Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – Sept. / Oct. 2015
SCT 364-2 Strength of Materials

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Instructions to candidates
Duration: 02 hours
Number of questions: 04
Mark allocation: 100 mark
Answer All Questions

1.

For the steel truss (E = 200 GPa) and loading shown in Figure 1, determine the forces acting on the members BD and AD. Given that their cross-sectional areas are 2000 mm^2 and 2500 mm^2, respectively find their deformations.

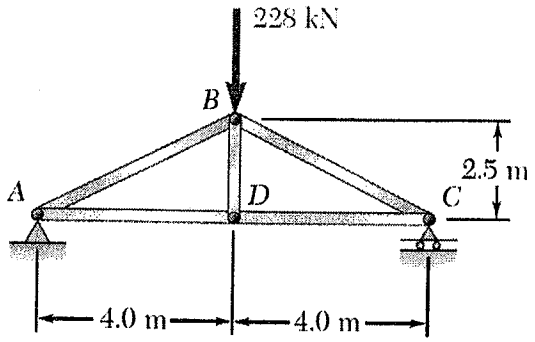

Figure 1

(25 mark)

2.

Two cylindrical rods, one made out of steel and the other made out of brass, are joined at C and restrained by rigid supports at A and E. For the loading shown in Figure 2 and given that E_s = 190 GPa and E_b = 110 GPa, determine (what are Ea and Eb, do students know these symbols? are they standard symbols?)

i. the reactions at A and E,

ii. the deflection of point C.

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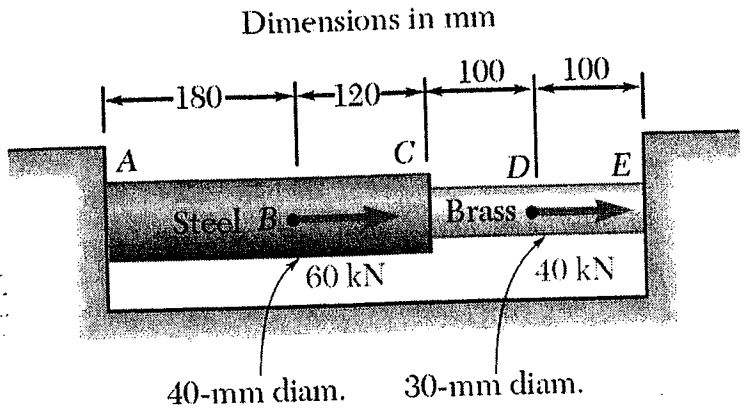

Figure 2

(25 mark)

3.

The torques shown in Figure 3 are exerted on pulleys A, B and C. Given that all shafts are solid, determine

a. the shaft having the maximum shearing stress and its value,

b. the angle of twist at A.

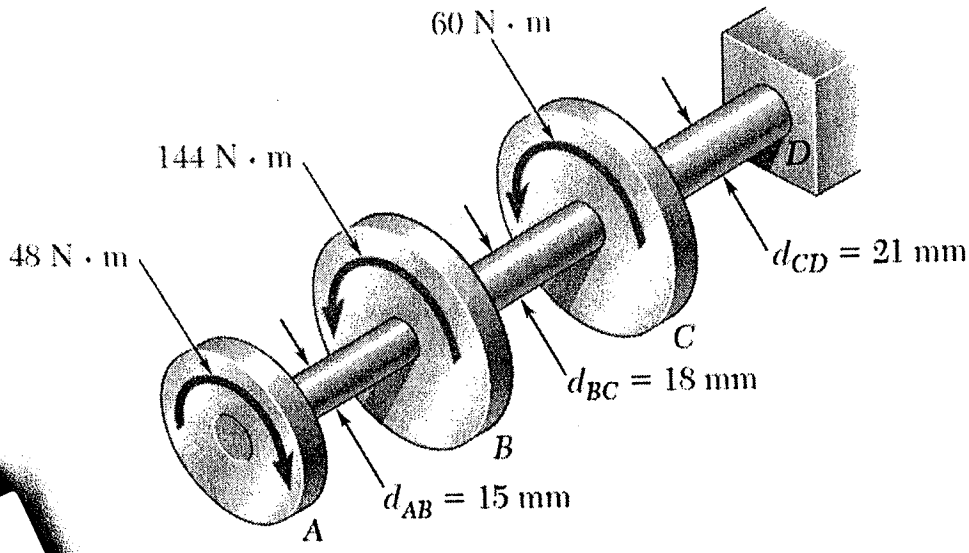

Figure 3

(25 mark)

4.

For the given state of stress in Figure 4, determine the maximum shearing stress, if

a. $\sigma_z = 0$ MPa

b. $\sigma_z = 50$ MPa

c. $\sigma_z = -50$ MPa

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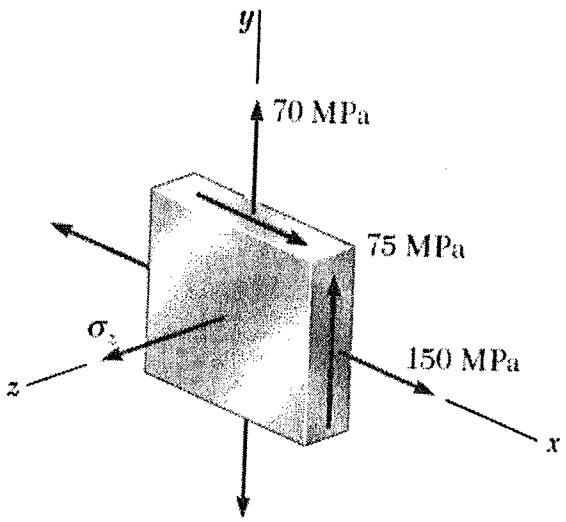

Figure 4

(25 mark)