|	Alexandria Higher Institute of Engineering & Technology (AIET)	
All Departments		0th Year
ME002	Mechanics II	End-of-Semester-3 Exam., august, 29, 2011
Examiners:	Dr. Rola Afify and committee	Time: 3 hours

Answer the following questions:
Question one (12 marks)

A particle moves along a horizontal path with a velocity of $v = \left(3t^2 - 6t\right)$ m/s, where t is the time is seconds. If it is initially located at the origin O, determine the distance traveled in 3.5s, and the particle's average velocity and average speed during the time interval.
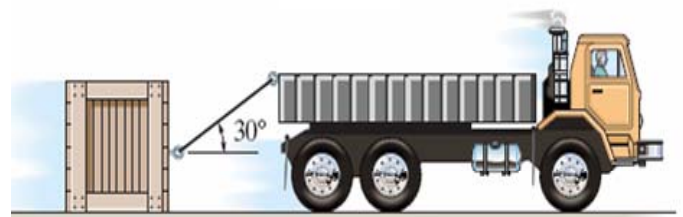
Question two (12 marks)

a) Derive the Cartesian equation for a projectile.

b) The snowmobile is traveling at 10 m/s when it leaves the embankment at A. Determine the time of flight from A to B and the range R of the trajectory.
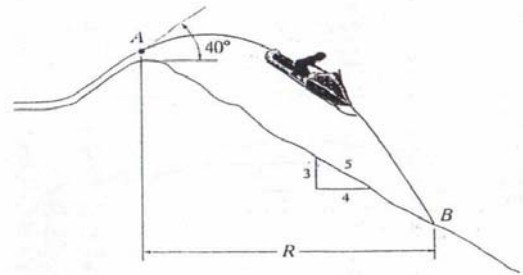
Question three (12 marks)

The driver attempts to tow the crate using a rope that has a tensile strength of 1 kN. If the crate is originally at rest and has a mass of 250 kg, determine the greatest acceleration it can have if the coefficient of static friction between the crate and the road is $\mu_s = 0.4$, and the coefficient of kinetic friction is $\mu_k = 0.3$.

Question Four (12 marks)

A motor gives disk A an angular acceleration of $\alpha_A = 0.6t^2 + 0.75$ rad/s^2, where t is in seconds. If the initial angular velocity of the disk is $\omega_o = 6$ rad/s, determine the magnitudes of the velocity and acceleration of block B when t = 2s.

$\omega_0 = 6$ rad/s

A 0.15 m

B
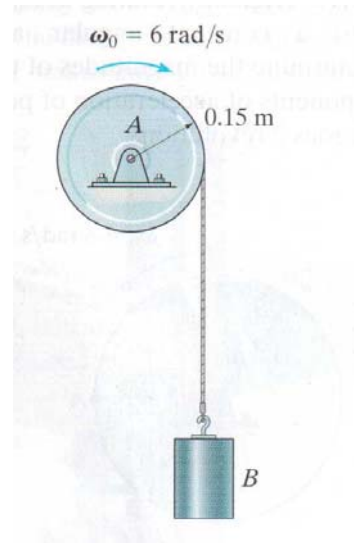
Question Five (12 marks)

Determine the velocity of the slider block C at the instant $\theta = 45^o$, If the link AB is rotating at 4 rad/s.

125 mm

C

45°

B

$\omega_{AB} = 4$ rad/s

300 mm

θ

A