



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

Date: 4/8/2016  
Time Allowed: 50 minutes  
No. of Pages: 1

**Question 1:** Giver the following equation:

$$x^2 e^{2x} = 5.2$$

**7 points**

It is required to:

- 1- perform 3- iterations of bisection method using the intervaln  $[0.6 - 1.2]$  , then calculate the absolute error in the last iteration.
- 2- Perform 2 iterations of Newton-Raphson method taking  $x_0 = 0.8$  , then calculate the relative error in the last iteration .

**Question 2:** Considering the following system of linear equations.

$$\begin{aligned} 2x + y &= -2 \\ 3x + 4y &= 7 \end{aligned}$$

**7 points**

It is required to:

- 1- Perform 3 Guess-Siedel iterations starting with  $x_0 = 0$  ,  $y_0 = 3$  .
- 2- Solve the given equations to obtain the true solution using matrices as represented below:

$$\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2 \\ 7 \end{bmatrix}$$

Knowing that the solution of  $AX = B$  system of matrices is  $X = A^{-1}B$ . Calculate the relative error between the obtained results from parts 1 and 2.

**Question 3:** chose the correct answer of the followings:

**6 points**

- 1- If  $x_5 = 3.562$  and  $x_6 = 3.570$  then  $x_6$  is correct to \_\_\_\_\_ Significant digits  
A) 2                                      B) 3                                      C) 4                                      D) 5
- 2- The eigenvalues of  $A = \begin{bmatrix} 5 & -1 \\ 7 & -3 \end{bmatrix}$  are  
A)  $\lambda_1 = 4$  ,  $\lambda_2 = 2$       B)  $\lambda_1 = -4$  ,  $\lambda_2 = 2$       C)  $\lambda_1 = 4$  ,  $\lambda_2 = -2$       D)  $\lambda_1 = -4$  ,  $\lambda_2 = -2$
- 3- Calculating the second order Lagrange interpolation polynomial for  $f(-1)$  based on the given data, the value of  $L_1$  is:

$X$	-2	1	3
$f(x)$	8	6	-2

- A) 3                                      B) 1                                      C)  $\frac{2}{3}$                                       D)  $\frac{1}{3}$
- 4- If  $x_l = 0.7$  and  $x_u = 1.3$  and  $f(x) = \cos(x) - 0.5$  then the value of  $x_r$  after the first iteration using false position method is:  
A) 1.019                                      B) 0.9551                                      C) 1.226                                      D) 0.9003