

MEEG 3013

Name: _____
(Underline your last name.)

Test II ()

ID #: _____

1. (30%) For the beam shown, (a) draw the free-body, shear, and bending-moment diagrams, (b) write the equations defining the loading function q , shear V , and bending moment M using singularity functions, (c) determine the maximum bending moment M_{\max} based on the equations for V and M .

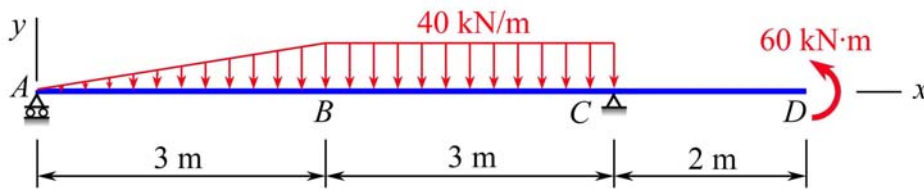


Fig. P1

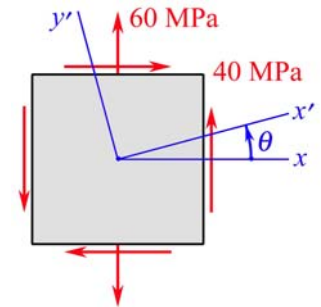
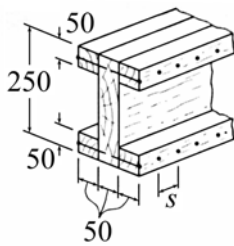


Fig. P2

2. (30%) For the state of stress shown, draw and use Mohr's circle to determine the ranges of values of θ for which the magnitude of the shearing stress $\tau_{x'y'}$ is equal to or less than 30 MPa.



Dimension in mm

Fig. P3A

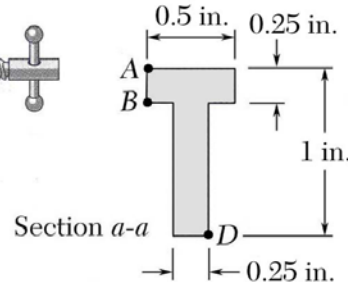
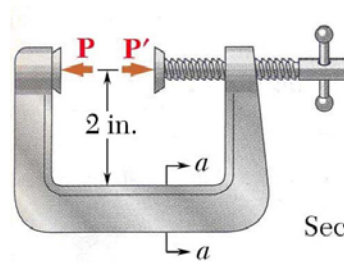


Fig. P3B&C

3. Circle on this test sheet the nearest item for each of the following:

- A. (7%) The built-up wooden beam shown is subjected to a vertical shear of 4.4 kN. If the spacing of nails is $s = 45$ mm and each nail is 90 mm long, the shearing force in each nail is
 (a) 289 N. (b) 296 N. (c) 303 N. (d) 310 N. (e) 316 N. (f) 323 N. (g) 330 N.
- B. (7%) It is known that the magnitude of tightening force developed in the clamp is $P = 130$ lb. The stress at point A in section a-a of the clamp, as shown, is
 (a) + 4.17 ksi. (b) + 4.37 ksi. (c) + 4.57 ksi. (d) + 4.77 ksi. (e) + 4.97 ksi. (f) + 5.17 ksi.
- C. (6%) It is known that the magnitude of tightening force developed in the clamp is $P = 130$ lb. The stress at point D in section a-a of the clamp, as shown, is
 (a) - 6.01 ksi. (b) - 5.78 ksi. (c) - 5.55 ksi. (d) - 5.32 ksi. (e) - 5.09 ksi. (f) - 4.86 ksi.

4. (20%) Non-numerical problem.