Philadelphia University
Faculty of Engineering

Student Name:
Student Number:

Dept. of Computer Engineering
Second Exam, Second Semester: 2006/2007

Course Title: Real-Time Computer Control System	**Date: 22/5/2007**
Course No: (630581)	**Time Allowed: 1 Hour**
Lecturer: Dr. Mohammed Mahdi	**No. of Pages: 1**

Question 1: ***(10 Marks)***

Objectives:
This question is about difference equations, Jury test, and computer simulation.

Consider the system described by the following difference equation: -

$$y(k) - 0.6\,y(k-1) - 0.81\,y(k-2) + 0.67\,y(k-3) - 0.12\,y(k-4) = x(k)$$

It is required to: -

1. **Determine the absolute stability, then comment your result.** (3 Marks)
2. **Write the software program segment to simulate y (k).** (3 Marks)
3. **Draw a representative block diagram.** (2 Marks)
4. **Is the system realizable? Why?** (2 Marks)

Question 2: ***(10 Marks)***

Objectives:
This question is about the z-inverse and digital PID controller.

A) Find E (0) and E (5) for E (z) = 1 \ (z – 0.5)(z – 0.2) (2 Marks)

B) Given G(s) = 1 \ (s + 0.2) (s + 0.5) it is required to: -

1- **Find the suitable sampling rate for RTCCS.** (2 Marks)
2- **Find the suitable PID combination. Why?** (2 Marks)
3- **Write down the velocity form equation for your PID combination choice.** (2 Marks)
4- **Which is better to use velocity or positional PID form. Why?** (2 Marks)