EASTERN MEDITERRANEAN UNIVERSITY

DEPARTMENT OF MATHEMATICS

MATH 373 – NUMERICAL ANALYSIS ENGINEERS

LAB QUIZ1-B

QUESTION 1	QUESTION 2	QUESTION 3	TOTAL
14	**18**	**18**	**50**

1) (14 p)Consider the function

$$f(x) = \sin(x) - 3x + 6$$

Use **Secant Method** and **Bisection Method** to find the roots of the given function. Start with $(a, b) = (1,3)$ and $(p_0, p_1) = (2,3)$.

a) Write the function in **MATLAB** language (3)

b) Write the derivative of the function in MATLAB language (3)

c) How many iterations did **Secant Method** obtained? _____ (1.5)
What is the root with this method? _____ (1.5)

d) How many iterations did **Bisection Method** obtained? _____ (1.5)
What is the root with this method? _____ (1.5)

e) Which method is the best? _____ (1) ; Why is the best? _____(1)

2) (18 p)Use the user-friendly program developed fort he **Fixed Point** and **Newton-Raphson** method to determine the roots of the simultaneous nonlinear equation. Employ initial guesses of $(x_0, y_0) = (0.6,0.6)$.

$$F(x,y) = 5x - y + 4$$

$$G(x,y) = 3x^2 - 2y - 5$$

a) Write the function in MATLAB language (5)

b) Write the derivatives of the functions in MATLAB language (5)

c) How many iteration did **Fixed Point System** obtained? _____ (2)
and does it converges? _____ (2)

d) How many iteration did **Newton Method** obtained? _____ (2)
and does it converges? _____(2)

3) (18 p)Use **Jacobi and Gauss-Seidel iterations** to find x_k. Start with $x_0 = (0,0,0)$.

$$-2x + 3y + 6z = 4$$

$$4x + y - z = 11$$

$$-x + 5y - 2z = 6$$

a) How many iteration did **Jacobi Method** obtained? _____ (2.5)
and does it converges? _____ (2.5)

b) How many iteration did **Gauss-Seidel** obtained? _____ (2.5)
and does it converges? _____ (2.5)

c) Which method is the best? _____ (2.5)
Why is the best? _____ (2.5)

d) Solve the above system of linear equation using **LU decomposition**. What value did you obtained?

x=_____ (1)
y=_____ (1)
z=_____ (1)