

- (b) Create a base class Shape which stores two member variables length and breadth and member function displayArea() and calculateArea (). Derive two classes rectangle and triangle from the base class Shape. Using runtime polymorphism calculates area of rectangle and right angled triangle.

5 + 7 = 12

**Group - E**

8. (a) Write a program to read three integers x, y and z and evaluate r given by  

$$r = z / (x - y)$$
 Use exception handling to throw an exception in case division by zero is attempted.
- (b) How do you write a C++ function that is data type independent? Use this technique to write a C++ function that can print the average of two numbers.
9. (a) What is the use of throw keyword in C++? Explain with example.
- (b) Define a namespace named Constants that contains declarations of some constants. Write a program in C++ that uses the constants defined in the namespace Constants.
- (c) Write a program in C++ that accepts a number and check whether it lies within the range 10-50. If it lies above or below the range then throw exceptions. If it lies within the range then call myterminate().

7 + (2 + 3) = 12

2 + 5 + 5 = 12

**B.TECH/ECE/6<sup>TH</sup> SEM/CSEN 3004/2017**  
**OBJECT ORIENTED PROGRAMMING USING C++**  
**(CSEN 3004)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) What is default visibility mode for members of classes in C++?  
 (a) Private (b) Public (c) Protected (d) Default.
- (ii) Given `int *arr_ptr= new int[5];` What is the correct syntax for releasing this allocated memory size of 5 integers  
 (a) `delete arr_ptr` (b) `delete arr_ptr []`  
 (c) `delete [] arr_ptr` (d) `delete arr_ptr[5]`
- (iii) Which operators cannot be overloaded?  
 (a) Unary Operator (b) Ternary Operator  
 (c) `::` operator (d) both (b) and (c).
- (iv) The failure of new operator to allocate requested memory space leads to which of the following exceptions being raised?  
 (a) Bad\_allocation (b) bad\_alloc (c) null (d) null\_alloc.
- (v) The return type of `ostream::operator<<(int)` is  
 (a) int (b) void  
 (c) ostream (d) none of the above.
- (vi) What is the general syntax for accessing the namespace variable?  
 (a) `namespaceid::operator` (b) `namespace, operator`  
 (c) `namespace#operator` (d) none of the mentioned.
- (vii) Which of the following relationship is known as inheritance relationship  
 (a) 'is-a' relationship (b) 'has-a' relationship  
 (c) association relationship (d) aggregation relationship

- (viii) If class A is friend of class B and if class B is friend of class C, which of the following is true?  
 (a) Class C is friend of class A      (b) Class A is friend of class C  
 (c) Class A is not a friend Class C      (d) Class B is friend of classes A & C.
- (ix) A template class  
 (a) is designed to be stored in different containers  
 (b) works with different data types  
 (c) generates objects which must be identical  
 (d) generates classes with different numbers of member functions.
- (x) RunTime Polymorphism is achieved by \_\_\_\_  
 (a) friend function      (b) virtual function  
 (c) operator overloading      (d) function overloading.

**Group - B**

2. (a) What is abstract Class?  
 (b) List out the advantages of new operator over malloc().  
 (c) What do you mean by actual parameter and formal parameter? Explain with example.  
 (d) What are the differences between call-by-address and call-by-reference? Explain with example.

**2 + 3 + 4 + 3 = 12**

3. (a) What is inline function? Explain with example how the function is made inline. What are the advantages and disadvantages of inline functions?  
 (b) What is encapsulation and data hiding? Explain your answer with suitable examples.

**6 + 6 = 12****Group - C**

4. (a) Illustrate, with example, a situation where friend function is a must to overload a binary operator.  
 (b) How do you overload pre-increment and post-increment ++ operator?  
 (c) What do you mean by static class members? Explain the characteristics of static data member with suitable example.

**4 + 4 + 4 = 12**

5. Explain any four of the followings with example and state the scopes of the respective objects:  
 (i) Local objects  
 (ii) Nameless object  
 (iii) Global objects  
 (iv) Static objects  
 (v) Live objects.

**(4 × 3) = 12****Group - D**

6. (a) What is operator overloading?  
 (b) Write a C++ program to add two complex numbers by overloading + operator. Also overload >> and << operators to read and display complex numbers.

**2 + 10 = 12**

7. (a) Write output of the following code. Explain your answer. Make correction, if required.

```
#include<iostream>
using namespace std;
class Base
{
    public:
        Base(int a){cout<<"Base constructor";}
};
class Child: public virtual Base
{
    public:
        Child(): Base(5){cout<<"Child constructor";}
};
class Grandchild: public Child
{
    public:
        Grandchild(){cout<<"Grandchild constructor";}
};
int main()
{
    Grandchild d;
    return (0);
}
```