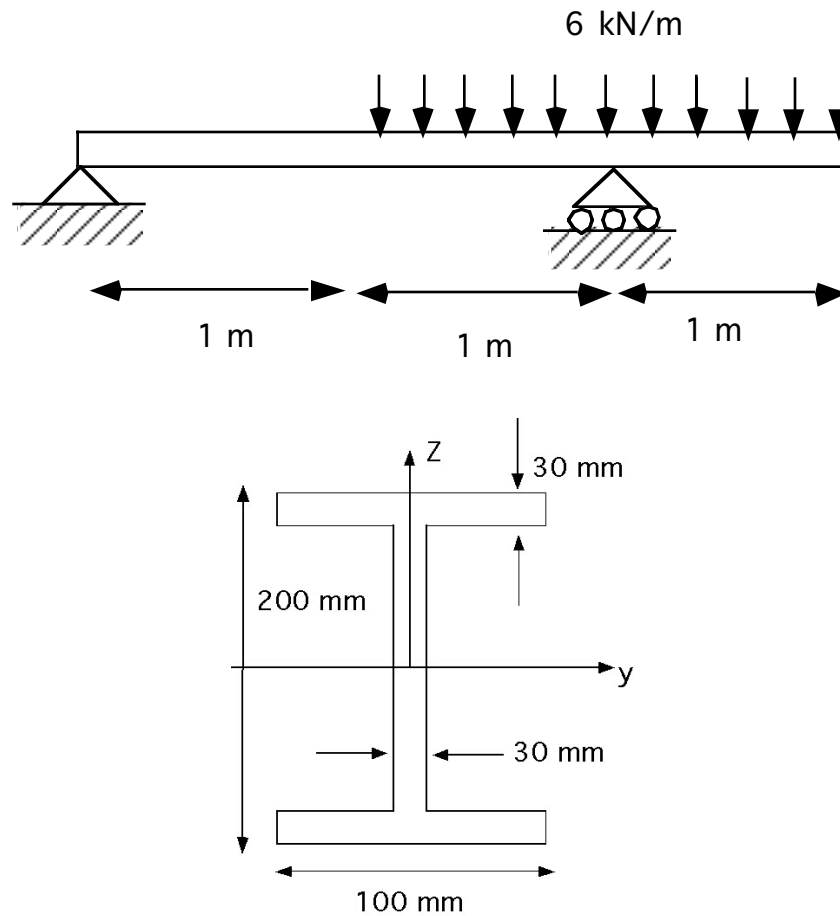


**Problem M7 and M8 (this is a two hour question)**

A simply supported aluminum alloy beam is 3 m long and has a cross-section which is an "I" cross-section 200 mm high and 100 mm wide. A uniform distributed load of 6 kN/m acts on the left hand two thirds of the beam. The Young's modulus of the aluminum alloy is 70 GPa. The yield stress is 300 MPa.



- Determine the loading, shear force and bending moment as functions of the distance  $x$  measured from the left end of the beam. Draw the appropriate diagrams.
- Determine the maximum deflection(s) of the beam and its (their) location(s).
- Determine the magnitudes and locations of the maximum axial stress,  $\sigma_{xx}$  and the maximum shear stress,  $\tau_{xz}$ . Will the aluminum alloy yield?