# 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 20.8 kN and a tension in the rod of 41.3 kN. Determine:

a) the normal stress in rod BD $\left[1\,{kN}\!/{mm^2} = 10^3\,MPa \right]$

b) the shear stress at end A of bar ABC

c) the minimum diameter of the hole required at B
with the allowable bearing stress on bar ABC
of $F_p = 330$ MPa

d) the shear stress in the bolt at B

e) the length change (and direction) of rod BD
when the material is high strength low-alloy
steel (E = 200 x 10^3 MPa and
$\alpha = 11.7$ x 10^{-6} mm/mm/°C)

f) the final temperature for the total length change
to be 1.55 mm (longer) if the length change due
to a force (part e) happens at 35 °C.

g) *[some short question from the text material]*
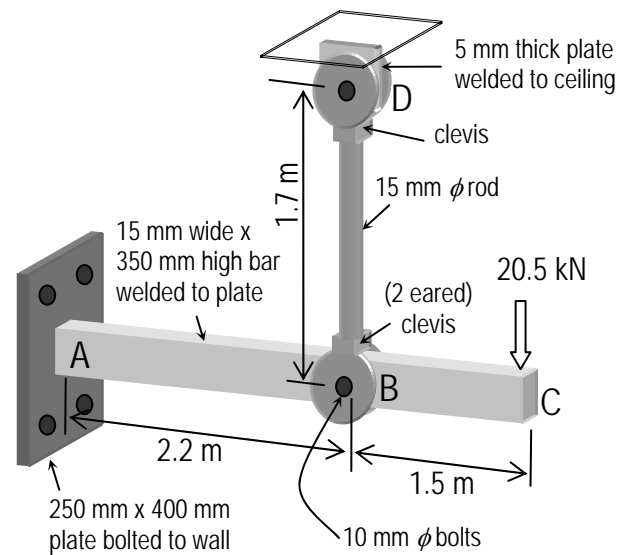
Answers– Not provided on actual quiz!

a) 237 MPa	b) 4.0 MPa	c) 8.34 mm
d) 263 MPa	e) 1.98 mm	f) 13.4 °C