KIIT Deemed to be University
Online End Semester Examination(Autumn Semester-2020)

Subject Name & Code: Object Oriented Programming (IT-2005)
Applicable to Courses: B.Tech

Full Marks=50 **Time:2 Hours**

SECTION-A(Answer All Questions. Each question carries 2 Marks)

Time:30 Minutes **(7×2=14 Marks)**

Question No	Question Type(MCQ/SAT)	Question	CO Mapping	Answer Key (For MCQ Questions only)
Q.No:1	**SAT**	How does a main() function in C++ differ from main() function in C ?	CO1,CO2	
	SAT	Why does C++ have type modifiers?	CO1,CO2	
	SAT	How do the following statements differ? (a) char *const p; (b) char const *p;	CO1,CO2	
	SAT	When will you make a function inline ? Also write why its is used ?	CO1,CO2	
Q.No:2	**SAT**	What is wrong with this code? T *p = new T[10]; delete p;	CO3	

	SAT	Find the size of the following class 'Base' with justification.
		
		class Base
		{
		int a;
		static int b;
		public:
		virtualvoid func1(void){};
		};
			CO3	

	SAT	In the following C++ code how many times the string "A's constructor called" will be printed?
		[Assume the necessary header files and namespaces included]
		
		class A{
		int a;
		public:
		A(){
		cout<<"A's constructor called";
		}
		};
		class B{
		static A a;
		public:
		B(){
		cout<<"B's constructor called";
		}
		static A get(){
		return a;
		}
		};
		A B::a;
		int main(int argc, char const *argv[])
		{
		B b;
		A a1 = b.get();
		A a2 = b.get();
		A a3 = b.get();
		}
			CO3,CO4	

	SAT	Find the output with justification.
		[Assume the necessary header files and namespaces included]
		
		class Sample
		{
		static int x;
		public:
		Sample() { x++; }
		static int getX() {return x;}
		};
		
		int Sample::x = 0;
		
		int main()
		{
		cout<<Sample::getX() <<"";
		Sample t[5];
		cout<<Sample::getX();
		}
			CO3,CO4	

Q.No:3	**SAT**	Find the errors in the following program and correct them.
		[Assume the necessary header files and namespaces included]
		class A
		{
		int i;
		};
		class AB: virtual A
		{
		int j;
		};
		class AC: A, ABAC
		{
		int k;
		};
		class ABAC: AB, AC
		{
		int l;
		};
		void main()
		{
		ABAC abac;
		cout<<"Size of ABAC:"<<sizeof(abac);
		}
			CO3	

	SAT	Find the errors in the following program and correct them.
		[Assume the necessary header files and namespaces included]
		
		class Base1
		{
		public:
		void show()
		{
		cout<<" In Base1 ";
		}
		};
		
		class Derived1: public Base1
		{
		public:
		int x;
		void show()
		{
		cout<<"In Derived 1";
		}
		Derived1()
		{
		x = 10;
		}
		};
		
		int main(void)
		{
		Base1 *bp, b;
			CO3	

		Derived1 d;
		bp = &d;
		bp->show();
		cout << bp->x;
		return 0;
		}		

	SAT	For the program given below, write statements to call display function from base and derived class in main.
		
		class base
		{
		int x;
		public:
		base(int a)
		{x=a;}
		void display()
		{
		cout<<x<<"\n";
		}
		};
		class derived : public base
		{
		int d;
		public:
		derived(int a, int b): base(a)
		{
		d=b;
		}
		void display()
		{
		cout<<d;
		}
		};
		int main()
		{
		derived D(10,20);
		return 0;
		}
			CO3	

	SAT	Write the order in which the constructors and destructors are called for the following derived classes given below (i) class D: virtual public A, public B, public virtual C{}; (ii) class P: M, public virtual N, public O{};	CO3	
Q.No:4	**SAT**	"A friend function cannot be used to overload the assignment operator =". Justify your answer.	CO4	
	SAT	In the case of operator overloading using friend functions how many maximum object arguments a unary operatorfunction and binary operator function can take?	CO4	
	MCQ	Which one denotes that set of operators may not be overloaded using friend operator function. (a) = , ( ) , [ ] , ->	CO4	Option (a)

