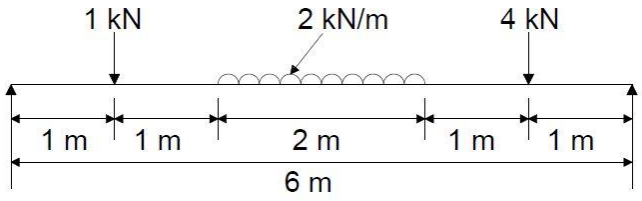
UNIT 2 TRANSFER OF LOADS AND STRESSES IN BEAMS

PART A

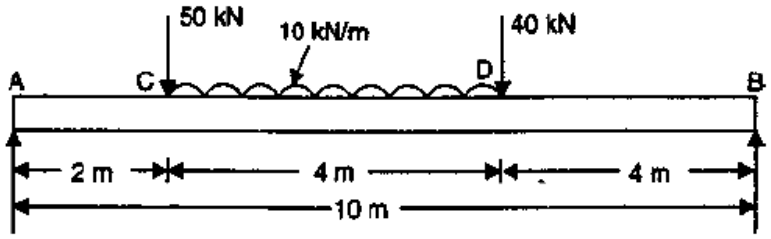
1. Differentiate statically determinate and indeterminate beams.
2. How do you relate intensity of loading, shearing force and bending moment?
3. How do you determine Shear Force at any section in a beam?
4. Explain bending moment?
5. What is meant by cantilever beam?
6. What is point of contra-flexure?
7. A simply supported beam of span 5 m carries a uniformly distributed load of intensity of 4 kN/m over the entire span. Determine the maximum Bending moment.
8. What is the maximum bending moment for a simply supported beam subjected to uniformly distributed load and where it occurs?
9. Draw the S.F. & B.M. diagrams for simply supported beam of length L carrying a point load W at its centre.
10. List out the assumptions in simple bending.
11. What is meant by pure bending?
12. What is bending equation?
13. What is meant by section modulus?
14. Sketch the shear stress variation for symmetrical I section.

PART B

1. Draw SFD and BMD for a simply supported beam with udl over entire span.
2. A simply supported beam of span 10 m carries a point load of 10 kN at 2 m from the left support and a UDL of 4 kN/m over the entire length. Draw the SF & BM.
3. A simply supported beam AB of span 4 m is subjected to two point loads of 2 kN and 4 kN each at C and D, distances of 1.5 m and 3 m from the left end. Calculate the shear force and bending moment values at salient points.
4. A simply supported beam 6 m long is carrying a uniformly distributed load of 5 kN/m over a length of 3 m from the right end. Draw shear force and bending moment diagrams for the beam and also calculate the maximum bending moment on the beam.
5. A simply supported beam of 16 m span carries the concentrated loads of 4 kN, 5 kN and 3 kN at distances 3 m, 7 m and 10 m respectively from the left support. Calculate the maximum shearing force and bending moment. Draw the SF and BM diagrams.
6. Draw the S.F and B.M diagram for the beam shown in figure and also calculate the maximum shear force and bending moment.

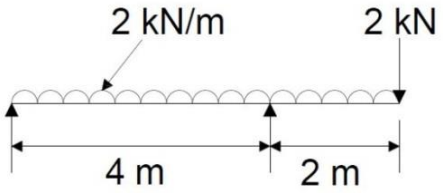


7. Draw the S.F and B.M diagram for the beam shown in figure and also calculate the maximum shear force and bending moment.

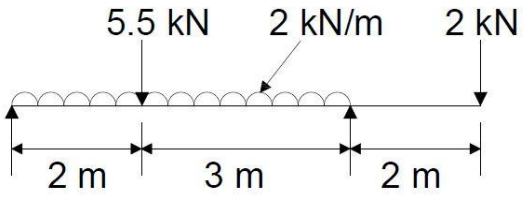


8. Draw SFD and BMD for a cantilever with single concentrated load at a free end
9. A cantilever of span 5 m carries concentrated loads of 1 kN, 3 kN and 2 kN at 2m, 3m and 5 m from the fixed end. Draw SF & BM diagram.
10. A cantilever beam of 2 m long carries an udl of 1 kN/m over a length of 1.5 m from the free end. Draw the shear force and bending moment diagrams for the beam.
11. A cantilever beam 1.5 m long, fixed at A is carrying point loads of 1000 kg at B,C and D each and at distances of 0.5 m, 1 m and 1.5 m from the fixed end. Calculate the shear force and bending moment values at salient points.

