SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING / SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2022-23

Programme: B.Tech (All Streams) / MBA Tech (All Streams) Year: I Semester: I

Subject: Programming for Problem Solving

Date: 11 January 2023

Marks: 100
Time: 11.00 am - 2.00 pm
Durations: 3 (Hrs)
No. of Pages: 03.

Final Examination (2022-23) / Re-Examination (2021-22)

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

1) Question No. _1___ is compulsory.
2) Out of remaining questions, attempt any __4___ questions.
3) **In all ___5_ questions to be attempted.**
4) All questions carry equal marks.
5) **Answer to each new question to be started on a fresh page.**
6) **Figures in brackets on the right hand side indicate full marks.**
7) **Assume Suitable data if necessary.**

Q1		Answer briefly:	[20]
CO: 1 SO: 1 BL: 5	a.	Write an algorithm and draw a flowchart to print first n natural numbers in reverse order (n, n-1, n-2,…., 3, 2, 1), where n is taken as input.	[5]
CO: 3 SO: 6 BL: 5	b.	Demonstrate the concept of call by address by giving appropriate example.	[5]
CO: 2 SO: 6 BL: 5	c.	Compare the "break" and "continue" construct through example.	[5]

CO: 4
SO: 6
BL: 5
	d.	Justify how abstraction is being achieved in the following code? Explain in brief.
		
		#include <iostream>
		using namespace std;
		class TestClass{
		private:
		int a,b;
		public:
		void setData(){
		a=10;
		b=20;
		}
			[5]

		void getData(){
		cout<<"b="<<b;
		}
		};
		int main(){
		TestClass t1;
		t1.setData();
		t1.getData();
		return 0;
		}	

Q2 CO: 3 SO: 1 BL: 3	a.	Write a program that accepts two numbers from the user and then passes these numbers to a function GCD_cal(), which returns the GCD of two numbers. Hint: GCD of two numbers 45 and 27 is 9.	[10]
Q2 CO: 2 SO: 1 BL: 4	b.	Consider a currency system in which there are notes of seven denominations, namely, Rs.1, Rs.2, Rs.5, Rs.10, Rs.50 and Rs.100. If a sum of Rs. N is entered through the keyboard, write a program to compute the smallest number of notes that will combine to give Rs. N.	[10]
Q3 CO: 3 SO: 1 BL: 4	a.	Illustrate with the help of a structure of type time that contains three members: hours, minutes and seconds that a worker is allowed to work second day if the number of hours is more than 7 hrs 30 minutes on day 1.	[10]
Q3 CO: 2 SO: 1 BL: 3	b.	Write a C++ program to check whether the entered number is Prime or Not.	[10]
Q4 CO: 3 SO: 1 BL: 6	a.	Explain any 2 string functions in brief with syntax and example. Write an interactive program to check whether a given string (user input) is palindrome or not.	[4+6]
Q4 CO: 3 SO: 1 BL: 5	b.	Write a program to generate Fibonacci series using a recursive function. Mathematically, Fibonacci series can be represented as: $F_n = F_{n-1} + F_{n-2}$	[10]
Q5 CO: 1 SO: 1 BL: 3 CO: 4 SO: 1 BL: 3	a.	i. Write a program to reverse a 4-digit number. The number is to be taken as input from the keyboard (Without using a loop). ii. Class "PageDetails" has data members as page size, page width, and page height. An object of PageDetails and assign values as "A3", 297.0, 420.0 to page size, page width and page height respectively and display the same. Write a C++ code for the same.	[5+5]

Q5 CO: 3 SO: 1 BL: 5	b.	List down different ways of initialization of Array. Develop a program for two 3x3 matrices as Mat 1 and Mat 2, multiply the given matrices and print the result in third Matrix as Mat 3. Take appropriate assumptions if required.	[2+8]
Q6 CO: 3 SO: 1 BL: 5	a.	Write a program to print following pattern. *	[10]
Q6 CO: 4 SO: 1 BL: 3	b.	A class "ObjectType" having data members height, width and radius with member function set_hwr() is used to assign the values to height, width and radius. Derive two child classes "sphere" and "Cylinder" and define the member function volume () in each class to calculate the volume. Write a program that can access the volume function for both the classes. Note: formula for sphere_volume=(4/3)*pi*r*r*r and cylinder_volume=pi*r*r*h	[10]
Q7 CO: 4 SO: 1 BL: 5	a.	Examine the concept of function overloading by creating a program that overloads the function "area()" to calculate the area of each of the shapes: triangle, rectangle and circle and also display their result.	[10]
Q7 CO: 2 SO: 1 BL: 3	b.	Write a program that accepts the age of 15 persons and evaluates how many of them fall under each category: a) Toddlers- age 0 to 5 b) school-going - age 6 to 17 c) Adults - age 18 & over [using while loop]	[10]