2054
M.Sc. (Bio-Informatics) Second Semester
MBIN-8009: Programming Languages in Bioinformatics - I

Time allowed: 3 Hours   Max. Marks: 60

NOTE: Attempt _five_ questions in all, including Question No. 1 (Unit-I) which is compulsory
and selecting atleast one question each from Unit II-IV.
x-x-x

UNIT-I

1.   Attempt the following:
a)   What are some key features of Java?
b)   How is memory management handled in Java?
c)   Explain the purpose of the **super** keyword used in the constructors of Java classes.
d)   Explain the concept of method overriding in Java and how it differs from method overloading.
e)   What is an interface in Java?
f)   How do you import classes from another package in Java?
g)   Can custom exceptions be created in Java? If yes, how?
h)   What are some security considerations when using native methods in Java?   12

UNIT-II

2.   a)   What is a JDK, JRE, and JVM in the context of Java? How does Java achieve platform independence?
b)   Explain the difference between an abstract class and an interface in Java. What is a constructor in Java, and what is its purpose?   12

3.   a)   Can multiple command line arguments be passed to a Java program? If so, how? How can command line arguments be accessed inside a Java program?
b)   Write a Java program demonstrating inheritance between a parent class 'Vehicle' and two child classes 'Car' and 'Bike'. The 'Vehicle' class should have attributes 'make' and 'model', and a method 'drive()' that prints "Vehicle is being driven." Both 'Car' and 'Bike' should have an additional attribute specific to them ('colour' for 'Car' and 'ishighendBike' for 'Bike'), and they should override the 'drive()' method to print out specific driving behaviors for each   12 vehicle type.

UNIT-III

4.   How an interface is declared in Java? Can a class implement multiple interfaces? If yes, how? Also provide an example of using default methods in interfaces?   12

5.   How exceptions are handled in Java? Explain how the try-with-resources statement works. Write a program that demonstrates the use of the finally block to execute cleanup code regardless of whether an exception occurs or not.

12

UNIT-IV

6.   a)   What is a race condition, and how does synchronization help prevent it?
b)   Explain the concept of multithreading in Java and provide an example program demonstrating its use.   12

7.   a)   Write an applet program that demonstrates animation by moving a shape across the applet window.
b)   What happens when a variable is marked as volatile in Java? How does the volatile modifier affect performance in multithreaded Java applications?   12
X-X-X