I Semester M.C.A. (Two Years Course) Examination, May/June 2025 (CBCS) (2020 – 21 and Onwards)
COMPUTER SCIENCE
Paper – 1MCA1 : The Art of Programming

Time : 3 Hours

Max. Marks : 70

Instruction : *Answer* **any five** *from Part –* **A** *and* **any four** *from Part –* **B**.

PART – A

Answer **any five** of the following. **Each** carries **six** marks. (5×6=30)

1. What is an algorithm ? What are the qualities of a good algorithm ?

2. What are the standard notations used to describe the asymptotic behavior of running time functions ? Give an account of standard functions.

3. Write both recursive and non-recursive algorithms to find the sum of the digits of an integer.

4. Write a C program to find whether a given date is valid or not [day, month and year are the inputs].

5. Write a C program to convert a decimal integer to any number system among Binary, Octal number systems.

6. Write an algorithm to find whether integer values in an integer array are unique or not.

7. Present selection sort algorithm and write C code for it.

8. Write a C program to search for a substring in a given string.

PART – B

Answer **any four** of the following. **Each** carries **ten** marks. (4×10=40)

9. a) Write algorithms to generate n members of the Fibonacci series. 5
   i) Without using array of integers
   ii) Using array of integers.

   b) Write a C program to find the sum of the digits of a given integer till the sum reduces to a single digit. 5

P.T.O.

10. a) Write an algorithm for sorting each row of a matrix and provide a C program for it. **5**

   b) Write a C program to segregate prime numbers and composite numbers from a matrix of integers into two one-dimensional arrays. **5**

11. a) Write an algorithm to find the number of times of occurrences of each number in a list of numbers, and display each number and the number of times it occurs. **5**

   b) Describe the Naive method of computing the GCD of two given integers, and write a C program to implement the method. **5**

12. a) Develop an algorithm to compute the prime factors of a given integer. **5**

   b) Write a C program to remove the duplicate values in an array of integer values. **5**

13. a) Write a C program to search for a string in a list of strings and also find its frequency of occurrence. **5**

   b) Describe the procedure of sorting by insertion and present the complete algorithm for sorting by insertion. **5**

14. Write functions to illustrate the following : **10**

   a) Finding the largest of four integers

   b) Break and continue statements in C

   c) Swapping two one-dimensional arrays

   d) Comparison of two strings.

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