



MECH 211 Section 3

Fall 2001

Test 1

Due October 8, 2000 at the start of class.

Show all work. Any force existing in an equation must also be denoted on an appropriate free body diagram. Clearly indicate final answers.

This test is taken under the Rice Honor Code system. You may consult only the textbook (Pytel and Kiusalaas), and notes that you have personally taken or received from me in class. You may use a calculator, including programmable calculators. The test must be taken during a 3 hour period, with an optional 30 minute break. For example, work for 2 hours take a half hour break and work for another hour.

At the conclusion of the test, fold all sheets in half, seal them (staple or tape), and write your name across the seal.

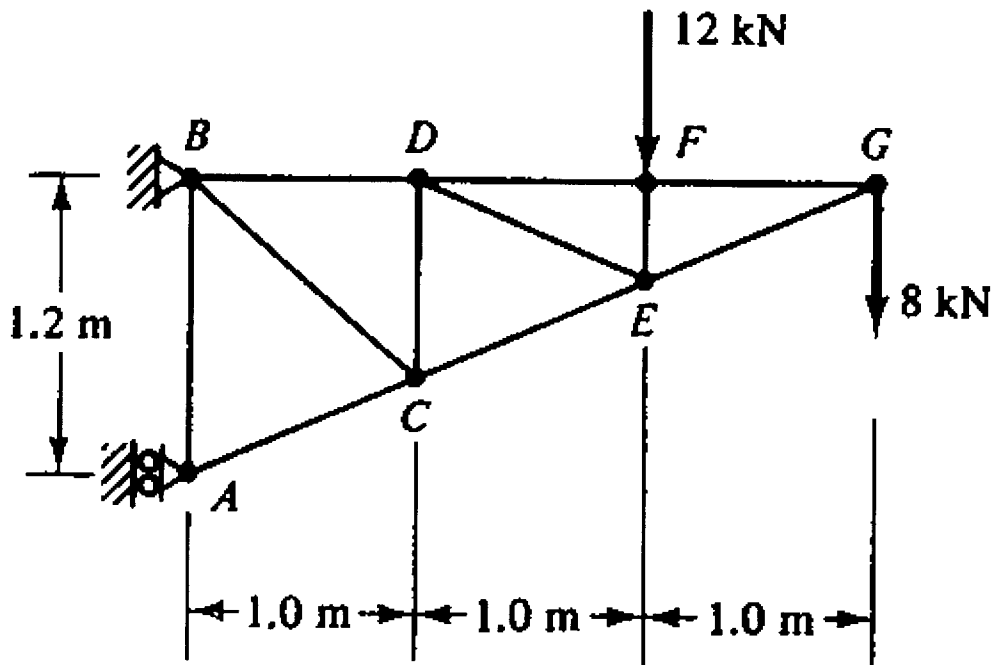
Name: _____

Time started: _____

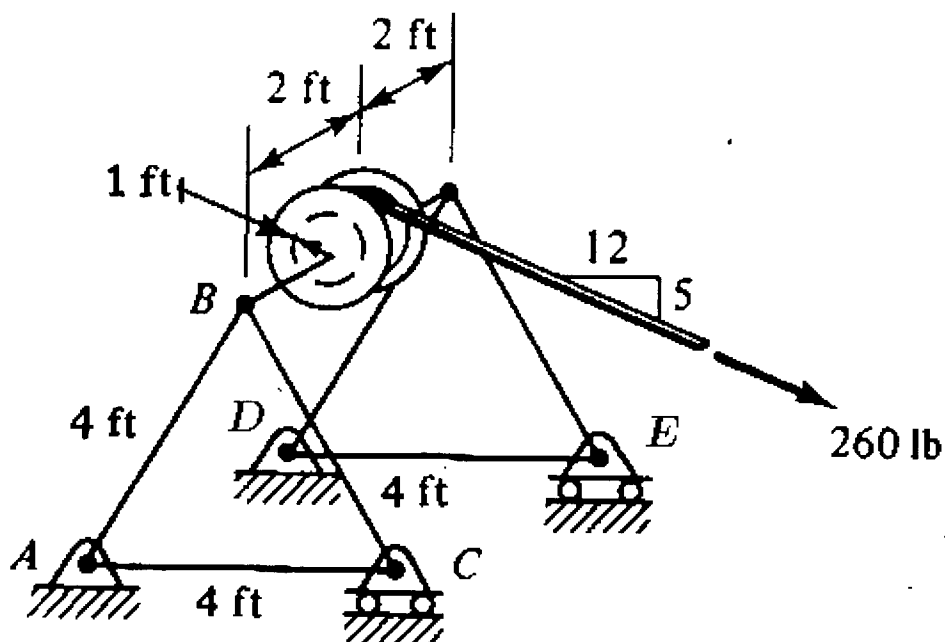
Time finished: _____

Pledge: _____

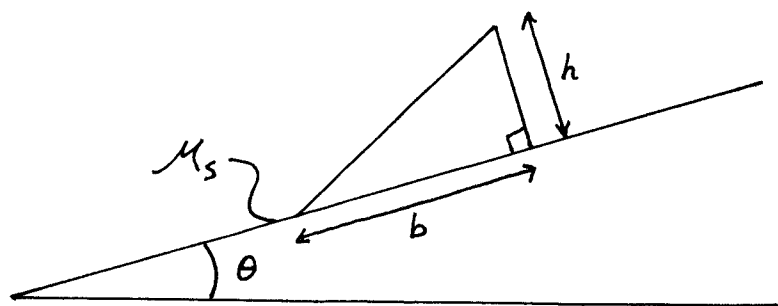
1. For the truss shown, determine the forces carried by each member using any method you wish. Specify whether each member is in tension or compression. Use the method of sections to determine the forces in members DF, EC and DE. Draw all relevant free body diagrams.



2. A 900-lb reel of electrical cable is supported as shown. If the tension on the cable has a magnitude of 260-lb, determine the total moment due to the reel weight and cable tension about an axis through supports C and D. Each of the support members is 4-ft long and has a negligible weight; the radius to the outer layer of the cable on the reel is 1-ft.



3. For the uniform density triangular block shown: (a) Determine the conditions when the block will slide. (b) Determine the conditions when the block will tip. (c) If the angle θ is increased gradually from the horizontal, determine the conditions for sliding to occur before tipping and then for tipping to occur before sliding. The angle of the incline plane is θ , the base of the triangle is b , the height of the triangle is h , the weight of the block is W , and the coefficient of static friction between the block and the inclined plane is μ_s .



4. The compound beam of total length L is supported as shown and loaded with the triangular ramp load $q(x) = cx$. The compound beam is made of two simple beams of length $L/2$ joined in the middle with a frictionless pin. Determine the reactions at A and O .

