

2055

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 (Section-A) which is compulsory and selecting atleast two questions each from Section B-C.

x-x-x

**SECTION-A**

- Q1. a) Differentiate between Java and other Object Oriented Programming languages.  
b) What is the purpose of the main method in a Java application?  
c) What are the primitive data types?  
d) Explain the difference between int and Integer.  
e) What is method overloading?  
f) What is the difference between public, private, and protected access modifiers?  
g) How do you create an object in Java? Give an example.  
h) What is inheritance? How is it implemented?

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**SECTION-B**

- Q2. a) Explain the concept of encapsulation in classes. How is it implemented in Java?  
b) How Java handles memory allocation for class variables versus instance variables and how this affects object instantiation performance?  
c) What happens if you define a class without any constructor? Can it still be instantiated? Why?
- Q3. a) Explain how this keyword is used. Provide an example where it resolves ambiguity.  
b) Differentiate between a static method and a non-static method? When would you use one over the other?  
c) What is an inner class in Java? How does it differ from a regular class?
- Q4. a) What is the role of the super keyword in inheritance? Give an example of calling a superclass constructor.  
b) Write a Java program to demonstrate single inheritance with the following:  
i) Create a superclass named Person with instance variables as *name* and *age* and a method *display()* that prints the *name* and *age*  
o Create a subclass named Student that inherits from Person and adds an instance variable *studId* and a method *displayStudentDetails()* that prints all three fields, i.e., *name*, *age* and *studId*  
ii) In *main()* method:  
o Create an object of Student, set values for all fields and call both methods to display the data

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**SECTION-C**

- Q5. a) What is the purpose of using packages and how do they help with code organization and access control? 12  
b) How does Java achieve multiple inheritance using interfaces? Write a program to demonstrate the same.
- Q6. a) Explain how the try-catch-finally block works. What happens if an exception is not caught? Is it possible to have multiple catch blocks for a single try block? How does Java determine which one to execute? 12  
b) What is the difference between start() and run() methods in a Java thread? How does Java ensure thread safety when multiple threads access shared resources?
- Q7. Write a Java Applet program that takes the user's name and age as input and displays a Hello message using AWT components like the following: 12  
i) Use TextField for input.  
ii) Use a Button to trigger the action.  
iii) Display the output using Label.

x-x-x