



Dept. of Computer Engineering  
First Exam, Second Semester: 2014/2015

Course Title: Engineering Analysis II  
Course No: (630262)

Date: 2/4/2015  
Time Allowed: 50 minutes  
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. Sultan Al-Rushdan

Lecture time:  8:10 ح ث خ  11:10 ح ث خ  13:10 ح ث خ  11:15 ن

**Question 1:** (8 marks)

Consider the following equation, the solution is in the range  $[-2.5, 1]$

$$(x-4)^2(x+2)=0$$

- a) Perform **three** iterations using **bisection** method (4 marks)  
b) Perform **three** iterations using **false position** method (3 marks)  
c) Find the relative error in the last iteration for parts (a) and (b) (1 mark)

**Question 2:** (6 marks)

Use **Newton-Raphson** iterations to find the root of  $f(x) = e^x \cos(x)$ , start with  $x = -1.4$  and approximate the root with an absolute error less than 0.02

**Question 3:** (6 marks)

Choose the correct answer in the following questions (1.5 marks each)

1) Assume that  $x_4=35.21$  and  $x_5=35.19$ , then  $x_5$  is correct for \_\_\_\_\_ significant digits

- a) 2                                      b) 3                                      c) 4                                      d) 5

2) Consider the following system of linear equations:

$$\begin{bmatrix} 4 & 2 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$$

start with  $x=1$ ,  $y=1$  and find values of  $x$  and  $y$  after **two** Gauss-Seidel iterations:

- a)  $x=0$ ,  $y=2.5$                                       b)  $x=-0.75$ ,  $y=2.125$   
c)  $x=-1$ ,  $y=2.5$                                       d)  $x=-0.6$ ,  $y=2.2$

Consider the following matrices to answer parts (3) and (4)

$$[A] = \begin{bmatrix} 1 & 2 & 0 & -3 \\ 2 & 1 & 3 & 1 \\ -2 & 1 & 1 & 3 \\ 0 & 2 & 2 & 1 \end{bmatrix}, [B] = \begin{bmatrix} 5 & 5 & 7 & -11 \\ 4 & 3.5 & 5.5 & -8 \\ b_{31} & -5.5 & -8.5 & 13 \\ 4 & 4 & 6 & -9 \end{bmatrix}$$

3) if  $[C]=[A][B]$  then  $c_{42} =$

- a) -11                                      b) 7                                      c) 0                                      d) 2

4) if  $[A]=[B]^{-1}$  then  $b_{31} =$

- a) -6                                      b) 5                                      c) 6                                      d) -5