

EASTERN UNIVERSITY, SRI LANKA  
SECOND EXAMINATION IN SCIENCE 2001/2002

First Semester (April/May, 2002)  
(Repeat)

MT 206 Introduction to C++ and Object-Oriented  
Programming

Answer All Questions

Time : 2 Hours

Q1

- (a) Describe arithmetic, logical, and relational operators in C++ with examples.

What would be the output of the following C++ code:

```
#include<iostream.h>
#include<math.h>
#include<conio.h>

void main()
{
    clrscr();
    int p=5, q=-1*p, r=2; q+=20;
    cout<<endl<<p++<<endl<<++p;
    cout<<endl<<p--<<endl<<--p;
    cout<<endl<<q<<endl<<pow(q, r);
}
```

- (b) Describe, with the aid of examples, the following C++ control structures:

while,  
do-while, and  
for.

Write a C++ program to output the following pattern using each of the above loop constructs.

```
1 2 3 4 5 4 3 2 1
 2 3 4 5 4 3 2
   3 4 5 4 3
    4 5 4
     5
```

Q2

Explain the concept of a function in C++.

What is the purpose of function prototypes in C++?

What is meant by "passing arguments by reference"?

When do we need to use default arguments in a function?

What is meant by **overloading** of a function? When do we use this concept?

Write a function **Power()** to raise a number **m** to a power **n**. The function takes a **double** value for **m** and **int** value for **n**, and returns the result in **double**. Use a default value of 2 for **n** to make the function to calculate the square of the other argument when this argument is omitted. Write a **main** that gets the values of **m** and **n** from the user to test the function.



Q3

- (a) What do you mean by a pointer?  
How would you create a pointer variable?
- (b) Describe the functions of referencing operator (&) and dereferencing operator (\*).  
what would be the output of the following program?  
`#include<iostream.h>`

```
void main()  
{  
    int a=1, b=2*a, *p, *q;  
  
    p=&b;  
    *q=*p + 2;  
    cout<<endl<<"a="<<a;  
    cout<<endl<<"b="<<b;  
    cout<<endl<<"p="<<*p;  
    cout<<endl<<"q="<<*q;  
}
```

- (c) Write a single statement or a set of statements to accomplish each of the following:
  - (i) Define structure called `part` containing `int` variable `partNumber` and `char` array `partName` whose values may be as long as 20 characters.
  - (ii) Define `partPtr` to be a synonym for the type `part*`.
  - (iii) Declare variable `a` to be of type `part`, array `b[5]` to be of type `part`, and variable `ptr` to be of type pointer to `part`.
  - (iv) Read a part number and part name from the keyboard into individual members of variable `a`.
  - (v) Assign the member values of variable `a` to element 3 of array `b`.
  - (vi) Assign the address of array `b` to the pointer variable `ptr`.
  - (vii) Print the member values of element 3 of array `b` using the variable `ptr` and the structure pointer operator to refer to the members.

Q4

What is the primary role of the constructor?

Define a class `string` that could work as a user-defined string type. Include constructors:

(i) to create an uninitialized string

e.g. `string s;`

(ii) to initialize an object with a string constant at the time of creation

e.g. `string s("Good morning");`

and a copy constructor. Include a function that adds two strings to make a third string.

Write a complete program to test your class to see that it does the following tasks:

- (i) Creates uninitialized string objects.
- (ii) Creates objects with string constants.
- (iii) Concatenates two strings properly.
- (iv) Displays a desired string object.