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Candidate should write his/her Roll No. here.

Total No. of Questions : 03

No. of Printed Pages : 04

**M-SFS-I-2017 (13)**  
**COMPUTER SCIENCE ENGINEERING**  
**(Optional Subject)**  
**First Paper**

Time : 3 Hours ]

[ Total Marks : 200

**Instructions to the candidates :**

1. This question paper consists of **three** questions and all questions are compulsory.
2. Marks for each question have been indicated on the right hand margin.
3. There is no internal choice in Question No. 1, remaining questions carry internal choice.
4. The first question is of very short-answer type consisting of **15** compulsory questions. Each one is to be answered in one or two lines. Question No. 2 is short answer type, word limit is **100**. Question No. 03 is long answer/Essay type, word limit is **300**.
5. Wherever word limit has been given, it must be followed to.
6. Question should be answered exactly in the order same as mentioned in the question paper. Answer to the various parts of the same question should be written together compulsorily and no answer of the other question should be inserted between them.

M-SFS-I-2017 (13)

P.T.O.



1. Attempt all the questions, each question carries 4 marks. **15 × 4 = 60**
- (A) What is the relation between CPU clock speed and processor speed ?
  - (B) What is fifth generation computer ? State its important characteristics.
  - (C) What is 2's complement representation of a number ? Represent a number-6 inside the memory.
  - (D) What are peripheral devices ?
  - (E) What are the main steps of solving a problem on computer ? Write down properly.
  - (F) What are void pointers in C ?
  - (G) Differentiate between formal arguments and actual arguments of a function in 'C'. Take one simple example for illustration.
  - (H) What is the purpose of function `ftell ()` in 'C' ?
  - (I) What is the basic difference between data structure and file structure ?
  - (J) Which data structure is used for implementing recursion and why ?
  - (K) What is the difference between a tree and a graph ?
  - (L) Write down the steps to sort n elements of an array A using insertion sort.
  - (M) Differentiate between multilevel inheritance and multiple inheritance.
  - (N) What is the role of virtual function ? How it is defined ?
  - (O) What are Friend functions ?

2. Attempt any 10 questions, each question carries 8 marks :

$10 \times 8 = 80$

- (A) What is the memory hierarchy of a computer? Explain in detail.
- (B) Write a C program to concatenate two strings without using any built in string concatenation function. Also, explain this program briefly.
- (C) Define a binary tree and a binary search tree. Write down the steps to search for an element 'x' in a binary search tree.
- (D) Write a C program to count the number of lines and characters in a file. Include relevant comments in the program.
- (E) What is the difference between pass by value and pass by reference? Discuss it by giving appropriate example in C program code.
- (F) What is valid and invalid pointer arithmetic? Explain.
- (G) What is "return by reference" in C++? Illustrate with a function max( ) that finds the maximum of two numbers.
- (H) Compare and contrast compile time polymorphism and runtime polymorphism.
- (I) Compare and contrast breadth first search and depth first search graph traversal algorithms.
- (J) What are infix, prefix and postfix notation of expressions? Write down the steps to evaluate a postfix expression using the stack data structure.
- (K) Write an algorithm to insert a node with data 'ABC' after a given node X in a linked list. Include comments in the algorithm.
- (L) Write down the steps to convert binary number to a decimal number. Apply these steps to convert a given number 1101.11 into its decimal equivalent.
- (M) What is meant by "Counter"? What are the two basic types of counters?



3. Attempt any **three** questions. Each question carries **20** marks. **3 × 20 = 60**

- (A) Explain overloading feature of C++. Also, write a program to add two complex numbers using the binary operator (+) overloading.
  - (B) What are different types of storage classes in C programming language ? Explain them with the help of example.
  - (C) What is meant by exception handling in C++ ? What is its significance ? Write an exception handling program to handle division by zero exception.
  - (D) Write a recursive algorithm to sort an array A of n numbers. Also write algorithm to merge the two sorted sublists of A using arrays.
  - (E) What are different registers available in 8085 microprocessor ? Explain significance of each register.
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