		(b) <<, = = , [ ] , >> (c) ?, = , ( ) , ++ (d) None of these		
	SAT	"sizeof operator cannot be overloaded". Justify your answer.	CO4	
Q.No:5	**SAT**	State what will happen in the following situation: "An exception is thrown outside a try block".	CO5	
	SAT	State what will happen in the following situation: "A catch handler throws an exception".	CO5	
	SAT	State what will happen in the following situation: "A function throws an exception of type not specified in the specification list".	CO5	
	SAT	State what will happen in the following situation: "An exception is rethrown within a catch block".	CO5	
Q.No:6	**SAT**	Distinguish between overloaded functions and function templates.	CO5	
	SAT	What is the difference between opening a file with a constructor function and opening a file with open() function? Which one is the most preferable?	CO5	
	SAT	Distinguish the behaviour of cin and getline() for reading the strings from the keyboard.	CO5	
	SAT	Explain the nested class in C++ with an example.	CO5	
Q.No:7	**SAT**	State True/ False in following statements. (a) In using object-oriented languages like C++, we can define our own data types. (b) All functions in an abstract base class must be declared pure virtual.	CO6	
	SAT	State True/ False in following statements. (a) Returning a reference to an automatic variable in a called function is a logic error. (b) Class templates can have only class-type as parameters.	CO6	
	SAT	State True/ False in following statements. (a) Two catch handlers cannot have the same type. (b) A file pointer always contains the address of the file.	CO6	
	SAT	State True/ False in following statements. (a) A member function declared const cannot modify any of its class's member data. (b) An abstract class is never used as a base class.	CO6	

SECTION-B(Answer Any Three Questions. Each Question carries 12 Marks)

Time: 1 Hour and 30 Minutes **(3×12=36 Marks)**

Question No	Question	CO Mapping (Each question should be from the same CO(s))
Q.No:8	(a) Assume that a bank maintains two kind of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer_name, account_no and account_type. From this, derive the classes Current_Account and Saving_Account to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks: (i)Accept deposit from a customer and update the balance. (ii)Display the balance. (iii)Compute and deposit interest. (iv)Permit withdrawal and update the balance. (v)Check for the minimum balance and update the balance. Do not use any constructors. Use member functions to initialize the class members (b) Distinguish among inline function and macro with suitable	CO1,CO2,CO3

	example.Write a program to find square and cube of a number using inline function.	
	(a)Write a program in C++ for a dynamically given array with both positive and negative numbers. We need to find the two elements such that their sum is closest to zero. For Example the array below designed function should give -80 and 85. 1, 60, -10, 70, -80, 85. (b)Difference between function overloading and function with default arguments? Write a program using default argument to calculate the simple interest of certain amount where principal, rate of interest and time is given. Demonstrate the use of default argument use in the function.	
	(a)Create a **Date class** with three integer instance variables named day,month,year.It has a constructor with three parameters for initializing the instance variables,and it has one method named **daysSinceJan1().** It computes and returns the number of days since January 1 of the same year,including January 1 and the day in the Date object. For example,if day is a Date object with day=1,month=3,and year=2000,then the call**date.daysSinceJan1()** should return 61 since there are 61 days between the dates of January 1,2000,and March 1,2000,including January 1 and March 1. Don't forget to consider leap years. (b)Create a class distance which stores a distance in feet and inches. Input 2 distance values in objects, add them, store the resultant distance in an object and display it.	

