

Answer Four Questions Only

Time Allowed: 02 Hours

Q1

- (a) Explain the functions of ten arithmetic operators in C++.
What would be the output of the following C++ code?

```
#include <math.h>
int main()
{
    int p=2, q=4, r=3;
    cout<<"p="<<p<<endl;
    cout<<"q="<<q<<endl;
    cout<<"p="<<p--<<endl;
    cout<<"q="<<++q<<endl;
    cout<<"p="<<p<<endl;
    r%=q;
    cout<<"r="<<r<<endl;
    cout<<"p="<<p++<<endl;
    cout<<"p^q="<<pow(p,q)<<endl;
    return 0;
}
```

- (b) What are the relational operators in C++?
- (c) What are the logical operators in C++? Explain the functions of each operator.

Q2

(a) Using suitable examples, explain the following control structures in C++:

(i). *if.....else.....* constructs

(ii). *switch.....case* constructs

Write a program that receives name, sex and age of a person from the user, and outputs whether she/he is major or not according to the following rules:

A male is considered as *major* if he is over 21 years old.

A female is considered as *major* if she is over 18 years old.

(b) Describe, with aid of examples, the functionality of each of the following repetition constructs:

(i). *while* loop

(ii). *do-while* loop

(iii). *for* loop

Write a program to output the following pattern using one of the above loop constructs:

```

1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
6 6 6 6 6 6
5 5 5 5 5
4 4 4 4
3 3 3
2 2
1

```

Q3

(a). What do you mean by *type casting* in C++. Explain using examples.

(b). Briefly explain the *increment* and *decrement* operators in C++.

If $A = 5$ and $Z = (--A + A++)$ then what is the value of Z ?

(c). Write statements in C++ to do each of the following:

(i). to set **dsqr** to $\sqrt{b^2 - 4ac}$

(ii). to check whether **dsqr** is non-negative and if so set x to $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$

otherwise set x to -9999 .

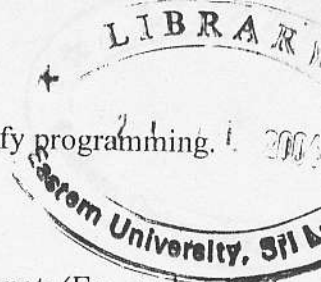
(iii). to return the number of days in a month.

(iv). to print the first 50 odd numbers.

(d). Write a program to read a set of non-zero numbers into an array of maximum size 200. Data is terminated by -1 and amount of number is unknown before hand.

(i). Find and print the largest.

(ii). Find and print the average.



Q4

(a) What are arrays? With suitable examples explain how they simplify programming.

What are strings? Are they standard or derived data type?

Write a program to check whether a given string is palindrome or not. (Eg, malayalam)

(b) What are the differences between parameter passing by values and passing by reference? Give examples.

What are recursive functions?

Write a program to calculate the combination of two integer numbers n and r using the following expression:

$${}^n C_r = \frac{n!}{r!(n-r)!}$$

Q5

Explain the *increment* and *decrement* operators in C++.

What are pointers? What are the advantages of using pointers in programming?

Explain the syntax for defining pointer variables.

What would be the output for the following code segment?

```
char* S="Computer Science";
char* Temp =S;
while(*Temp)
{
    (*Temp++)++;
}

cout<<S;
```

Q6

What does the term *polymorphism* mean?

Design and implement an object class *complex* with the following attributes:

Private data members:

two real numbers – to hold values for real and imaginary parts

Public member functions:

a suitable constructor.

overload operator + to return the addition with another complex number.

overload operator + to return the addition with a real number.

overload operator += to return the addition with another complex number and then assign the result to itself.

Friend function:

overload operator << to display a complex number in $x + yi$ format..