4. (a) Explain different types of inheritance available in C++ with suitable examples. [4]

(b) Write a program using friend class to make the swapping of two data members that belongs to two different classes. [4]

5. (a) Write a function which accepts an index and returns the corresponding element from an array. If the index is out of bounds, the function should throw an exception. Handle this exception in main(). [4]

(b) Write a program to overload new and delete operator. [4]

6. (a) Write a program to create a class Student having Name, Roll_no, Age and Section as its data members. Create another class Mark that stores marks of three subjects. Derive a class Result from Student and Mark class, that stores total and average marks. Display all the details of a student by calling the necessary member functions. [4]

(b) Write a program using function template to sort the elements of an array of n integers, where n is the user input. [4]

7. (a) Write a program to copy the content of two files and merge them into a third file. [4]

(b) Generic function can be overloaded. Justify your answer with an example. [4]

8. Write short notes on any **two** [4×2]

(a) this pointer

(b) Pure virtual function

(c) Access specifies

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SPRING END SEMESTER EXAMINATION-2018

2nd Semester B.Tech

OBJECT ORIENTED PROGRAMMING

IT-1002

(For 2017 Admitted Batch)

Time: 3 Hours Full Marks: 50

Answer any SIX questions including question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. Answer all the questions [1×10]

(a) Assume that an integer and a pointer each takes 4 bytes. Predict the output of the following program with Justification .

```
#include<iostream>
using namespace std;
class Base{
public:
      virtual void show() { cout<<" In Base \n"; }
};
class Derived: public Base{
public:
   void show() { cout<<"In Derived \n"; }
};
int main(void){
   Base *bp = new Derived;
   bp->show();
   Base &br = *bp;
   br.show();
   cout<<sizeof(bp);
   return 0; }
```

(b) Predict the output of the following program with Justification .

```
#include<iostream>
using namespace std;
 class Test{
private:
  int x;
public:
  Test(int x = 0) { this->x = x; }
  void change(Test *t) { this = t; }
  void print() { cout << "x = " << x << endl; }
};
 int main(){
  Test obj(5);
  Test *ptr = new Test (10);
  obj.change(ptr);
  obj.print();
  return 0;
}
```

(c) Predict the output of the following program with Justification .

```
#include<iostream>
using namespace std;
class abc {
  public:
    static int x;
    int i;
   abc() { i = ++x; }
};
int abc::x;
int main() {
  abc m, n, p;
  cout<<m.x<<"\n"<<m.i<<endl;
  return 0;
}
```


(d) Justify, why a overloaded new operator function is static member by default.

(e) Differentiate between function overloading and function overriding.

(f) Write difference approaches to detect the end of file.

(g) Write the order of call of constructors for the following class declaration and justify it.
class D : public A, public virtual B, public C

(h) Distinguish between macro and template.

(i) What do you mean by function with default arguments? Explain with an example.

(j) Explain rethrowing of exception.

2. (a) Create a class Time having data members Hour, Minute and Second. Initialize the data members of the class through parameterized constructor. Using a member function add two Time objects and display the result. [4]

(b) Define copy constructor with a suitable example. Explain, why it takes the object as an argument by reference only. [4]

3. (a) Create an abstract class Shape which contains a pure virtual function calculate_area() and a protected attribute named as Area. Derive two classes from the above class named Circle and Rectangle having data members named as Radius and Sides respectively. Write the complete program to calculate the area of a circle and rectangle by using base class pointer and display the result. [4]

(b) Give the syntax of overloading insertion operator with a suitable example. Explain, why the insertion operator(<<) cannot be overloaded using member function. [4]