



Concordia  
UNIVERSITY

FACULTY OF ENGINEERING AND COMPUTER SCIENCE  
DEPARTMENT OF MECHANICAL ENGINEERING

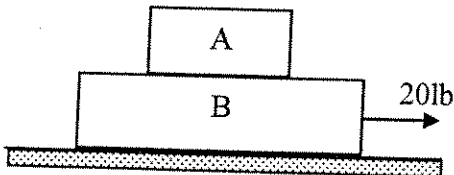
COURSE <b>Dynamics</b>		NUMBER <b>ENGR 243/4</b>	SECTION <b>T</b>
EXAMINATION <b>Test 2</b>	DATE <b>March 24, 2005</b>	TIME & PLACE Room: <b>11:45 - 13:00</b>	# OF PAGES <b>3</b>
PROFESSOR <b>Dr. Yong Zeng</b>		LAB INSTRUCTOR	
MATERIALS ALLOWED	<input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES (PLEASE SPECIFY)	One crib sheet attached
CALCULATORS ALLOWED	<input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES	
SPECIAL INSTRUCTIONS: Answer the following four questions. You <b><u>MUST</u></b> show <b><u>all</u></b> your steps in solving all problems!			

Name: \_\_\_\_\_  
Surname, given names

I.D.: \_\_\_\_\_

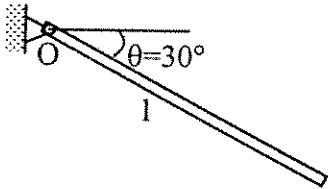
**Question 1 (5 Marks):**

The 10-lb block A and the 20-lb block B are placed as in the figure. If a force of  $P = 20\text{lb}$  is applied to B as shown, determine the acceleration of each block. The coefficient of kinetic friction between any two surfaces is  $\mu_k = 0.2$ . Please note that  $g = 32.2\text{ft/s}^2$ .



**Question 2 (5 Marks):**

The bar has a mass  $m = 5\text{kg}$  and length  $l = 2\text{m}$ . If it is released from rest from the position  $\theta = 30^\circ$ , determine its angular acceleration and the horizontal and vertical components of reaction at the pin  $O$ . Please note that the mass moment of inertia of a bar about a centroidal axis perpendicular to the bar axis is  $I_G = \frac{1}{12}ml^2$ .



**Question 3 (5 Marks):**

Determine the velocity of the 20-kg block  $A$  after it is released from rest and moves 2m down the plane. Block  $B$  has a mass of 10kg and the coefficient of kinetic friction between the plane and block  $A$  is  $\mu_k = 0.2$ . Also, what is the tension in the cord?

