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TCS–303/TIT–303

B. Tech. (CS/IT) (Third Semester)
End Semester EXAMINATION, 2017
OOPS WITH C++

Time : Three Hours] [*Maximum Marks : 100*

Note : (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are **twenty.**

1. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

   (a) What is an object and its use ? Discuss the various concepts of object oriented programming with neat diagrams.

   (b) Explain the following with examples :

   (i) scope resolution operator

   (ii) this pointer

(c) Examine the following code snippets, on each line state whether valid or invalid and if invalid write the reason and correct statement wherever applicable :

(I) CODE 1

```
(i)   void main( ){
(ii)  void *gp; // gp is generic pointer
(iii) int *ip;
(iv)  ip = gp;
(v)   gp = ip;
(vi)  void *ptr1; // generic pointer
(vii) char *ptr2; // char pointer
(viii) ptr1 = ptr2;
(ix)  ptr2 = ptr1;
(x)   }
```

(II) CODE 2

```
(i)   void main( ){
(ii)  int x, y;
(iii) x = 10; y = 20;
(iv)  int * const iptr = &x; // constant
      pointer
(v)   iptr = &y;
(vi)  const float p = 2.5;
```



```
(vii) float const * fptr = &p; // pointer to
      constant float
(viii) fptr ++;
(ix)  (*fptr) ++; }
```

2. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) What are the constructors and destructors ? Write the constructors (default parameterized, copy) and a destructor for the class with the following data members :

```
class Shopping{
  char item[20];
  int qty;
  float price;
  ..............
};
```

In the main function, create objects in such a manner that each constructor is invoked at least once.

(b) Write a class to represent a bank account which stores acc number, type of account and balance amount. Write member functions for assigning initial values, depositing an amount, withdraw an amount after checking the balance and an output function. Write a main function for handling 5 customers.

(c) What are the implications of using the public and private access specifiers with different members of a class ? How can you access a private member function ? Explain with a program code.

3. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) (i) What is function overloading ? What type of polymorphism does function overloading depict ? 3

(ii) WAP that calculates the area for square, rectangle and triangle using function overloading. The corresponding formulae are S*S, L*B, sqroot(s(s – a) (s – b) s – c)), where s = (a + b + c)/2. 7

(b) (i) List out *three* features of a friend function. 3

(ii) Write a program to add two matrices using friend functions. The function should return an object of the class matrix. 7

(c) (i) What is Operator Overloading ? What are the operators that cannot be overloaded in C++ ? 3

(ii) Write a program to overload the '+' operator to add two vectors without the use of friend functions. 7

4. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) (i) What is Inheritance ? Explain any *two* types using block diagrams and syntax or skeletal code. 5

(ii) How are exceptions handled in C++ ? Can you have multiple catch statements associated with a single try statement ? Explain. 5

(b) (i) What are virtual functions ? Also define a pure virtual function and abstract class. 4

(ii) Modify and complete the following program by adding main( ) program so that it exhibits run-time polymorphism : 6

```
class Media{
    protected :
    int id;
    char name[20];
    public :
        void indata( );
        void display( );
};
class CD  : public Media{
protected :
```

```
        int time;
        float price;
    public :
        void indata( );
        void display( ){
        }
};
class Book :public Media{
protected :
        int page;
        float price;
        public :
            void indata( );
            void display( );
};
```

(c) (i) How can we solve ambiguity in case of multiple inheritance ? Illustrate with example. 5

(ii) Write a note on STL (Standard Template Library) in C++. 5

5. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Explain the use of Template in C++. Write a calculator class template program that will work with different data types. It should have three functions called add, subtract and multiply.

(b) (i) Explain the different modes of opening a file. 4

(ii) Write a program which opens two text files, read the contents of one file and then copy them into the second file. 6

(c) Create a class Student. Write a menu based program to perform the following operations on a binary file :

(i) Write a Student object into a file.

(ii) Read Student objects from a file.

(iii) Search a Student object in a file and return the position.