BIRZEIT UNIVERSITY

Faculty of Engineering and Technology
Department of Mechanical and Mechatronics Engineering
First Examination – Fall 2016

ENME 232: Dynamics
Date of Examination: 6/11/2016
Eng. Sima Rishmawi
Dr. Sameh Abu Awad

Student ID: _____
Time duration: 90 minutes
Total Marks: 100

This exam contains 8 pages (including this cover page) and 3 problems. Check to see if any pages are missing. Enter your Student ID number on the top of this page, and at the bottom of every page, in case the pages become separated.

You may *not* use your books, notes, or any other reference on this exam, except for the attached equation sheet. You can use your own calculator only. Borrowing calculators is not allowed.

You are required to show your work on each problem on this exam.

Do not write in the table to the right.

Problem	Points	Score
1	20	
2	40	
3	40	
Total:	100	

1) **ABET SO (a):** A golf ball is struck with a velocity of 80 ft/s as shown. Determine the distance d to where it will land. ($g = 32.2\ ft/s^2$).
Clearly label your coordinate system.

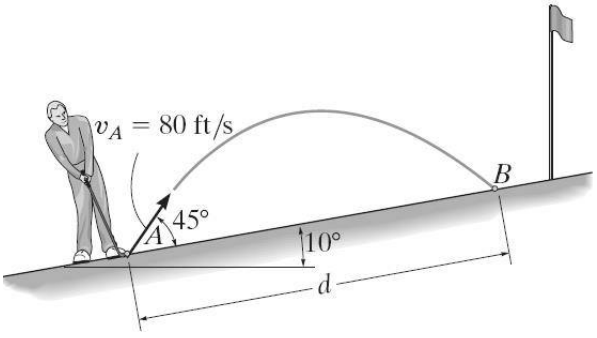

Figure 1: Problem 1

20 marks

2) **ABET SO (e):** The member OA rotates about a horizontal axis through O with a constant counterclockwise velocity $\dot{\theta} = 3\ rad/s$. As it passes the position $\theta = 0^o$, a small block of mass m is placed on it at a radial distance of $r = 1.5\ ft$. If the block does not slip until $\theta = 50^o$, determine the coefficient of static friction μ_s between the block and the member.
Clearly label your coordinate system.

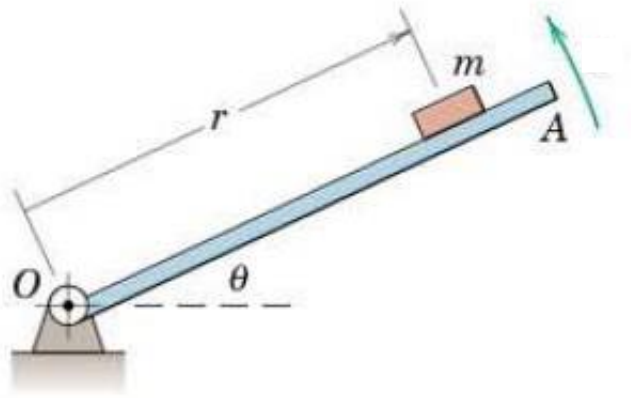

Figure 2: Problem 2

40 marks

3) **ABET SO (e):** A small collar of mass m is given an initial velocity $v_o = 3\ m/s$ on the horizontal circular track fabricated from a slender rod. If the coefficient of kinetic friction is $\mu_k = 0.4$ and the radius of the track is $r = 4\ m$, determine the distance traveled before the collar comes to rest. Use $g = 9.81\ m/s^2$.
(*Hint:* the friction force depends on the resultant normal force in two directions.)
Clearly label your coordinate system.

Note: $\int \frac{dx}{\sqrt{x^2+a^2}} = \ln\left(\frac{x+\sqrt{x^2+a^2}}{a}\right)$

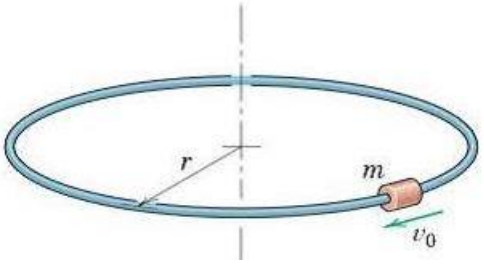

Figure 3: Problem 3

40 marks