Unique Paper Code	: 32345102-OC
Name of Course	: Computer Science: Generic Elective for Honours
Name of the Paper	: Introduction to Programming
Semester	: I
Duration	: 3 Hours
Maximum Marks	: 75

Instructions for Candidates

1. All question carry equal marks.
2. Attempt any four questions.

Q1.

- Write a function `rev_arr()` which accepts an array as an argument and reverses the order of the elements of the array. For example, on execution of the function `rev_arr` the array `[1, 2, 3, 4, 5, 6, 7, 8]` would be transformed to `[8, 7, 6, 5, 4, 3, 2, 1]`.

- Write a function `sum_arr()` which accepts an array as argument and returns the sum of odd elements of the array.

Q2. What will be the output produced on execution of the following `C++` code? (Assuming all the header files required to run the code are already included.)

```
struct Play
{
   int score, bonus;
};

void calculate(Play &p, int n = 10)
{
            p.score++;
            p.bonus += n;
}

int main()
{
            Play pl = {10, 15};
            calculate(pl, 5);
            cout<<pl.score<< ":" <<pl.bonus<<endl;
            calculate(pl);
            cout<<pl.score<< ":" <<pl.bonus<<endl;
            calculate(pl, 15);
            cout<<pl.score<< ":" <<pl.bonus<<endl;
            return 0;
}
```

Write a function `sumDigits(int n)` that accepts an integer number `n` as an argument and returns the sum of its digits. For example, if the number is 563 then `sumDigits(563)` returns 14 (= 5+6+3).

Q3. Write logical expressions to represent each of the following conditions:

- `marks` scored are greater than 300 but less than 500.
- The `category` is `'A' or 'D'`.
- The `experience` is less than 4.

What will be the output produced on execution of the following `C++` code?

```
void swap(int x, int y)
{
     int temp;
     temp = x;
     x = y;
     y = temp;
}

int main(){
     int a = 100;
     int b = 200;
     cout << "Before swap, a = " <<  a << " b = " << b;
     cout << endl;
     swap(a, b);
     cout<<"After swap, a = " <<  a << " b = " << b;
     return 0;
}
```

What will be the output produced on execution of the following `C++` code?

```
#include<iostream>
    using namespace std;
    int main()
    {
     int array1[] = {1, 2, 3, 4, 5};
        int temp;
        int uIndex = 4;
        int result = 0;

        for (temp = 0; temp <uIndex; temp++)
        {
            result += array1[temp];
            temp++;
        }
        for (temp = 0; temp < uIndex; temp++)
        {
            result += array1[temp];
```

```
        }
        cout<<result;
        return 0;
    }
```

Q4. Consider the code below and answer the questions that follow:

```
const int nameSize = 20;
class A
{
     int rollno;
     char s_name[nameSize];

     protected:
          float marks;
     public:
          void enterInfo(int r, char n[nameSize],
          float marks);
          void view();
 };

class B
{
     int code;

     protected:
          char teacherName[nameSize];

     public:
          void getInfo(int code,
          char teacherName[nameSize]);
          void display();
};

class C: public A, private B
{
     char name[nameSize];
     char location[nameSize];

     public:
          void enterAll(char name[nameSize],
                        char loc[nameSize]);
          void displayAll();
};
```

a) Which type of inheritance is illustrated in the above code?

b) Write the names of all the data members, which are directly accessible from the member functions of class `C`.

c) Write the names of all the member functions, which are directly accessible by an object of class `C`.

d) What will be the order of execution of the constructors, when an object of class `C` is created?

e) Write the definition of `enterAll()` function of class `C` which accepts name and location as argument and invokes `getInfo()` and `enterInfo()` functions of the base classes.

Q5. Write a function `to_word(int num)` in `C++` that accepts a digit between 0 and 9 as argument and displays it in words. For example, `to_word(5)` displays `"five"`. If the digit passed is not between 0 and 9 then it should display `"Invalid Input"`.

Rewrite the following C++ code using a for-loop.

```
int x;
cin>>x;
while(x!=20){
  cout<<x<<"\t";
  cin>>x;
}
```

Identify which of the following are valid identifiers? Justify your answer.

- `_abc`
- `#qty`
- `Name`
- `first.name`

Q6. Write a program in `C++` to count the number of uppercase alphabets present in a text file `"book.txt"` and copies these uppercase alphabets from `"book.txt"` to `"book1.txt"`

Suggest appropriate data type for the following:

- The number of biscuits in a packet
- Name of a person
- Weight of a person
- Grade secured by a student