

St. ID: _____,

Name: _____

Note: You can use pencil or any pen in answering the problems. Dictionary, calculators and mathematics tables are allowed. Please hand in both solution and this problem sheet.

ABSOLUTELY NO CHEATING!

Problems (total 4 problems, 120%)

1. A uniform beam of length 7.60 m and weight 4.50×10^2 N is carried by two workers, Sam and Joe, as shown in Figure P12.11. Determine the force that each person exerts on the beam.
(30%)

Ans:

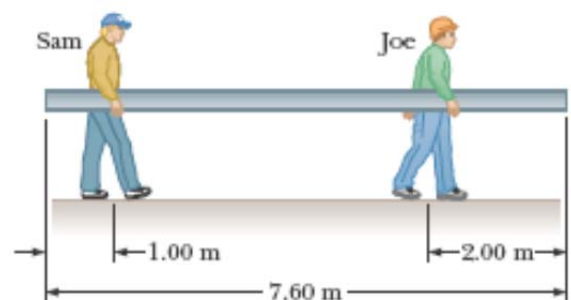


Figure P12.11

2. The *Explorer VIII* satellite, placed into orbit November 3, 1960, to investigate the ionosphere, had the following orbit parameters: perigee, 459 km; apogee, 2 289 km (both distances above the Earth's surface); period, 112.7 min. Find the ratio v_p/v_a of the speed at perigee to that at apogee. (30%)

Ans:

3. The spring of the pressure gauge shown in Figure P14.7 has a force constant of 1 250 N/m, and the piston has a diameter of 1.20 cm. As the gauge is lowered into water in a lake, what change in depth causes the piston to move in by 0.750 cm? (30%)

Ans:

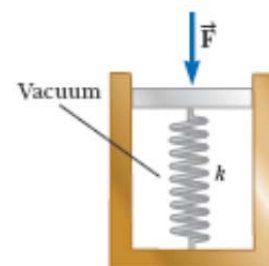


Figure P14.7

4. A block of unknown mass is attached to a spring with a spring constant of 6.50 N/m and undergoes simple harmonic motion with an amplitude of 10.0 cm . When the block is halfway between its equilibrium position and the end point, its speed is measured to be 30.0 cm/s . Calculate (a) the mass of the block, (10%) (b) the period of the motion, (10%) and (c) the maximum acceleration of the block. (10%)

Ans: