

Name _____ Instructor/Section _____/_____



Ho Ho Ho



ES204

Examination I
December 16, 2005

Problem	Score
1	/25
2	/35
3	/40
Total	/100

Show all work for credit
AND
Turn in your signed help sheet
AND
Stay in your seat until the end of class

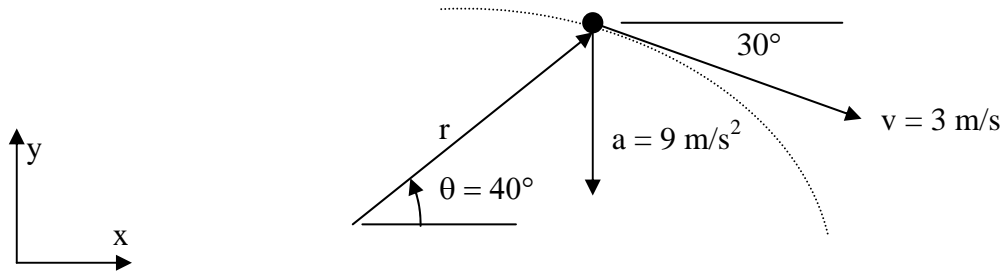


Merry Christmas! Frohe Weihnachten!



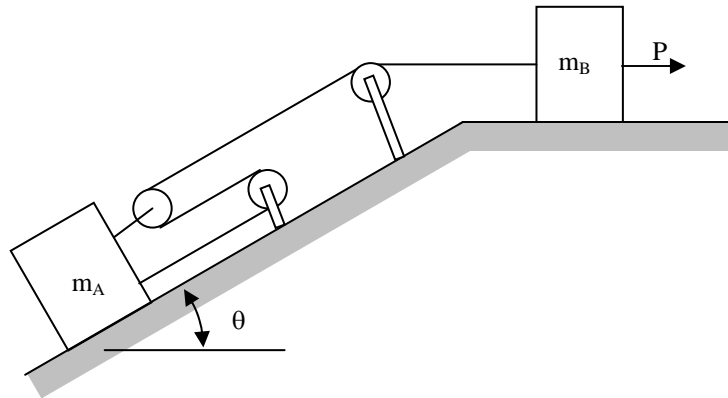
A particle is traveling on the path shown with the given velocity and acceleration. Determine

- v_x , and v_y , that is the velocity components in the x and y directions,
- \dot{r} and $\dot{\theta}$ assuming that r is known.
- the radius of curvature of the path at the instant shown.



A known constant force P is applied to block B of mass m_B on the horizontal frictionless surface. A series of pulleys will cause block A of mass m_A to move up the frictionless incline due to force P 's influence on m_B .

- Find the equations necessary to determine the accelerations of blocks A and B . The following parameters are known: P , m_A , m_B , and θ . Set-up but do not solve the equations, number the equations and list the unknowns. (25 points)
- Determine the acceleration of B with respect to A assuming that $\theta = 30^\circ$ and the acceleration of block B is 6 ft/s^2 to the right and the acceleration of A is 2 ft/s^2 up the incline. (10 pts)

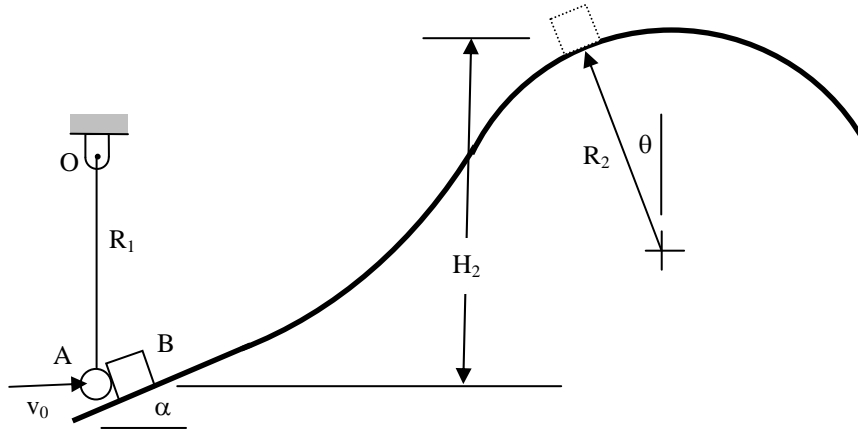


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Problem 2 (continued)

35 pts
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Pendulum OA is released in such a way that it has a known speed, v_0 , when it strikes block B. Find the equations necessary to determine the normal force between B and the ground when the block reaches an elevation H_2 . Assume you know the mass of A, m_A , the mass of B, m_B , the coefficient of restitution between A and B, e , and all the dimensions, α , θ , R_1 , H_2 , and R_2 . **Your answer should consist of a clear list of numbered equations and unknowns, but do not solve the equations.** Clearly document your solution for full credit.



Unknowns

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Problem 3 (continued)

40 pts
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