Philadelphia University **Student Name:**

Faculty of Engineering **Student Number:**

Dept. of Computer Engineering
Second Exam, First Semester: 2009/2010

Course Title: Real-Time Computer Control Systems	**Date: 29 / 12 / 2009**
Course No: (630581)	**Time Allowed: 1 Hour**
Lecturer: Dr. Mohammed Mahdi	**No. of Pages: 1**

Question 1: **(10 Marks)**

Objectives: This question is about the basic concepts of discrete control systems.

1. **Show how you can extract z-transformation formula from the Laplace one. (3 Marks)**
2. **Show the rules of mapping s-plane into z-plane discussing the frequency and magnitude mapping. (3 Marks)**
3. **Given E (z)** $= \frac{m(z)}{x(z)} = \frac{z}{(z-1)}$ **it is required to: - (4 Marks)**
   - **Find E (∞).**
   - **Check E (∞) using inverse z-transform.**
   - **Draw the simulation diagram.**
   - **What conclusion can you make?**

Question 2: **(10 Marks)**

Objectives: This question is about the study and analysis of DDC system.

Given G(s) = $\frac{1}{s + 0.5}$ **it is required to: -**

1. **Sketch the closed loop discrete time system block diagram. (1 Mark)**
2. **Find G (z). (3 Marks)**
3. **Analyze the closed loop pulse transfer function. (2Marks)**
4. **What is the main parameter that may affects system stability? Why? (2 Marks)**
5. **Write down the simulation computer program segment. (2Marks)**