

BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2017

(2nd Year, 1st Semester, Supplementary)

BASICS OF NUMERICAL METHODS & PROGRAMMING

Time: Three Hours

Full Marks: 100

(50 marks for each part)

Use a separate Answer-script for each Part

PART-I

Answer any three questions

(Two marks are reserve for neatness
and well organized answers)

1. a) The values of $f(x)$ for $x = 0, 1, 2, \dots, 6$ are given by

x	0	1	2	3	4	5	6
$f(x)$	5	8	12	18	22	26	34

Estimate the value of $f(3.2)$ using only four of the given values. Choose the four values that you think will give the best approximation. 8

- b) In the following table, values of y are consecutive terms of a series of which 23.6 is the 6th term. Find the first term of the series. 8

x	3	4	5	6	7	8	9
y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

2. a) Find the real root of the equation $f(x) = x^2 - 3$ by Bisection method, correct to two decimal places. Start with interval $[1, 2]$. 8

- b) A real root of the equation $f(x) = x^3 - 5x + 1 = 0$ lies in the interval $(0, 1)$. Perform four iterations of the secant method. 8

3. a) Using Newton's divided difference formula, calculate the value of $f(6)$ from the following data: 8

x	1	2	7	8
y	1	5	5	4

- b) Fit a straight line to the following data: 8

x	71	68	73	69	67	65	66	67
y	69	72	70	70	68	67	68	64

4. a) Evaluate

$$\int_0^{10} \frac{1}{1+x^2}$$

by using Simpson's one-third rule.

10

b) Find a positive root of $xe^x = 2$ by the method of false position.

6

5. Briefly explain the Runge-Kutta method and Solve the equation

$$\frac{dy}{dx} = x + y$$

by second order Runge- Kutta method with initial condition $y(0) = 1$, $h=0.1$ from $x= 0$ to $x = 0.4$

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Ex/EE/T/212/2017(S)

B.Electrical Engg. Supple. Examination 2017
(2nd Year, 1st Semester)

Basics of Numerical Methods & Programming

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(50 marks for each part)

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Part II

Answer *any three* questions.

Two marks are reserved for neat and well organized answers.

1. a) Explain with examples different methods of looping in C. 6
- b) Write a program to find the sum of the digits of any given number. 10
2. a) Explain the working of increment – decrement operator in C. 3
- b) Any year is input through keyboard. Write a program that prints out the years which are leap years otherwise prints 'Not a leap year'. 6
- c) Write a program to calculate the HCF of two given numbers. 7
3. a) State limitation of switch statement. Also state how this limitation is overcome. 6
- b) Write a program to obtain the prime factors of any given number using recursion. 10
4. a) With the help of a small program explain the working of a recursive function. 8
- b) Write a program to print the sum of first 25 terms of the series : $x + x^2 + x^3 + x^4 + \dots$ where x is to be considered as input. 8
5. a) Write a program to transpose a given matrix. 8
- b) Write a function to determine the product of a matrix with its transposed matrix. 8