KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
KING ABDULAZIZ UNIVERSITY
Faculty of Engineering at Rabigh

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك عبد العزيز
كلية الهندسة برابغ

Midterm Exam

EEN 271 Engineering Numerical Methods

Spring 2019

Date: 29/6/1438 H – March 6, 2019

Name (in Arabic):
ID No:

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Question No	ABET SOs	Marks
Q1	a	10
Q2	a	30
Q3	a	30
Q4	a	15
Q5	a	15
	k	5
Total		100

Q1. Write True (T) or False (F) for the following statements:

1. Numerical methods give approximate solutions ( )
2. Round off error is a major error in Numerical methods ( )
3. Nonesingular matrix has unique solution ( )
4. Iterative solutions are used to minimize the error ( )
5. Nonlinear methods always onverge ( )
6. Relative Aapproximate Error=True value- Approximation ( )
7. Graphical Solution is not a numeric solution ( )
8. Linear system **Ax=b**, has a unique solution if **A** is nonsigular matrix ( )
9. Square matrix is always invertable ( )
10. The determinant of Identity matrix equals to **unity (one)** ( )

Q2. Electric circuit in Figure (1) has values R1=2 Ω, R2=4 Ω, R3=6 Ω, R4=8 Ω, R5=10 Ω, and Vin=10.

Find the solution of the circuit currents I_1, I_2, and I_3 using:

a- **Gauss Elimination Pivoting Method.**

b- **Determinant and Cramer's Rule**

Note: you need **KVL** and **KCL** to write the system equations.

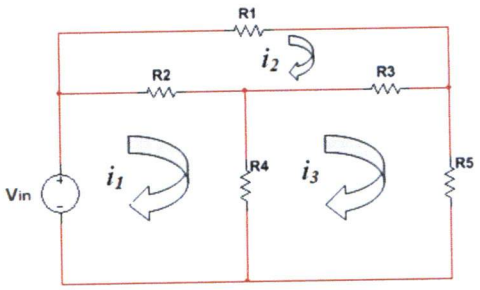

Figure (1)

Q3. Consider the following Nonlinear function: $\mathbf{f(x)=x^2-9}$

Find the root of the system using:

a- **Newton-Raphson Method** with initial value $\mathbf{X_0 = 1.2}$ (use **4 iterations**).

b- **Bisection Method** with $\mathbf{X_L=2.5}$, $\mathbf{X_U=3.5}$

Q4. Solve the given system using **Gauss Siedel Method** (3 iterations).

With intial values , **x1=1,x2=1,x3=1**

$$12x_1 + 3x_2 - 5x_3 = 1$$
$$x_1 + 5x_2 + 3x_3 = 28$$
$$3x_1 + 7x_2 + 13x_3 = 76$$

Q5. For circuit system shown in Figure 1,

a- **Solve** the system using Inverse Method **$x=A^{-1}b$.** Use **Gauss-Jordan Method** for computing **A^{-1}**.

b- **Write** the **MATLB** code to solve the system using **inverse** mtrix **$x=A^{-1}b$**