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DEPARTMENT OF MATHEMATICAL SCIENCES
B.SC. COMPUTER SCIENCES DEGREE PROGRAMME
2017/2018 RAIN SEMESTER EXAMINATIONS

COURSE CODE: CMP 202

COURSE TITLE: SCIENTIFIC PROGRAMMING II

Instruction: Answer any four questions

Course Code: 3units

Time: 2 hrs

QUESTION 1

a. Define the following terms using 1-3 sentences:

- (a) Inheritance
- (b) Polymorphism
- (c) Superclass
- (d) Subclass
- (e) Abstract Class

b. Compute the C++ expression $15\%6 + 9$.

c. Given a vector of integers $v = (1, 2, 3, 4)$, write C++ code for inserting these numbers into an Array

QUESTION 2

a. What is the output of the following code fragment?

```
int main()
{
    const int LENGTH = 10;
    const int WIDTH = 5;
    const char NEWLINE = '\n';
    int area;
    area = LENGTH * WIDTH;
    cout << area;
    cout << NEWLINE;
    return 0;
}
```

15

4

b4

C 3

A 3

double fork

b. The C++ expression $5/2+3$ evaluates to?

c. List and explain the basic data types supported by C++ programming language?

QUESTION 3

a. If X and Y are C++ variables of type double, write the C++ code for the mathematical

expression $\frac{X^2+2}{3Y-5}$

b. Explain C++ basic syntax

c. Explain the validity of these statements:

```
float y;  
int j;  
y = j;
```

QUESTION 4

a. Give the following sub programs, explain the **control statements** used, their differences and the outcome of each subprograms .

```
i.   int a = 10;  
     while( a < 20 )  
     {  
         cout << "value of a: " << a << endl;  
         a++;  
     }  
  
ii.  for( int a = 10; a < 20; a = a + 1 )  
     {  
         cout << "value of a: " << a << endl;  
     }  
  
iii. int a = 10;  
     do  
     {  
         cout << "value of a: " << a << endl;  
         a = a + 1;  
     } while( a < 20 );
```

b. List and explain the order of operator's precedence

c. How does the compiler know the execution order of the operators in the following program?

```
#include <iostream>  
using namespace std;  
main()  
{  
    int a = 20;  
    int b = 10;  
    int c = 15;  
    int d = 5;  
    int e;  
    e = (a + b) * c / d;  
    cout << "Value of (a + b) * c / d is : " << e << endl ;  
    e = ((a + b) * c) / d;  
    cout << "Value of ((a + b) * c) / d is : " << e << endl ;  
}
```



```

e = (a + b) * (c / d);
cout << "Value of (a + b) * (c / d) is :" << e << endl ;
e = a + (b * c) / d;
cout << "Value of a + (b * c) / d is :" << e << endl ;
return 0;

```

QUESTION 5

- List and explain the major groups of operators in C++ Language
- Why is C++ called middle level language?

QUESTION 6

- What is a variable? Write the basic form of a variable declaration in C++.
- Write a C++ **variable_list** that consist of the following valid declarations:
 - Enumeration of colors called colors and declare a variable C of type color
 - i, j and k are intergers
 - c and ch are characters
 - f and salary are real numbers
 - d is double
- Copy this program, circle the any **errors** and give the **result** of this program.

```

#include <iostream>
using namespace std;
// Variable declaration:
extern int a, b;
extern int c;
extern float f;
int main ()
{
    // Variable definition:
    int a, b;
    int c;
    float f;
    // actual initialization
    a = 10;
    b = 20;
    c = a + b;
    cout << c << endl ;
    f = 70.0/3.0;
    cout << f << endl ;
    return 0;
}

```