This question paper contains 3 printed pages.

Roll No._____

Unique Paper Code	**32341101_OC**
Name/Title of the paper	**Programming Fundamentals using C++**
Name of the Course	**B. Sc. (H) Computer Science**
Semester	**I**
Year of Admissions	**2017, 2018**
Duration of Examination	**3 Hours**
Maximum Marks	**75**

Instructions for Candidates

1. Attempt any FOUR out of SIX questions. All questions carry equal marks

2. State the assumptions taken, if any, in your answers. The data types of variables/data members/arrays and return types of the functions/member functions should be assumed suitably unless explicitly mentioned.

Q1 Write a program in C++ that creates a base class **`CentreTable.`** Use this class to store two **`double`** type values that is used to compute area of figures. The class also comprises the following members:

i. Default and parameterized constructors, height of all centretables is 1 metre.

ii. An inline member function **`printData()`** that prints the details of an object of the class.

iii. Derive classes called **`rectcentretable, tricentretable and circentretable`** from the base class **`Centretable,`** which have tops of the shape rectangle, triangle and circle respectively**.**

iv. Add member functions **`centretablearea()`**and **`displayarea()`**to the above classes to compute the area of the top of the centretable and display it.

Write a program that will accept dimensions interactively and display the area.

Q2. Write a C++ program **SALES** to calculate weekly and monthly average sales for a district. Use a two-dimensional **`double`** array to store six values representing sales for each week (Monday to Saturday). Write a function to calculate and print the following:

i. **`weeklyaverage()`** of sales.
ii. **`monthlyaverage()`**of sales.

Q3 Write a program that emulates the **`DOS COPY`** command which copies the contents of a text file (such as any .CPP file) to another file. Invoke the program with two command-line arguments - the source file and the destination file - like this:

```
C>ocopy srcfile.cpp destfile.cpp
```

Check the number of arguments and access permission to files.
Write a function that prompts the user to enter the **`first name, middle, last name, and employee number`** of type **`unsigned long.`** Using formatted I/O with the i**`nsertion (<<)`** operator copy the input to an **`ofstream`** object. Terminate the strings with a space or other whitespace character.
Close the **`ofstream`** object when user has completed the input
Open an **`ifstream`** object to read and display all the data in the file, and terminate the program.

Q4. Write a menu driven program in C++ which accepts four integer operands **a, b c** and **d** and operators **(+, -, *, /)** to implement operator overloading and displays the result:

```
 i.   Addition: a/b + c/d = (a*d + b*c) / (b*d)
ii.   Subtraction: a/b - c/d = (a*d - b*c) / (b*d)
iii.  Multiplication: a/b * c/d = (a*c) / (b*d)
iv.   Division: a/b / c/d = (a*d) / (b*c)
```

Q5 Implement the following functions in C++ :-

i) **printSumTerm()**: The function accepts value of a positive integer **n** as input and returns the **nth** term of the following series:

$$\left(1+\frac{1^0}{0!}\right)+\left(2+\frac{1^1}{1!}\right)+\left(3+\frac{1^2}{2!}\right)+\left(4+\frac{1^3}{3!}\right)+\left(5+\frac{1^4}{4!}\right)+\cdots\ldots\left(n+\frac{1^{(n-1)}}{(n-1)!}\right)$$

ii) **Odd_sentence_Case()**: The function that accepts a reference to a string and Capitalize the first letter of every word occurring in the odd position in the given string.

iii) **Count_even_Lower()**: The function accepts a string and returns the count of lowercase letters occurring at the even position in the given string.

Q6. Define a class **Airline** with the following data members and member functions

i. Data Members: - **Airline number, Boarding time, Airline cost**

ii. Define a parameterized constructor and a copy constructor to initialize its data members. The parameterized constructor function should accept the **Airline number, Boarding time** and **Airline cost** as input parameters.

iii. Define a member function **void print()** to display the objects of the class **Airline.**