

**B.E. ELECTRONICS AND TELE-COMMUNICATION ENGINEERING
FIRST YEAR FIRST SEMESTER SUPPLEMENTARY EXAM - 2018**

**COMPUTER PROGRAMMING
AND NUMERICAL ANALYSIS**

Time: 3 hours

Full Marks: 100

Answer **any four** questions from **Group A** and **any one** question from **Group B**

Group A

- Q.1 (a) Write a C program to print your name, roll number, and CGPA in separate lines. 5
 (b) Write a C program to first read your name, roll number, and CGPA. The same program should then display the above information in separate lines. 10
 (c) What is a header file? Name any header file you have used for writing the programs in (a) and (b). Mention the importance of the header file. 5

- Q.2 (a) What do you mean by branching statements? Give examples. 5
 (b) Discuss the syntax and importance of **switch** statements. 5
 (c) Write a C program to check the number of even and odd numbers in [a, b]. The user should input the two integers a and b. 10

- Q.3 (a) Discuss the syntax and importance of **for** loop. 5
 (b) How a **while** loop is different from a **do-while** loop? 5
 (c) Write a C program to print a triangle of '*'s with n rows. The user should input the value of n . A triangle of '*'s with 4 rows looks like the following: 10

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- Q.4 (a) Explain the importance of functions in C with examples. 5
 (b) Write a C program with two functions for swapping two integers, one using call-by-value and the other using call-by-reference. 8
 (c) Write a C program to calculate the members of the Fibonacci series. The user should input the number of members whose values are to be displayed. 7

[Turn over

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- Q.5 (a) Define an *array* in C with suitable examples. 5
 (b) Write a C program to find the product of all elements of a 1-D *array* with 10 integers. 10
 (c) How can you modify your program if the number of elements in the *array* is known only during execution? 5
- Q.6 (a) Discuss *structure* in C with proper examples. 5
 (b) Differentiate between the declarations `int *p[10]` and `int (*p) [10]`. 5
 (c) Write a C program to read a set of 10 floating point numbers stored in the file *input.txt* and write the average of their values in the file *output.txt*. 10

Group B

- Q.7 (a) Obtain an expression for finding a root of an equation using the *Newton-Raphson* method. 6
 (b) Mention the advantage(s) and disadvantage(s) of the *Newton-Raphson* method. 4
 (c) Use the method in (a) to solve: $f(x) = x - e^{-x} = 0$ with the initial guess as $x = 0.5$ and an allowed convergence error of 0.00001. 10
- Q. 8 (a) Discuss the importance of numerical integration. 2
 (b) Write the expressions for *Trapezoidal rule* and *Simpson's on-third rule* as used in numerical integration. 4
 (c) Following is the data for acceleration $a(t)$ of a rocket collected in intervals of 5 seconds:

| | | | | | | | | | |
|--------------------------|------|-------|------|-------|-------|-------|------|------|------|
| t (s) | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| a(t) (m/s ²) | 40.0 | 45.25 | 48.5 | 51.25 | 54.35 | 59.48 | 61.5 | 64.3 | 68.7 |

Find the velocity of the rocket at $t = 40$ s using both *Trapezoidal rule* and *Simpson's on-third rule*. 7+7