SVKM'S NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERING /
SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERING

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

AcademicYear: 2022-23

Subject: Programming for Problem Solving

Marks: 100

Time: 11.00 am - 2.00 pm

Date : 03 March 2023

Durations: 3 (Hrs)

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

No. of Pages: 4

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 check whether a number is positive or negative or zero, when the number is taken as input from the user.	[5]
CO: 3 SO: 1 BL: 3	b.	Write a program to display the following data of a student using structures: Name(string) Roll No.(int) Marks (int)	[5]
CO: 2 SO: 6 BL: 4	c.	Examine and explain the following code and give the output when user enters 'y' as input and 'a' as input. #include<iostream> using namespace std; int main() { char c; cout<<"Enter the choice"; cin>>c; switch(c) { case 'x':	[5]

		cout<<"Welcome"<<endl; case 'y': cout<<"Hello"<<endl; case 'z': cout<<"Hi"<<endl; break; case 'a': cout<<"How are you doing"<<endl; case 'b': cout<<"In this era"<<endl; default: cout<<"No where"<<endl; } }	

CO: 4
SO: 6
BL: 5
	d.	Justify how the following code is able to achieve encapsulation? Explain in brief.
		
		#include <iostream>
		using namespace std;
		class Test{
		int a;
		public:
		void setData(){
		a=100;
		}
		void getData(){
		cout<<"a="<<a;
		}
		};
		int main(){
		Test obj;
		obj.setData();
		obj.getData();
		return 0;
		}
			[5]

Q2 CO: 3 SO: 1 BL: 3	a.	WAP that accepts n numbers from the user in the form of an array and then pass this array to a function smallest(), which returns the smallest value in the array.	[10]
Q2 CO: 2 SO: 1 BL: 4	b.	If the lengths of three sides of a triangle are input through the keyboard, write a program to find the area of the triangle and also check whether the triangle is valid or not using the conditional operator. (? :) Hint: A triangle is valid if the sum of its two sides is greater than the third side.	[10]
Q3	a.	Illustrate the concept of pointers in an array with the help of a program to read 10 array elements using pointers and calculate their average.	[10]

CO: 3 SO: 1 BL: 4			
Q3 CO: 2 SO: 1 BL: 3	b.	Write a C++ program to display the below pattern. A B B C C C D D D D E E E E E	[10]
Q4 CO: 3 SO: 1 BL: 6	a.	Write an interactive program (using switch) to show the following string operations using string functions: a. Calculate the length of string b. Comparison of first 2 characters of string c. Concatenate 2 strings	[10]
Q4 CO: 3 SO: 1 BL: 5	b.	Write a program to find the reverse of a number entered by the user using recursion concept. Use while loop in your code.	[10]

Q5
CO: 1
SO: 1
BL: 5
	a.	i. Illustrate the output of the following code snippets:
		`#include<iostream>`
		`using namespace std;`
		
		`int main()`
		`{`
		
		`int x, y, p, q;`
		`x=5;`
		`y=10;`
		`x=y=15;`
		`p=x++ + --y;`
		`q=y++ + --x;`
		`cout<<x<<" "<<y<<" "<<p<<" "<<q;`
		`return 0;`
		`}`
			[5+5]

CO: 4 SO: 1 BL: 3		ii. Create a class Student with data members as first name, last name & email. Your program should generate an email automatically as firstname.lastname@nmims.edu Test the code with the following information of an Employee - The first name is "Rahul" - The last name is "Dravid" - The main() function accepts the above details (first and last name) of the user and prints the email in the required format.	

<table>
<tr><td>Q5
CO: 3
SO: 1
BL: 5</td><td>b.</td><td>Write the need of array in programming. Write a program to find the Transpose of matrix named as Mat1 and print the output in another matrix named as Mat2.</td><td>[2+8]</td></tr>
<tr><td>Q6
CO: 3
SO: 1
BL: 5</td><td>a.</td><td>Write a program in C++ to calculate and print the Electricity bill of a given customer. The customer id., name and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer. The charge is as follow:

<table><tr><td>Unit</td><td>Charge/ Unit</td></tr><tr><td>Up to 199</td><td>1.20</td></tr><tr><td>200 and above but less than 400</td><td>1.50</td></tr><tr><td>400 and above but less than 600</td><td>1.80</td></tr><tr><td>600 and above</td><td>2.00</td></tr></table>
If the bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be Rs. 100/-</td><td>[10]</td></tr>
<tr><td>Q6
CO: 4
SO: 1
BL: 3</td><td>b.</td><td>Class “Employee” has data members: Emp_id, Emp_name and Emp_salary and this class uses a parameterized constructor to accept the details of 2 employees and display the results using the display() function.</td><td>[10]</td></tr>
<tr><td>Q7
CO: 4
SO: 1
BL: 5</td><td>a.</td><td>Explain the concept of run time polymorphism and justify with the help of a program how it can be achieved using virtual functions.</td><td>[10]</td></tr>
<tr><td>Q7
CO: 2
SO: 1
BL: 3</td><td>b.</td><td>Write a C++ program to print Armstrong numbers between 100 to 999.</td><td>[10]</td></tr>
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