



**EASTERN UNIVERSITY, SRI LANKA**  
**DEPARTMENT OF MATHEMATICS**  
**EXTERNAL DEGREE EXAMINATION IN SCIENCE**  
**FIRST YEAR EXAMINATION IN SCIENCE (2008/2009)**  
**FIRST SEMESTER (Dec/Jan, 2012/2013)**

**EXTMT 206 – INTRODUCTION TO OBJECT ORIENTED PROGRAMMING (JAVA)**

Answer all questions

Time: Two hours

Q1)

- a) State clearly what is meant by Object Oriented Programming.
- b) List the principle features of the Object Oriented methodology.
- c) Describe the access specifiers in Java programming language.
- d) List down five keywords that are used in java programming language.
- e) Briefly describe the difference between method Overloading and Overriding in Java.

Q2)

- a) Define the following terms with regard to object oriented methodology:

- (i) Class
- (ii) Object
- (iii) Method
- (iv) Constructor

- b) Define a class batsman in Java with the following specifications:

**Private members:**

bcode                      4 digits code number  
bname                      20 characters  
innings, notout, runs    integer type  
batavg                      it is calculated according to the formula  
                                   $batavg = runs / (innings - notout)$   
calcavg()                    Function to compute batavg

**Public members:**

readdata()                 function to accept value for bcode, name, innings,  
                                  notout and invoke the function calcavg().  
displaydata()              Function to display the data members on the screen.

Q3) Write Java programming for the following questions.

- a) To print a lower triangular shape made with asterisks (\*) in a given height  $n$  and print the number of asterisks it needs. An example is shown in below. This corresponds to  $n=5$ , and the number of asterisks it needs is 15.

```
*
**
***
****
*****
```

- b) To find the minimum number in an array  $int A$  of  $n$  integers.  
c) To compute the *circumference* and *area* of a circle whose radius is  $r$ .  
d) To multiply two matrices  $A$  of order  $p \times q$  and  $B$  of order  $q \times r$  storing the result in another matrix  $C$  of order  $p \times r$ .  
e) To search for given integer *key* in an array  $A$  of integers, and return the corresponding index if the *key* exists in the array, otherwise return -1.

Q4).

- a) Describe briefly what is meant by *inheritance* in Object Oriented paradigm.  
b) Distinguish between “using” a class “extending” a class with the aid of suitable examples.  
c) Give a suitable example of a: (i) class member, (ii) instance member in a class *Student* that is defined to represent a group of undergraduate students.  
d) Define a class *Publication* which has attributes title and price, functions: `getData()` and `print()`.

Derive the following sub-classes from the *Publication* class:

a sub-class *Book* which has an attribute: accession number and functions: `getData()` and `print()`.

a sub-class *Magazine* which has an attribute: volume number and functions: `getData()` and `print()`.

With these two sub-classes as bases, derive another sub-class *Journal* which has attribute: Journal Name and functions: `getData()` and `print()`.

In `main()` create an object for the class *Journal*. Invoke the `getData()` and `print()` functions for this object.