

- N.B. : (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assumptions made should be **clearly** stated.
 (4) **All** computer programs and program segment only in C++.

1	a	<p>Write an object oriented program (in terms of classes and objects) to evaluate the expression for standard deviation as given below</p> $\sqrt{\frac{\sum_{i=1}^n (\bar{X} - X_i)^2}{N}}$	10
	b	<p>With the help of suitable program explain i) copy constructors ii) Friend functions</p>	10
2	<p>Expand the class member functions to satisfy the functionality described along side the function declaration</p> <pre> class Dmanip { private : int N,A[100]; public: Dmanip(); // Default constructor void Display(); void InputArray ()// input function to read array A void InputArray(int M, int X[100]);// overloaded input function void Sort() // sorting data stored in Array A void Search(int data); void Insert(int data); void Delete(int data); void Merge (Dmanip OB1, Dmanip OB2); //Merging A of //Object 1 and A of Object 2 resulting in A of object about //which the merge function get referenced }; </pre>		20

3		<p>Write Object Oriented programs to exemplify different types of inheritance namely</p> <ul style="list-style-type: none"> • public • protected • private • and multiple and hierarchical Inheritance 	20
4		<p>Exemplify Binary Operator overloading with the help of a class and its member functions for overloading the following binary operators (+, -, *, /)</p>	20
5		<p>Write a program to arrange the names of students in descending order their marks , input data consists of student details such as name, ID.no, subject marks of Mathematics, Physics, Chemistry and total of these three.(Note: Use hierarchical struct and array of struct)</p>	20
6	a	<p>Explain abstract classes , late binding, pure virtual functions and virtual classes</p>	10
	b	<p>With help of suitable programs and functions explain parameter passing by reference and parameter passing by value</p>	10
7		<p>Write notes on the following</p> <ol style="list-style-type: none"> Overriding functions Function overloading Function templates Static members of classes and objects 	20