

M.S. IN BIOTECHNOLOGY (Bioinformatics)
(MSBOBI)

Term-End Examination

December, 2014

00134

**MBOI-019 : INTRODUCTION TO OBJECT ORIENTED
PROGRAMMING WITH JAVA**

Time : 3 hours

Maximum Marks : 100

Note :

- (i) *Section I is compulsory.*
- (ii) *In Section II, answer any five questions.*
- (iii) *Assume suitable data wherever required.*
- (iv) *Draw suitable sketches wherever required.*
- (v) *Italicized figures to the right indicate maximum marks.*

SECTION I

1. Explain the Abstraction and Inheritance concepts of OOP with suitable examples. 10
2. Write about any *five* of the following headers used in C++ core programming : 5×2=10
 - (a) iostream
 - (b) string

- (c) `fstream`
- (d) `algorithm`
- (e) `numeric`
- (f) `sstream`
- (g) `vector`

3. What are the basic differences between C++ and Java, both being object oriented programming languages ? List the advantages and disadvantages of both.

6+4

SECTION II

4. Given a DNA string, write a JAVA class having functions to (a) get cDNA, (b) calculate GC content, (c) get codons and (d) find the position of "AUG" in the sequence. 14
5. Write a C++ program containing two classes with 'get' methods representing LOCUS and DEFINITION. Use the two classes in a main program to extract locus name and description. 14

File "locdef.txt" contains the following content :

```
LOCUS AF068625 200 bp mRNA linear ROD
06-DEC-1999
DEFINITION Mus musculus DNA
cytosine-5 methyltransferase 3A
(Dnmt3a)mRNA, complete cds.
```

HINT : Code snippet in the main() function :

```
Locus x1("locdef.txt");
Definition x2("locdef.txt");
cout<<x1.getLocusName()<<endl;
cout<<x2.getDefinition()<<endl;
```

6. Explain function overloading and constructor overloading with examples. How is overloading different from overriding? 10+4
7. (a) What is exception handling? What is the purpose of *Exception* class in JAVA?

- (b) Write a customized exception class named "NotFastaFormatFile" and demonstrate through a Java code snippet. 7+7
8. (a) Describe the keywords in Java : 4x1
- (i) extends
 - (ii) try
 - (iii) new
 - (iv) implements
- (b) Write an essay on procedural programming versus object oriented programming. 10
9. Below is a code for swapping two "MyDate" objects stored in an array. List down the errors in the code given below. (Note# Mention the line numbers with syntax errors). 14

File MyData.java

```
1 class MyDate
2 {
3     private int dd,mm,yy;
4     public void MyDate (int d,int m,int y)
5     {
6         dd = d;
7         mm = m;
8         yy = y;
9     }
10    public string toString()
11    {
12        return " Date="+dd+" /" +mm+"/" +yy;
```

```
13     }
14
15     public static void swap(MyData ar[])
16     {
17         MyDate temp;
18         temp = arr[0];
19         arr[0] = arr[1]
20         arr[1] = temp;
21     }
22 }
23
24 class ArraySwap
25 {
26     public void main (string args[])
27     {
28         MyDate d1 = new MyDate(1,2,3);
29         MyDate d2 = new MyDate(2,2,2);
30         MyDate arr[];
31         arr = new MyDate[2];
32         arr[0] = d1;
33         arr[1] = d2;
34         System.out.println(arr[0]);
35         System.out.println(arr[1]);
36         MyDate.Swap(arr);
37         System.out.println(arr(0));
38         System.out.println(arr(1));
39     }
40 }
```