?
17. Calculate the thickness of metal necessary for a steel cylindrical shell of internal diameter 100 mm to withstand an internal pressure of 40 N/mm2 , if the allowable tensile stress is 120 N/mm2
18. A beam of Tee section having flange of 100 mm x 20 mm and web of 150 mm x10mm and 3 m long is simply supported at its ends. It carries 4 kN at 30 ° to vertical and passing through the centroid of the section. Calculate the maximum tensile stresses and maximum compressive stresses. E = 200 kN/mm2
19. A 80 x 80 x 10 mm angle is used as a simply supported beam over a span of 2.4 m. It carries a load of 400 kN along the vertical axis passing through the centroid of the section. Determine the resulting bending stress on the outer corners of the section along the middle section of the beam.