

**B.E. ELECTRONICS AND TELECOMMUNICATION ENGINEERING
FIRST YEAR FIRST SEMESTER EXAMINATION 2019 (OLD)**

COMPUTER PROGRAMMING AND NUMERICAL ANALYSIS

Time: 3 hours

Full Marks: 100

Answer any four questions from Group A and any one from Group B.

Group - A

Q.1 (a) Write a C program to print "COMPUTER PROGRAMMING" and "NUMERICAL ANALYSIS" in two separate lines. **5**

(b) Write a C program to display your name, CGPA, and last two digits of your roll number in separate lines after inputting the same information. Your program should also include some prompt statements like "Enter your name:". **10**

(c) Name the header file(s), library function(s) and special character(s) you have used for your programs in 1(a) and 1(b). **5**

Q.2 (a) Differentiate between **if-else** and **switch** statements in C with proper syntaxes. **5**

(b) Write a C program to check if an integer is odd or even. Display appropriate messages. **5**

(c) Write a C program which will respectively print the seven days of the week starting from Monday corresponding to an user input from 1, 2, ..., 7. For example, if the user inputs 1, then "Monday" should be displayed and so on. If the user inputs anything other than 1, 2, ..., 7, "Invalid Input" should be displayed. **10**

Q.3 (a) Compare **for** and **while** loops in C with proper syntaxes. **5**

(b) Write a C program to compute the sum of first n integers. The user should input the value of n . **5**

(c) Write a C program to count the number of vowels in an inputted string. **10**

Q.4 (a) Explain the importance of functions. **3**

(b) Differentiate between *call-by-value* and *call-by-reference* parameter passing mechanisms in C with proper examples. **5**

(c) Write a C program with two functions to compute the factorial of a number x in iterative and recursive manners. The user should input x and a choice for obtaining the factorial in iterative or recursive fashion. **12**

- Q.5 (a) What is an *array*? Give examples. 3
 (b) Write a C program to find the average of 100 elements which are inputted and stored in an array. 7
 (c) Write a C program to realize subtraction of two 3x3 matrices. 10
- Q.6 (a) Explain the concept of dynamic memory allocation in C. Name the C functions which are used for this purpose. 5
 (b) Write a C program to obtain the maximum and minimum of n integers which are inputted and stored in an array. The value of n is provided during the execution of the program. Use separate functions to obtain the maximum and minimum. 10
 (c) Create a *structure* in C to model a date calendar. Use C statements to assign values to the members of your structure. Complete program is not necessary. 5

Group –B

- Q.7 (a) Obtain an expression for finding root of an equation using Newton-Raphson method. 7
 (b) Explain one advantage and one disadvantage of the above method. 3
 (c) Apply the Newton-Raphson method to find a root of the equation: $f(x) = x - e^{-x} = 0$. Use an initial guess of 0.5 and an absolute convergence of 0.00001. 10
- Q.8 (a) Explain why numerical integration is necessary. 3
 (b) Obtain the formula for numerical integration using Trapezoidal rule. 7
 (c) Apply Trapezoidal rule with 20 points to obtain the value of $\int_0^1 x^3 e^{x-1} dx$. 10