ST. XAVIER'S COLLEGE
KOLKATA
(AUTONOMOUS)

1st SEMESTER EXAMINATION
NOVEMBER - DECEMBER 2014
M.Sc. Computer Science

CMSM4157

LAB 2; OBJECT ORIENTED PROGRAMMING LAB

Wednesday & Thursday,
10th December & 11th December 2014
10:00 am onwards
3 hours
Full Marks : **80**

READ THESE INSTRUCTIONS FIRST:

- Of the questions attempted, the answers to only the first required number of questions (as stipulated in the question paper) will be evaluated. **So please do not attempt extra questions**.
- Use fountain pen or ball-point pen of **blue** or **black ink**.
- Answer in your own words as far as practicable.
- Do not write anything on the Question paper other than your Roll No.

At the end of the examination, fasten all your work securely together.

The marks are given in **brackets [ ]** at the end of each question or part question.

SET: 2
PROGRAM CODE: 45; SAMPLE OUTPUT(S): 15; VIVA: 20

1. (a) Write a Java program to print all the prime factors of a positive integer that is taken as an input.
   (b) Write a Java program to arrange an array of integers in the descending order. The elements in the array are to be taken as inputs.

2. (a) Write a program in Java to find out the sum of the following series:
   $1 + 2/2! + 3/3! + \ldots$ up to n^{th} term. The result should be correct up to 5 decimal places. 'n' should be taken as an input.
   (b) Write a class to print the first 'n' prime numbers where 'n' is to be taken as a command line argument.

3. Create a base class called 'TwoDFigure' that holds two dimensions of a figure. It also declares an abstract function called calculateArea ( ) that, when overridden by derived classes, returns the area of the type of 2D figure defined by the derived class. Create three derived classes, 'Rectangle', 'Square' and 'Triangle' that inherit '2Dfigure', Write a main () function to create objects of these classes and display the areas of all the figures. Use base class object reference to call the function.

4. Write a multi threading program in Java to demonstrate thread blocking and thread synchronization.

5. Write a program in Java which has an interface called 'Stack' having two methods push ( ) and pop ( ). Design a class called 'FixedStack' that will implement 'Stack' Interface and will give the details of the methods push ( ) and pop ( ) for general stack operations.

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SET: 2

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   (b) Write a Java program to arrange an array of integers in the descending order. The elements in the array are to be taken as inputs.

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SET: 2

2. (a) Write a program in Java to find out the sum of the following series:
   $1 + 2/2! + 3/3! + \ldots$ up to n^{th} term. The result should be correct up to 5 decimal places. 'n' should be taken as an input.
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SET: 2

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SET: 1

4. Write a multi threading program in Java to demonstrate thread blocking and thread synchronization.

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SET: 1

5. Write a program in Java which has an interface called 'Stack' having two methods push ( ) and pop ( ). Design a class called 'FixedStack' that will implement 'Stack' Interface and will give the details of the methods push ( ) and pop ( ) for general stack operations.