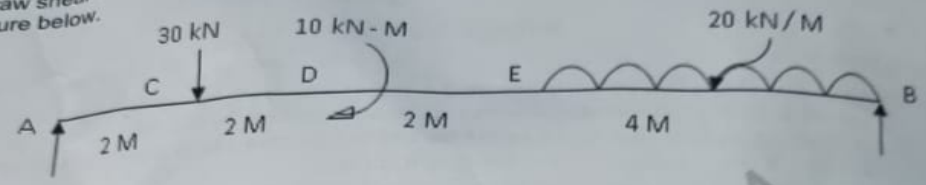
4. Draw shear force and bending moment diagrams for the simply supported beam shown in figure below.



5. a) Sketch the shear stress distribution across the I-section in which flanges are 160mm x 15mm each with centrally placed web of 10mm x 120mm, subjected to a shear force of 200kN.

   b) A rectangular strut is 210mm wide and 150mm thick. It carries a load of 60kN an eccentricity of 20mm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in section.

6. a) A solid shaft is requiring to transmit 750 kW at 60rpm. If the maximum value of the shear stress is not to exceed 50N/mm², calculate the diameter of the shaft. If this shaft is replaced by hollow shaft of a diameter ratio 0.6, what will be the percentage saving? The torque, maximum shear stress, the material and the length of the shaft are same in either case.

   b) A closely coiled helical spring is subjected to an axial load of 400N. The mean coil diameter is 10 times of the wire diameter. If the permissible shear stress is 80 MPa. Calculate the diameter of wire and the coil.

7. a) A rectangular beam 250 mm deep and 350 mm wide is simply supported over a span of 10m. what uniformly distributed load per meter the beam can carry, if the bending stress is not to exceed 120 N/mm².

   b) A bar of 25mm diameter is subjected to a pull of 40kN.The measured extension on gauge length of 200mm is 0.085mm and the change in diameter is 0.003mm. Calculate the poisson's ratio and the values of the three module.

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