

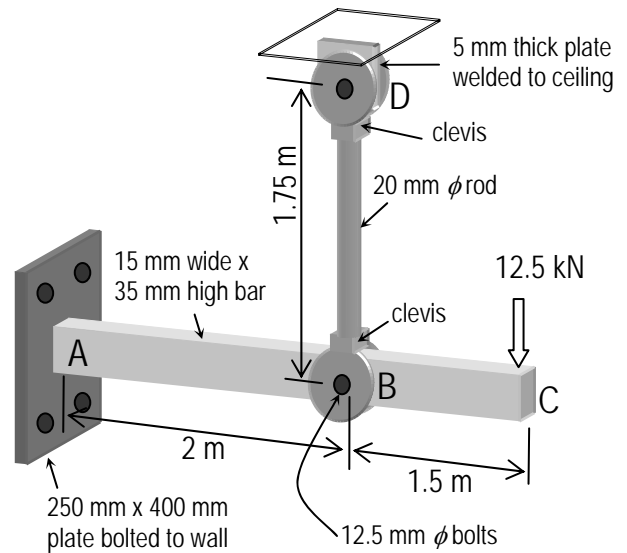
ENDS 231: Practice Quiz 7

*Note: A one page (one sided) crib sheet is allowed during the quiz, along with a silent, **non-programmable** calculator.*

Clearly show your work and answer.

A bar is supported by a pin-type connection at A and a short link pinned at the top and bottom with clevises as shown. A force is applied to the end of the rod, resulting in a vertical reaction at A of 7.5 kN and a tension in the rod of 20 kN. Determine:

- the normal stress in rod BD
- the shear stress at end A of bar ABC
- the minimum diameter of the hole required at B with the allowable bearing stress on bar ABC of $F_b = 213 \text{ MPa}$
- the shear stress in the bolt at B
- the elongation of rod BD when the material is aluminum ($E = 70 \times 10^3 \text{ MPa}$ and $\alpha = 23.1 \times 10^{-6} \text{ mm/mm/}^\circ\text{C}$)
- the temperature that would have to be reached for the elongation from the tensile force at 40°C found in part e) to be reduced to 0.25 mm
- [some short question from the text material]



Answers– Not provided on actual quiz!

- | | | |
|-------------|-------------|------------------------------|
| a) 63.7 MPa | b) 14.3 MPa | c) 6.26 mm |
| d) 81.5 MPa | e) 1.59 mm | f) 6.8 °C (<i>shrinks</i>) |

Disclaimer: Answers have NOT been painstakingly researched.