Université d'Ottawa
Faculté de génie

University of Ottawa
Faculty of Engineering

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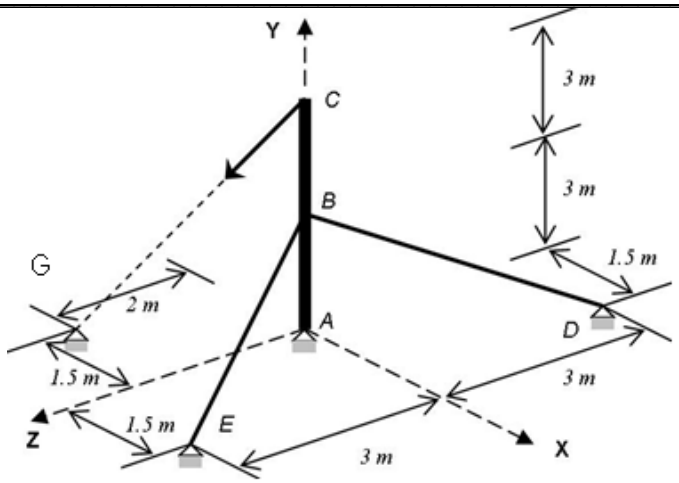
GNG 1105
ENGINEERING MECHANICS

Differed Final examination
22 February 2012
Profs. Ahmed, Girault Haddad and Skaff

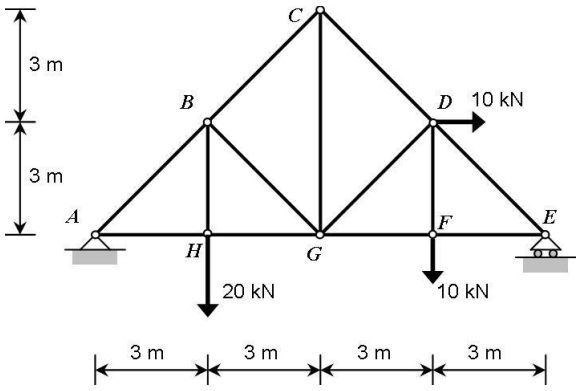
Time: 3 hrs

Closed Book Exam. Programmable calculators are not allowed.
Free-body diagrams must be drawn where appropriate. All problems carry equal weight.

Problem 1
Find the tension forces in the ropes BE and BD and the reaction at the ball & socket A. The force at C is 20 kN

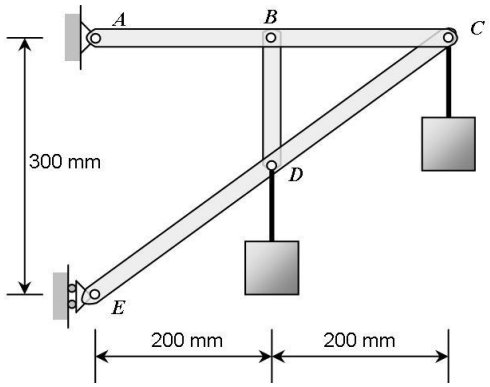


Problem 2
Find the forces in members CD, DG, and FG in the following plane truss:



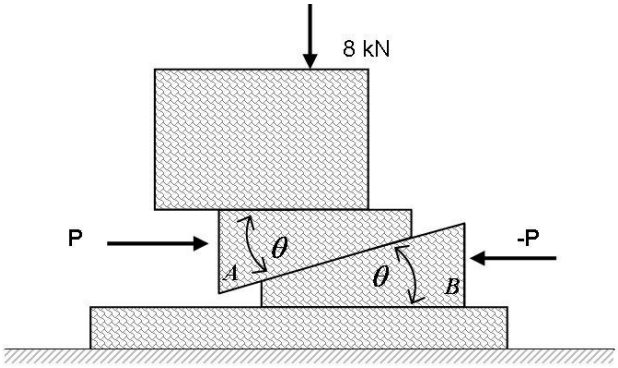
Problem 3

The mass of each of the suspended boxes is 80 kg. Determine the reactions at the supports A and E, as well as the forces acting on member ABC.



Problem 4

To level a wood deck, wood wedges A&B are placed under a corner of the deck. Wedge B rests on a wood board as shown. Knowing that the coefficients of static friction are 0.35 between all wood surfaces and 0.60 between the board and the ground, determine the value of the wedge angle θ for which the system will remain in equilibrium after the clamping forces **P** and –**P** are removed.



Problem 5

A projectile is fired from point A, located at $h_0 = 2$m above the ground, with an initial velocity v_0 and at an angle $\alpha=50°$.

(a) What would be the minimum value of v_0 that guarantees that the wall B is cleared if the height of the wall is H=5 m?

(b) For the value of v_0 obtained in part (a), determine the distance L that separates point A and the wall B.