

SECOND EXAMINATION IN SCIENCE (2000/2001)

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

Answer ALL Questions.

Time: 2 Hours

1. a) Describe the following operators in C++:

(i) Arithmetic.

(ii) Relational.

(iii) Logical.

Give examples.

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

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

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

```
int main()
```

```
{
```

```
int a=2,b=2,c=2,d=2;
```

```
cout<<a<<" ";
```

```
cout<<a--<<" ";
```

```
cout<<++b<<" ";
```

```
c %= b;
```

```
cout<<d<<" ";
```

```
cout<<c++<<" ";
```

```
a++;
```

```
cout<<a++<<" ";
```

```
cout<<b<<" ";
```

```
cout<<pow(a,b)<<" ";
```

```
return 0;
```

```
}
```

- b) Describe, with the aid of examples, the following C++ statements: while, do-while and for.

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

5

54

543

5432

54321

2. Explain the concept of an array data structure.

a) Write a program to store ten integers and to sort them in ascending order .

b) Write a program to add two (10 x 5) matrices.

3. a) What is meant by a pointer? How would you create a pointer variable?

b) Describe the functionalities of referencing operator(&) and dereferencing operator(*).

What would be the output of the following program?

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

```
int main()
```

```
{
```

```
    int a=1, b=3, c=6, *p, *q, *r;
```

```
    p = &a;
```

```
    *p = c;
```

```
    b=a;
```

```
    r=p;
```

```
    *r=10;
```

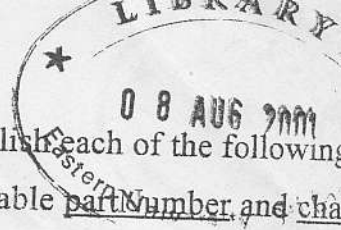
```
    q= &c;
```

```
    *q = *p;
```

```
    cout<<"a = "<<a<<" b = "<<b<<" c = "<<c<<endl;
```

```
    return 0;
```

```
}
```



- c) Write a single statement or a set of statements to accomplish each of the following
- (i) Define a structure called part containing int variable partNumber and char array partName whose values may be as long as 25 characters.
 - (ii) Define PartPtr to be a synonym for the type part*
 - (iii) Declare variable a to be of type part, array b[10] to be of type part, and variable ptr to be of type pointer to part.
 - (iv) Read a part number and a 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 structure pointer operator to refer to the members.

4. a) What are the differences between a class and its objects? What is the primary role of constructor?

Create a C++ class to represent a 'person' with attributes of name, year of birth and height in meters. Define methods to set these three attributes. Add a method which will return persons (approximate) age when given an year as a parameter. Add another method which will return their height in centimeters.

- b) Describe the term inheritance.

What advantage do we have when inheriting from a class whose attributes are 'protected' rather than 'private'? Illustrate with an example.