

Name _____ Section _____



Ho Ho Ho



ES204
Examination I
December 18, 1998

Problem	Score
1	/30
2	/35
3	/35
Total	/100

Show all work for credit
AND
Turn in your signed help sheet

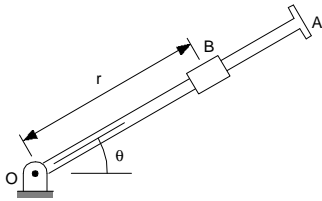


Merry Christmas! Frohe Weihnachten!

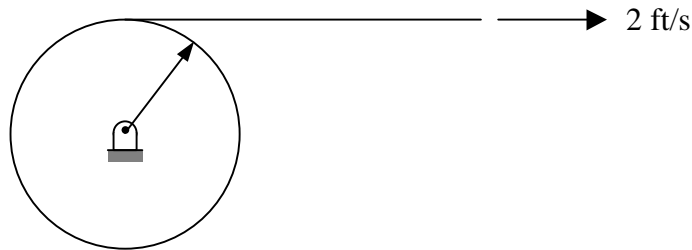


1.1) The rod OA shown in the figure is rotating in the x-y plane such that at any instant $\theta = t$ rad., where t is time measured in seconds. At the same time, Collar B is sliding outward along OA so that $r = 110 t$ mm. (Again t is time measured in seconds). Determine the magnitude of the collar velocity when $t = 1$ s.

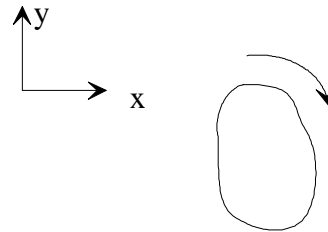
- (a) 110 mm/s (b) 155 mm/s (c) 220 mm/s (d) 12,100 mm/s (e) none of these



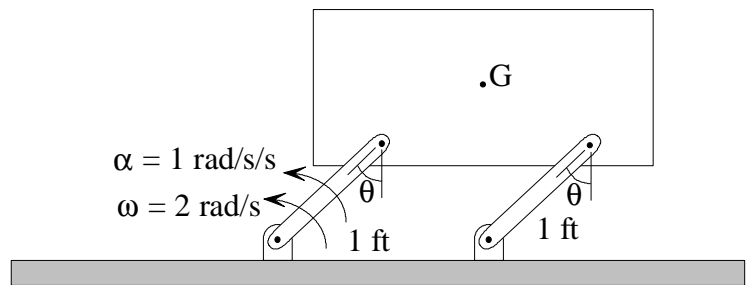
1.2) The disk shown below has a radius of 0.5 ft and the rope is being pulled with a velocity of 2 ft/s. Determine the magnitude of the angular velocity of the disk.



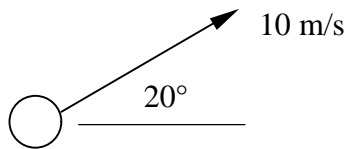
1.3) An rigid body is rotating at 3 rad/s clockwise. Express the angular velocity as a vector in terms of it's \hat{i} , \hat{j} and \hat{k} components.



1.4) A rectangular plate swings from arms of equal length as shown below. Determine the angular velocity of the plate.



1.5) A baseball is thrown as shown below. Neglecting air resistance, what is the radius of curvature of the path immediately after the ball is released?

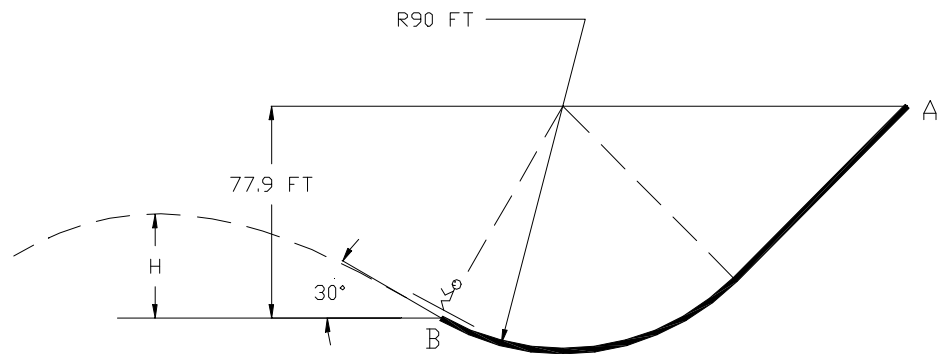


Name _____
ES204 Examination I

Problem 2

35 pts
Dec. 18, 1998

A 120 pound ski jumper begins from rest at point A. a) Ignoring friction and wind resistance, determine her speed as she passes through point B at the takeoff position. b) Determine the normal force, N , exerted by the snow on her skis, just as she reaches point B. c) Determine the maximum height, H , she will reach.

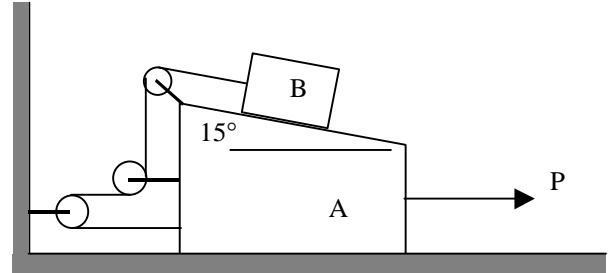


Name _____
ES204 Examination I

Problem 3

35 pts
Dec. 18, 1998

For the system shown the mass of A is m_A and the mass of B is m_B and the applied force is P. Assume the friction between all surfaces is negligible. Derive the equations necessary to solve for the tension in the cable and the accelerations of the two blocks but **DO NOT SOLVE THESE EQUATIONS**. Your final answer should be a list of unknowns and a list of equation numbers that could be used to solve for the unknowns.



Unknowns	Equation Number