	[Write the above program in two ways.] a) store the resultant distance in the calling object:C3.add(C1,C2) b) return the resultant object C3=C1.add(C2)	
Q.No:9	(a)Explain the characteristics of destructors. Write a program using friend function to swap the private data of two classes assuming each class to contain one private integer data member and associated member functions for inputting and displaying the data. (b) How member function is different from normal function ? Overload the function find_perimeter() with one, two and three float parameters. The function with one parameter is used to return the perimeter of the circle. The function with two parameters is used to return the perimeter of the rectangle. The function with three parameters is used to return the perimeter of the triangle. Write the necessary C++ program to test the functionality of above functions.	CO3,CO4
	(a)Create a class Data with data members: height and breadth of object given by the user and member functions get_data() to read the values and put_data() to display the values. Create another class Rectangle that inherits class Data and implement its methods areaRectangle() and perimeterRectangle() that computes the area and perimeter of a rectangle. Create another class Triangle that inherits class Data and implement its methods areaTriangle() and perimeterTriangle() that computes the area and perimeter of a triangle. (b)Write a program in C++ to create abstract class Figure having abstract method area(),	

	and data members length, breadth. Derive classes Triangle and Rectangle from Figure having member function area(). Find area of triangle and rectangle by function overriding concept? [Note: sub classes does not contain any data members].	
	(a)Justify the significance of protected access specifier in inheritance. Write a Program in C++ that will read a line of text containing more than three words and then replace all the blank spaces with an underscore(_). (b)Create a class complex which stores real and imaginary part of a complex number. Write a Program to add two complex numbers. Include all types of constructors and destructor. The destructor should display a message about the destructor being invoked. Create objects using different constructors and display them.	
Q.No:10	(a) Create a class which stores employee name,id and salary of an employee. Derive two classes from 'Employee' class: 'Regular' and 'Part-Time'. The 'Regular' class stores DA, HRA and basic salary. The 'Part-Time' class stores the number of hours and pay per hour. Calculate the salary of a regular employee and a par-time employee, using virtual function. (b) Write a Program to add two objects of distance class. Overload the greater than operator (>)to compare two objects and return the object with larger time	CO3,CO4

	value and display it. Overload the equals to operator (==) to compare and display whether two given objects contain same distance value.	
	(a)Write a program in C++ to create an exception. If the user entered character is a blank then throw the Blank_Character_Exception else convert the user entered uppercase character to a lowercase character. (b)Write a Program to count number of objects created from a class using concept of static data members and static member function.	
	A Base class Detail has been defined to store the details of a customer having Data members name,address and meter number.Use parameterized constructor to assign values to data members and void show() to display the details of the customer. Define a subclass PowerBill having Data members n to store the number of units used and Total_bill to store the amount to be paid by the customer. Use parameterized constructor to assign values to data members of both classes and to initialize amt = 0.0.void cal() calculates the monthly charge as per the unit range charge given below and void show() to display the detail of the customer and amount to be paid. To compute the monthly power bill of the customer follow the chart given below: **Number Of Units charge per unit** 1 – 50 2.5 rupees 51 – 100 5 rupees 101 – 200 6 rupees Above 200 7.5 rupees	

Q.No:11	(a)Write a Program in C++ to copy the contents of the file from one location to another location (Ex: C:\Demo\Test.txt to D:\Demo\Test.txt) and also check the content in both files are same or not. (b) Explain the advantages of using templates in a program. Write a program to justify the control flow and use of templates by mentioning overloaded function as well.	CO5,CO6
	(a)Differentiate among text file and binary file. Write a program in C++ to create an exception. Throw the exception when user entered mark is less than zero(<0) and greater than 100(>100). (b) Explain the different modes in file handling. Write the statements using seekg() to achieve the following: (i) To move the pointer by 15 positions backward from current position. (ii) To go to the beginning after an operation is over. (iii) To go backward by 20 bytes from the end. (iv) To go to byte number 50 in the file.	
	(a)Write a program in C++ to enter a string into file and read the same file to display all the words in the file with stating letter 'p'. (b)Write a Program to sort an integer array and a float array, using function template.	