Iqra National University, Peshawar
Department of Electrical Engineering

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Final – Term Examination Summer 2020
Date:23/009/2020

Course Code:	**MTH305**			Course Title:	Numerical Analysis
Prerequisite:				**Instructor:**	Engr. Pir Meher Ali Shah
Module:	3	**Program:** BEE	**Total Marks:** 50	**Time Allowed:**	

Note: Attempt all questions.PLO: program learning outcome   C:Cognitive

			Marks
Q1.	(a)	Find the LU Factorization of the following matrix $$A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ -3 & 1 & 1 \end{bmatrix}$$	**6** CLO1
	(b)	Find the unknown variables of the following equation using gaussian elimination methods $$x + 2y - z = 3$$ $$2x + y - 2z = 3$$ $$-3x + y + z = -6$$	**7** CLO1
	(c)	Apply Gaussian elimination with partial pivoting to solve the following system of equations $$x_1 - x_2 + 3x_3 = -3$$ $$-x_1 - 2x_3 = 1$$ $$2x_1 + 2x_2 + 4x_3 = 0$$	**7** CLO
Q2	(a)	Apply Gauss- Seidel Method to the following system $$\begin{bmatrix} 3 & 1 & -1 \\ 2 & 4 & 1 \\ -1 & 2 & 5 \end{bmatrix} \begin{bmatrix} u \\ v \\ w \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \\ 1 \end{bmatrix}$$	**6** CLO1
	(b)	Find the reduced QR factorization by applying Gram- Schmidt orthogonalization to the column of the following matrix $$A = \begin{bmatrix} 1 & -4 \\ 2 & 3 \\ 2 & 2 \end{bmatrix}$$	**7** CLO2

	(c)	Let $x = [3 \quad 4]$ *and* $w = [5 \quad 0]$. Find a house holder reflector H that satisfies Hx=w	**Marks** 7
			CLO
Q3	(a)	Find the Newton's method formula for the following equation $$x^3 + x - 1 = 0$$	**Marks** 5
			CLO2
	(b)	Find the line that best fits the three data points (t , y)=(1,2),(-1,1) and (1,3) in the figure below	**Marks** 5
			CLO 2