Philadelphia University
Faculty of Engineering

Student Name:
Student Number:

Dept. of Computer Engineering
Final Exam, First Semester: 2007/2008

Course Title: Modeling & Simulation	**Date: 29/1/2008**
Course No: (630573)	**Time Allowed: 2 Hours**
Lecturer: Dr. Mohammed Mahdi	**No. of Pages: 2**

Question 1: *(12 Marks)*
Objectives:
This question is about the principles of modeling and simulation.

A) **Choose the right answer: - (3 Marks)**

1. **In state-space model the dynamic matrix deals with:-**
   a) **Input.**
   b) **Output.**
   c) **States.**
   d) **None of the above.**
2. **Direct matrix: -**
   a) **Always exists.**
   b) **Does not exist.**
   c) **Sometime exists.**
   d) **None of the above.**

B) **Explain the following briefly: -(6 Marks)**
Simulation can help in: -

1- **Exploring new operating procedures.**

2- **Time compression or expansion.**

3- **Answering "what if" questions.**

C) **What are the possible errors one can face in the identification procedures? (3 Marks)**

Question 2: *(12 Marks)*
Objectives:
This question is about classical and modern model representations and Matlab.

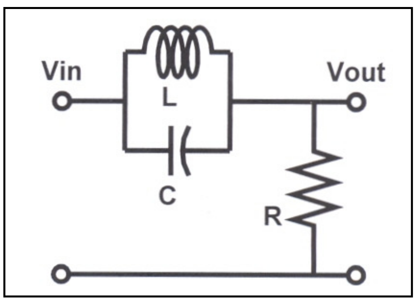
A) **Prove that the classical transfer function model = $C(SI - A)^{-1}B + D$. (3 Marks)**

B) **Show with simple example how can for, while, if..else be implemented using Matlab? (3 Marks)**

C) **Derive the general solution for first order model subjected to a unit ramp input. Discuss your result. (6 Marks)**

Question3: *(13 Marks)*
Objectives:
This question is about extracting model and Matlab.

A) **Given the band – stop filter with parallel topology. It is required to derive its model. Discuss your results. (7 Marks)**



B) **Give a simple example on the use of the following matlab functions: - roots (p), poly(r), conv (a,b), deconv(c,b), polyder(g), and plot(x, y 'g *'). (6 Marks)**

Question4: ***(13 Marks)***

Objectives:

This question is about analog simulation circuit diagrams and Matlab.

Given the following system $\ddot{y}+5\dot{y}+6y=u$ **. It is required to: -**

A) **Simulate it using two methods. (7 Marks)**

B) **Write a Matlab code for the dynamic matrix to find Eigen values, transpose, and polynomial showing the expected values. (6Marks)**