

B.E. Electrical Engineering (Part Time) EXAMINATION, 2017
2nd YEAR 2nd SEMESTER

SUBJECT : BASICS OF NUMERICAL METHODS & PROGRAMMING

Full Marks -100

(50 marks for each part)

Time : Three hours

Part-I

Use a separate Answer-Script for each part

ANSWER ANY THREE QUESTIONS

(Q.No. 5 carries 18 marks)

Q.1. A) Explain the False position method (with graphical illustration) to find out real root of non-linear equation.

B) Determine the root of the following equation by Newton-Raphson method -

$$x - \cos(x) = 0$$

8+8=16

Q.2. A) Solve using Gaussian elimination method-

$$x_1 + 2x_2 + x_3 = 8.8; \quad 2x_1 + 3x_2 - x_3 = 5.3; \quad 3x_1 - 4x_2 + 2x_3 = 2$$

B) Perform LU decomposition for the following matrix -

$$A = \begin{vmatrix} 2 & 4 & 1 \\ 3 & 2 & -2 \\ 1 & -1 & 1 \end{vmatrix}$$

10+6=16

Q.3. A) Perform 4 iterations with the following system of equations by applying the Gauss-Seidal method with the given initial value $x_1^{(1)} = x_2^{(1)} = x_3^{(1)} = 0$.

$$5x_1 + 2x_2 - x_3 = 7.6; \quad x_1 + 6x_2 - x_3 = 8.8; \quad x_1 - 2x_2 + 5x_3 = 6.9$$

B) Fit the equation $Y = A * e^{B * X}$ with the following data:

X	2	4	6	8	10
Y	4.077	11.084	30.128	81.897	222.62

6+10=16

Q.4. A) Calculate $(151)^{0.5}$ and $(155)^{0.5}$ following Newton's interpolation method with the given table-

x	150	152	154	156
y=(x) ^{0.5}	12.24744	12.32882	12.40967	12.48999

B) Construct the divided difference table with the following data-

x	1.3	2.7	3.3	4.9
y	2.897	18.983	34.637	114.749

10+6=16

Q.5. A) Apply Simpson's 1/3rd Rule to solve the following integration with four intervals -

$$\int_0^{\pi} \frac{x}{3} * \sin(x) dx$$

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

$$\frac{dy}{dx} = 3x + y^2, \quad y(1) = 1.2 \quad \text{for } 1.1 \leq x \leq 1.2, \quad \text{with increment } (h) = 0.1$$

8+10=18

[Turn over

**BACHELOR OF ENGINEERING IN
ELECTRICAL ENGINEERING (EVENING) EXAMINATION, 2017
(2nd Year, 2nd Semester)**

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

PART-II

Answer *any three* questions

Two marks are reserved for neatness and well organized answer script

1. a) Write a brief note on "Character Set" in C. What are their uses? 8
- b) What are variables in C? Mention the rules for naming variables in C. 8

2. a) With examples, explain the different types of constants that are used in C. 8
- b) What do you understand by the term "Operator"? Briefly describe some operators that are used in C programming. 8

3. a) With suitable examples, explain input-output statements in C. 8
- b) Carefully read the following program and explain the step by step execution in your language. What is the output of the program? 8

```
#include <stdio.h>
int main()
{
    int i = 9876;
    float f = 987.6543;
    printf("%6d\n", i);
    printf("%.2f\n", f);
    printf("%e\n", 987.6543);
    return 0;
}
```

4. a) Explain branching and looping control in C with suitable examples. 8
- b) Explain the execution of the following program and predict the output. 8

```
#include <stdio.h>
main ()
{
    int n[10];
    int i,j;
    for (i = 0; i < 10; i++)
    {
        n[i] = i + 100;
    }
    for (j = 0; j < 10; j++ )
    {
        printf("Element[%d] = %d\n", j, n[j] );
    }
}
```

5. a) Give the differences between C and C++ with suitable example. 8
- b) Give two programming examples in C++ of your choice. 8