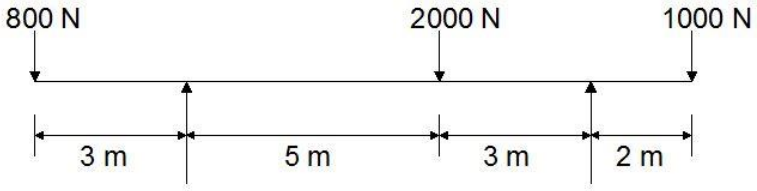
12. Draw shear force and bending moment diagram for the beam shown in figure.



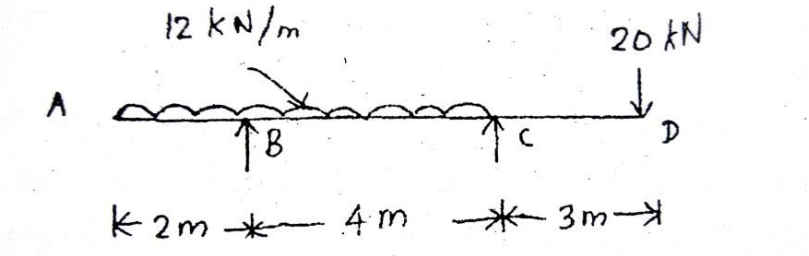
13. Draw shear force and bending moment diagram for the beam shown in figure.



14. Draw shear force and bending moment diagram for the beam shown in figure.



15. Draw the shear force and bending moment diagrams for the beam shown in figure below.



16. An overhanging beam ABC is simply supported at A & B over a span of 6m and BC overhangs by 3m. If the supported span AB carries a central concentrated load of 8kN and overhang span BC carries 2kN/m draw the shear force and bending moment diagrams.
17. An overhanging beam ABC of length 8 m is simply supported at B and C over a span of 6 m and the portion AB overhangs by 2 m. Draw the SF & BM diagram and determine the point of contra-flexure if it is subjected to UDL of 3 kN/m over the portion AB and 4 kN/m over the portion BC.
18. A 10 m long beam ABC is simply supported at B and C over a span of 8 m with end A being free. It carries point loads of 8 kN and 4 kN at distances 3 m and 5 m from C. The beam also has two uniformly distributed loads of intensity 4 kN/m for a distance of 4 m starting from C and of kN/m on AB. Draw shearing force and bending moment diagrams indicating all principal values.

19. An I section beam 340mm x 200mm has a web thickness of 10mm and flange thickness of 20mm. If the shear force acting on the section is 100 kN, draw the shear stress distribution across the section.
20. The cross section of T beam is as follows: Flange thickness = 10mm; width of the flange = 100mm; thickness of the web = 10mm; depth of the web = 120mm; If the shear force of 2kN is acting at a particular section of the beam, draw the shear stress distribution across the section.
21. A channel section made with 120mm·10mm horizontal flanges and 160mm·10mm vertical web is subjected to a vertical shearing force of 120kN. Draw the shear stress distribution diagram across the section.

22. Find the dimensions of a timber joist span 5 m to carry a brick wall 200 mm thick and 3.2 m high, if the weight of brickwork is 19 kN/m^3 and the maximum stress is limited to 8 N/mm2. The depth is to be twice the width.
23. A flitched beam is made up of two timber joists, each 60 mm wide and 100 mm deep, with a 10 mm thick and 80 mm deep steel plate placed symmetrically between them on vertical faces. Determine the total moment of resistance of the section if the permissible stress in the timber joist is 7 N/mm^2. Take the modular ratio between steel and timber as 20.