

PHYS 111

HOMEWORK #5

Due : 2 Oct. 2014

Submit homework in proper format. Solutions must be accompanied by complete work and/or explanations to receive full credit. In all physics problems, but especially those involving forces, it is very useful to draw free body diagrams representing all the forces.

1. Use the scenario from problem 6 of the last homework set, except now the projectile is launched downward with an initial velocity of 30 m/s at an angle 40 degrees below the horizontal. Compute time of flight, the horizontal distance from the edge of the cliff the object lands, the x and y components of its final velocity, and the magnitude and direction of the final velocity vector. Compare this velocity vector to the one we obtain for problem 6 on the previous homework; what relationship do they have to each other? Explain why they bear this relationship. (25 points total; 5 pts for each part)
2. Problem 34, text, p. 96. Be careful to convert everything to a consistent set of units. $1 \text{ g} = 9.8 \text{ m/s}^2$
3. Problem 58, text, p. 97.
4. Problem 62, text, p. 97
5. Problem 4, text, p. 124
6. Use the diagram for problem 16 on p. 123. Two boxes are in contact on a frictionless table. If the applied force is 3 N, and the mass of block A is 2 kg and the mass of B is 1 kg, find the acceleration of the combined system, AB. Find the contact force between the two blocks. If the force of 3 N is applied to block B, show that the contact force between the blocks is 2 N (which is not the same force as derived before)
7. Problem 52, text, p. 127