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Reg. No.

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I Semester M.C.A. Degree Examination, June/July - 2023

COMPUTER SCIENCE

The Art of Computer Programming

(CBCS Scheme (Y2K20))

Paper : IMCA1

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer any Five questions from Part - A

Answer any Four questions from Part - B.

PART - A

Answer any Five questions. Each question carries 6 marks.

(5×6=30)

1. Explain Asymtotic notations.
2. Write an algorithm to reverse the digits of an integer, check your algorithm for the input 4356.
3. Explain with example the formatted I/O functions in C.
4. Explain with examples the different forms of if statements.
5. Write a C program to remove duplicate elements from an unordered array.
6. Write a C Program for multiplying two matrices.
7. Explain two-way merge with an example.
8. Write the string matching algorithm and state its complexity.

PART - B

Answer any Four questions. Each question carries 10 marks.

9. a) Write an algorithm for coverting a decimal number to binary. (5+5)
b) State with example any five string functions in C.
10. a) Write a recursive algorithm for generating n^{th} fibonacci number. (5+5)
b) Explain the different looping constructs in C.

[P.T.O.]





(2)

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11. a) Differentiate with example-call by reference and call by value. (6)
b) Discuss with example command line arguments. (4)
12. a) Explain different types of arrays with examples. (5+5)
b) What are pointers? Explain with example how pointer is used to reference array elements.
13. Write a C program for binary search and trace it for the following array. Take search value as 15. (10)
2, 5, 6, 9, 11, 15, 18, 21.
14. Write Insertion sort algorithm. Trace the algorithm for the following array. (10)
5, 2, 4, 6, 1, 3.





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(CBCS Scheme)

Paper : 1MCA1

Time : 3 Hours

Maximum Marks : 70

PART - A

Answer any FIVE. Each carries SIX marks.

(5×6=30)

1. Write an algorithm to find $1^2+3^2+5^2+\dots +n^2$ Find the complexity of the algorithm.
2. Write an algorithm to reverse the digit reverse 786 using your algorithm.
3. Write an efficient algorithm to find GCD of two numbers. Find GCD of 512 and 36 using your algorithm.
4. Write an algorithm to search for an element in the list using binary search. Find 7 in the list {1, 4, 5, 6, 9, 13, 15} using your algorithm.
5. What is the difference between while-do and repeat control structures.
6. Give an example for pass by value and pass by address. Discuss the differences.
7. Write an algorithm to find Pseudo random number.
8. Write an algorithm to multiply two matrices of the order $m \times n$ and $n \times p$.

PART - B

Answer FOUR. Each carries TEN marks.

(4×10=40)

9. What is complexity of an algorithm, and rate of growth? Define Big oh notation. Write an algorithm to find an element using Linear search, and find its best case, worst case complexity.
10. Write an algorithm to sort the numbers using insertion sort. Sort the following list. {4, 1, 3, 9, 0, 2, 6, 5, 7}. Trace your algorithm. Suppose the elements given for sorting were to be {1, 2, 3, 4, 6, 7} how many comparisons you make.

[P.T.O.]





11. Write an algorithm to remove the identical numbers in a list. Trace your algorithm for removing the identical numbers for the following list {1, 3, 3, 5, 6, 7, 7, 8, 10, 10}
12. What is structured programming? Write a C program to find factorial of a number using functions. Call the function to find factorial of 3 & factorial of zero.
13. Write an efficient algorithm to raise the power of a number by a large number.
14. Write algorithm to merge two sorted arrays. Trace your algorithm to merge the following two list.

{1, 4, 6, 9, 13, 18}

{2, 3, 5, 7, 8, 15, 19, 21}

