B.E. Electrical Engineering (Part Time) EXAMINATION, 2019
2nd YEAR 2nd SEMESTER
SUBJECT : BASICS OF NUMERICAL METHODS & PROGRAMMING
Full Marks -100
Time : Three hours   **(50 marks for each part)**
Part-I
Use a separate Answer-Script for each part

ANSWER Q.No.1 AND ANY TWO QUESTIONS FROM THE REST

Q.1. A) Write down Trapezoid rule of numerical integration. Apply Simpson's 1/3rd Rule to solve the following with six intervals -

$$\int_0^2 x.e^x \, dx$$

B) Solve the following Ordinary Differential Equation for y(1.2) by 2nd order Runge-Kutta method-

$$\frac{dy}{dx} = x - y, y(1) = 1, \text{ increment}(h) = 0.1$$

10+10=20

Q.2. A) Explain the Newton-Raphson method (with graphical illustration) to find out real root of non-linear equation.
B) Solve the following by applying Bisection method
$f(x) = x^3 - 5x + 1 = 0$ lies in the interval (0, 1). Assume e=0.1

7+8=15

Q.3. A) Find the solution, to five decimal places, of the system of linear equations by Gauss-Seidel method with initial solution set as x(0) = y(0) = z(0) = 1. Perform only five iterations. Find out Euclidian norm of the solution vector.
   $14x + 5y + 2z = 39; 3x + 7y + z = 16; x + 4y + 9z = 33$
B) Using Newton's divided difference formula, calculate the value of f(6) from the following data:

x	1	2	7	8
y	1	5	5	4

8+7=15

Q.4. A) Determine the constants 'a' and 'b' by Least square method such that y = a.e^{bx} fits the following data-

x	1.0	1.2	1.4	1.6
y	20.08	36.87	66.39	121.92

B) Explain the Euler's method to find out numerical solution of first order ordinary differential equation. How this method is modified using Trapezoidal rule of numerical integration?

8+7=15

Q.5. Write down short note on the followings-
A) Numerical differentiation;
B) Newton's forward difference interpolation OR Lagrange interpolating polynomial.

8+7=15

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BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) SECOND YEAR SECOND SEMESTER - 2019

SUBJECT: BASICS OF NUMERICAL METHODS AND PROGRAMMING

Time: Three Hours

Full Marks 100
(50 Marks for each part)

Use a separate Answer-Script for each part
Two marks for neat and well-organized answers

Question No.	Part II	Marks

Answer any three questions

1. (a) Explain with examples working of modulo division and conditional operator in C. — 7

   (b) Write a C program to calculate the G.C.F of two numbers. Consider the numbers are given input from keyboard. — 9

2. (a) What are the various looping methods in C? Explain these methods with suitable examples. — 6

   (b) Write a C program to calculate the number of the digits of an integer number. The number must be given input through keyboard. — 10

3. (a) Write a C program to transpose a 3×3 matrix. The matrix must be stored in a two dimensional array. — 6

   (b) Write a C program to arrange six different numbers in ascending order. The number should be given input from keyboard and stored in one dimensional array. — 10

4. (a) What is recursion – explain with the help of a C program. — 6

   (b) Explain the difference between "call by value" and "call by reference" in C programming language with proper example. — 10

5. Write short notes on following topics (any two) — 2×8
   (i) Dynamic memory allocation
   (ii) Structure
   (iii)Preprocessor