Philadelphia University
Faculty of Engineering

Student Name:
Student Number

Dept. of Computer Engineering
First Exam, Second Semester: 2013/2014

Course Title: Engineering Analysis II	**Date: 2/4/2014**
Course No: (630262)	**Time Allowed: 1 hour**
	No. of Pages: 1

NOTES:

- **Round ALL your calculations to 4 significant digits**
- **Angles for trigonometric functions are in radian scale**

Please choose your section:

Instructor: □ **Dr. Mohammed Mahdi** □ **Eng. Anis Nazer** □ **Eng. Muteeah Al-Jawarneh**

Lecture time: □ **ح ث خ10:10** □ **ح ث خ12:10** □ **ح ث خ14:10** □ **ن ر11:15**

Question 1: **(6 points)**

Use bisection method to find the root of $f(x) = \cos(x) - xe^x$, the root is between $[0.5, 0.7]$. Perform three iterations; find the relative error in each iteration.

Question 2: **(6 points)**

Use false position method to find the root of the equation $\ln(x) - \cos(x) = 0$. Start with $x_L = 1$, and $x_U = 2$ and find x_0, x_1, x_2.

Question 3: **(5 points)**

You are designing a spherical tank to hold water; the volume of the water in the tank is given by:

$$V = \pi h^2 \frac{(3R - h)}{3}$$

Where V is the volume and h is the height of the water and R is the radius of the tank. Find the height of the water so that the volume of the water is $30\,m^3$. Assume that $\pi = 3.142$ and $R = 3\,m$. Use two Newton-Raphson iterations (i.e. find h_1, h_2) starting with $h_0 = 1m$.

Question 4: **(3 points)**

1) If $x_{11} = 4.131$ and $x_{12} = 4.129$ then the approximation x_{12} is true for _____ significant digits.

2) Assume that $[A] = \begin{bmatrix} 1 & 0 & 2 & 3 \\ 4 & 5 & 6 & 7 \\ 0 & 7 & 0 & 8 \\ 3 & 9 & 2 & 4 \end{bmatrix}$ and $[C] = [[A]^T]^T$, then $c_{31} =$

3) If $[A] = [1 \quad 2]$ and $[B] = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$ then $[B] \times [A] =$

GOOD LUCK