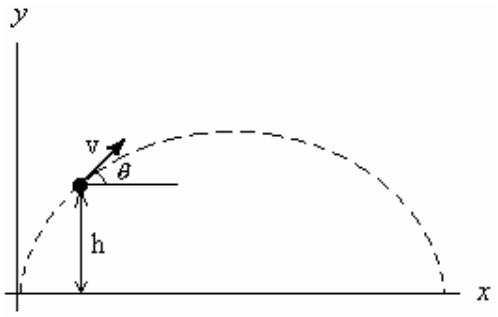
	UNIVERSITY OF GAZIANTEP **DEPARTMENT OF ENGINEERING PHYSICS** **EP 105 General Physics I** **First Midterm Exam Questions**	**10/11/2005** **TIME 100 min.**

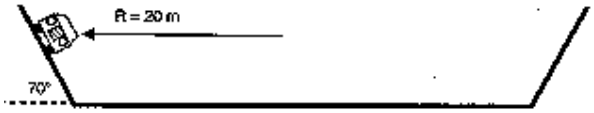
[1]. Two vectors are given by **a** = 4**i**+2**j** and **b** = –6**i**+3**j**. Find
(a) **a**+**b** using geometrical and analytical methods
(b) **a.b**
(c) **axb**
(d) the angle between **a** and **b**

[2]. A ball is thrown from the ground into air. At height of h=5.0 m, the velocity is observed to be v=30 m/s and the angle between velocity of the ball and the horizontal axis is $\theta = 30^{o}$, as shown in figure.

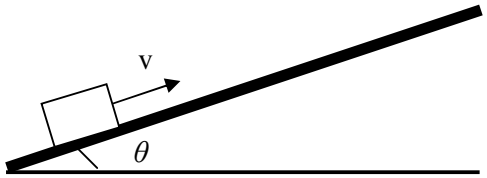


(a) To what maximum height will the ball rise.
(b) What will be total horizontal distance travelled by the ball.

[3]. A car having a mass of 1000 kg is driven around a circular path of radius 20 m, as shown in the figure. The path is sharply banked at an angle of 70^{0} from the horizontal line. It is driven around at the slowest speed possible such that it does not slide down. The frictional coefficient between the tires of the car and the path is assumed to be 0.95. At what speed does the car have to be driven?



[4]. A 10 kg block is projected up a 30^{o} ramp, with an initial speed of 5 m/s at the bottom of the ramp. The coefficient of kinetic friction between block and inclined plane is 0.3. Determine the work done on the block as it slides on the plane for a distance of 1.67 m by,



(a) the net force,
(b) the weight of the block,
(c) the normal force,
(d) the frictional force,
(e) what are the kinetic energies of the block when it is at the lowest and highest points on the ramp?

Useful constants:
g = 9.8 m/s^2, sin30=0.5, cos30=0.86, sin70=0.94, cos70=0.34