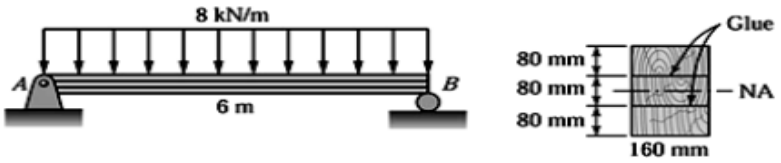
## BENDING STRESSES & SHEAR STRESSES

### Unit-III

1. The tension flange of a cast iron I section beam is 240 mm wide and 50 mm deep, the compression flange is 100 mm wide and 20 mm deep where as the web is 300 mm deep and 30 mm thick. Find the load per unit run which can be carried over a 4 m span of a simply supported beam if the maximum permissible stresses are 90Mpa in compression and 24Mpa in tension

2. The simply supported wood beam in figure 2 is fabricated by gluing together three 160-mm by 80-mm planks as shown. Calculate the maximum shear stress at the glue position and at the neutral axis.




3. How to find neutral axis of a beam and explain its importance?

b) A cantilever beam of cross-section 90 mm. Width 120 mm deep carries a UDL of 12 KN/m. over the entire length and a concentrated load of 15 KN at the right end. Find the bending stress in the beam, when the length of beam is 10 m.

4. A rolled steel Joist of I-Section has flange length of 300 mm. wide and 20 mm thick with a web thickness of 20 mm. and overall depth of I-Section is 600 mm. If this beam carries a UDL of 40 KN/m over the simply supported beam of span 10 m, find the maximum stress produced in the beam

5 A steel beam of I-section, 200 mm deep and 160 mm wide has 16 mm thick flanges and 10 mm thick web. The beam is subjected to a bending moment of 200 kN m at a critical section. Determine the maximum bending stress if the web of the beam is kept horizontal.

b) Show that maximum shear stress in a beam of rectangular section is 1.5 times the average shear stress.

6. a) Show that a square section is more efficient for a beam than a circular section of the same cross sectional area.

b) A timber beam is to be designed to carry a load of 6 kN/m over a simply supported span of 5 m. Permissible stress in bending is 10 MPa. Keeping the depth twice the width, design the beam.

7. What are the applications of bending equation?

A cantilever of length 10 m has a cross section of 100 mm × 130 mm has UDL of 10 KN/m over a length of 8 m. from the left support and a concentrated load of 10 KN at the right end. Find bending stress in the beam

8. A steel tube of 10 mm. bore with a wall thickness of 1 mm is 1 m. long is full of mercury in the tube. It is placed horizontally and supported at the ends. If the density of steel and mercury is 7.5 and 13.6, find the maximum stress in the tube