PHY 105 Test 1 September 26, 2003 50 minutes La Salle University Dr. R. DiDio

Do all work in the blue book! If you use your calculator to answer a question, briefly describe how.

1. (15 pts) The following equation describes the velocity of an object. What must the MKS units be for the variables A, B, and C? (Assuming x is a displacement, v and v_0 are velocities, m is a mass)

$$v = Axe^{Bm} - \frac{C^2}{v_0}$$

- 2. (20 pts) Three forces with magnitudes of 50 Nt, 100 Nt, and 125 NT all act on the same object at angles of 30 degrees, 45 degrees and 90 degrees with the positive x-axis. Find the direction and magnitude of the resultant force.
- 3. (20 pts)The position of a particle moving along the x-axis is given by $x(t) = 2t^3 6t^2 + 4$, where x is measured in m and t is measured in s.
 - a) What is the average velocity of the particle in m/s during the time interval 1 s < t < 3 s?
 - b) What is the instantaneous velocity of the particle at t = 2 s?
- 4. (25 pts) A stuntman is hired to drive a motorcycle off a cliff for a movie scene. If the driver takes off horizontally from a 40.0 m cliff and lands 60 m from the foot of the cliff (this is where the cameras are set up!)
 - a) Calculate the time for the car to hit the ground.
 - b) With what velocity did the motorcycle leave the track?
 - c) With what velocity did the motorcycle hit the ground?
- 5. (20 pts) A mass hangs from three cables as shown. (Cable 1 is horizontal)\
 - a) Calculate T₃
 - b) Write down Newton II for the knot where the three lines come together in terms of the tensions, angle, mass, and g.
 - c) Determine T_2 in terms of M, g, and θ

