EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

FIRST YEAR EXAMINATION IN SCIENCE-2013/2014

FIRST SEMESTER (SEPT. / OCT. , 2015)

CS 103 – INTRODUCTION TO PROGRAM DESIGN AND PROGRAMMING

(PROPER & REPEAT)

10 MAR 2016

Answer all questions   **Time allowed: 2 Hours**

Q1.Computer Programming is the process of creating computer programs. A program is a set of instructions that a computer what to do for the computer.

   a. Briefly describe the following terms:

      I.   Algorithm,

      II.   Flowchart,

      III. Pseudo code.

   b. Consider the following problem:

Department of Mathematics, Eastern University wants to send warning notice to first year students who are in danger of failing a subject. They need to calculate the average of three test marks and print out a student's Index number, average and whether or not the student is passing. (Pass: Average Marks > 50).

      I.   Draw a flowchart for the given problem.

      II.   Write pseudo code for the above problem.

      III. Write a C++ program to implement your algorithm.

   c. Define the terms **compiler** and **linker.**

Q2.A variable is a symbolic name for a memory location in which data can be stored and subsequently recalled.

   a. State the difference between **data types** and **keywords** with suitable example.

b. Briefly explain the three types of errors that can be present in a C++ program.

c. Find the output of the following C++ code fragment.

```cpp
int a=5, b=20;
cout<< ++b<<endl ;
cout<< a--<<endl;
cout<<b--<<endl;
cout<< a + b<<endl;
cout<< b % a<<endl;
```

d. Briefly explain the difference between **if** statement and **switch** statement with suitab example.

e. Write a C++ program to the following problem.

A company has decided to increase the salary of its employees. The system promp the user to enter the basic salary and compute the salary increment using t following criteria.

- The minimum salary increment is 2000/-:
- If the basic salary of the staff < 25000/-, 15% of the salary is increased:
- If the basic salary of the staff >= 25000/-, 20% of the salary is increased.

Your system has to give the total salary as the output.

Q3. The order of execution is called as "flow" or "flow control". The flow of control jum from one part of the program to another, depending on calculations performed in t program.

a. State the difference between **while** loop and **do while** loop.

b. Convert the following code fragment into **for** loop and **do-while** loop.

```cpp
int i=1;
while(i<5){
if(i%2==1)
cout<<"Hello World" << i;
i++;
}
```

c. Write a C++ program that uses **for** loops to perform the following steps:

  i. Prompt the user to input two integers: **Num1** and **Num2** (**Num1** must be less than **Num2**).

  ii. Output all even numbers between **Num1** and **Num2**.

  iii. Output the sum of all odd numbers between **Num1** and **Num2**.

d. What is the difference between the **break** and **continue** statements?

Q4.Function is subprogram or procedure that has a purpose to perform some tasks .

  a. Explain the concept of **Arrays**.

  b. Briefly explain the following parameter passing technique with suitable example:

  i.   Passed by value,

  ii.   Passed by reference.

  c. Write a void function named **divide()** to read 2 numbers from the user and then print the answer of division and reminder(first number divided by second number).

  d. Briefly explain the concept of **struct** and **pointer**.

  e. Write a declaration for each of the following:

  i.   Define a structure with following fields:

          Employee Name

          Employee Number

          Age

          Department Number

          Salary

  ii.   A pointer variable **pi** pointing to a variable.

  iii. Add two numbers using pointers.