**Department** : **Computer Science and Engineering**

**Year & Semester** : **II/III**

**Sub Code & Sub Name** : **23CSE232 OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

## Unit-I

| S.No | Part-A Questions |
|---|---|
| 1. | What is Object-Oriented Programming (OOP)? |
| 2. | Define class and object in Java. |
| 3. | What is encapsulation in Java? |
| 4. | Write the syntax of a simple Java program. |
| 5. | What are command-line arguments in Java? |
| 6. | List any two escape sequences used in Java. |
| 7. | What is the purpose of comments in a Java program? |
| 8. | Differentiate between local and instance variables. |
| 9. | What is type casting in Java? |
| 10. | What is the difference between == and = operators in Java? |
| 11. | What is the role of the final keyword in Java? |
| 12. | Define operator precedence. |
| 13. | Write the syntax of a switch statement in Java. |
| 14. | What is the use of the break statement? |
| 15. | What is the difference between while and do-while loops? |

| S.No | Part-B Questions |
|---|---|
| 1. | Explain the basic concepts and principles of Object-Oriented Programming with examples. |
| 2. | Describe the structure of a Java program and explain each part in detail. |
| 3. | Explain different types of tokens in Java with examples. |
| 4. | Write a Java program to demonstrate the use of command-line arguments and explain its working. |
| 5. | Discuss the various data types available in Java with suitable examples. |
| 6. | Explain type casting in Java. Differentiate between implicit and explicit type casting with examples. |
| 7. | Explain the concept of variable scope in Java with examples. |
| 8. | Describe different types of operators in Java and explain their precedence and associativity. |
| 9. | Write short notes on:<br>a) Symbolic constants<br>b) Static variables and methods<br>c) final attribute |

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| 10. | Write a Java program to demonstrate the use of arithmetic, relational, and logical operators. |
| 11. | Explain control statements in Java with syntax and examples. |
| 12. | Write a Java program to find the largest of three numbers using nested if statements. |
| 13. | Explain the working of the switch statement in Java with a program. |
| 14. | Write a Java program using for loop to print the multiplication table of a given number. |
| 15. | Explain the working of break and continue statements with suitable Java programs. |

## Unit-II

| S.No | Part-A Questions |
|---|---|
| 1. | What is a class in Java? |
| 2. | Define an object in Java. |
| 3. | What are class modifiers? Give examples. |
| 4. | How do you declare an object of a class in Java? |
| 5. | What is a constructor? |
| 6. | What is meant by constructor overloading? |
| 7. | What is the purpose of the this keyword? |
| 8. | What is a final class? |
| 9. | Differentiate between passing arguments by value and by reference. |
| 10. | What is a nested class? |
| 11. | What is method overloading? |
| 12. | What is method overriding? |
| 13. | What is the difference between static and instance methods? |
| 14. | What is the purpose of access specifiers in Java? |
| 15. | Define a recursive method with an example. |

| S.No | Part-B Questions |
|---|---|
| 1. | Explain the concept of classes and objects in Java with suitable examples. |
| 2. | Discuss the syntax and modifiers used in class declarations with examples. |
| 3. | Explain various types of class members in Java (variables, methods, constructors, etc.) with examples. |
| 4. | Write a Java program to demonstrate the creation and usage of class objects. |
| 5. | Explain how one object can be assigned to another. What are the implications of this operation? |
| 6. | Describe the access control levels for class members in Java with examples (public, private, protected, default). |
| 7. | Explain constructors in Java. Write a program to demonstrate both default and parameterized constructors. |
| 8. | Explain constructor overloading with an example program. |
| 9. | Write short notes on:<br>a) Nested classes<br>b) Final class and methods<br>c) this keyword |
| 10. | Discuss the difference between passing arguments by value and by reference with a Java program. |
| 11. | Explain the concept of method overloading with an example program. |
| 12. | Describe method overriding and show how it supports runtime polymorphism in Java. |
| 13. | Explain recursive methods with an example (e.g., factorial or Fibonacci series). |

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| 14. | Write a note on static attributes and static methods. Explain their uses with an example. |
| 15. | Explain nesting of methods in Java with suitable examples and discuss its advantages. |

## Unit-III

| S.No | Part-A Questions |
|---|---|
| 1. | What is an array in Java? |
| 2. | How are arrays declared and initialized in Java? |
| 3. | What is the default value of array elements in Java? |
| 4. | How are arrays stored in computer memory? |
| 5. | What is the difference between one-dimensional and two-dimensional arrays? |
| 6. | What is the purpose of the Arrays class in Java? |
| 7. | What is meant by dynamic array size in Java? |
| 8. | What is sorting of arrays? Name any two sorting methods in Java. |
| 9. | What is inheritance? |
| 10. | Define multilevel inheritance with an example. |
| 11. | What is the use of the super keyword in inheritance? |
| 12. | What is the difference between method overloading and method overriding? |
| 13. | What is an abstract class? |
| 14. | What is an interface in Java? |
| 15. | What is a functional interface? Give an example. |

| S.No | Part-B Questions |
|---|---|
| 1. | Explain the concept of arrays in Java. How are arrays declared, initialized, and accessed? Give suitable examples. |
| 2. | Describe how arrays are stored in memory and explain how elements are accessed using indices. |
| 3. | Write a Java program to sort and search elements in an array using the Arrays class. |
| 4. | Explain how one array can be assigned to another and how array size can be changed dynamically. |
| 5. | Discuss two-dimensional and three-dimensional arrays in Java with suitable programs. |
| 6. | Write a Java program to demonstrate an array of varying lengths (Jagged Arrays). |
| 7. | Explain the process and types of inheritance in Java with examples. |
| 8. | Discuss the role of the universal superclass Object in Java. List and explain some of its important methods. |
| 9. | Explain how the final keyword is used to inhibit inheritance. |
| 10. | Explain the use of the super keyword in inheritance with an example program. |
| 11. | Write short notes on:<br>a) Constructor and inheritance<br>b) Method overriding<br>c) Dynamic method dispatch |
| 12. | Explain abstract classes in Java. How are they different from interfaces? Give examples. |
| 13. | Discuss the concept of interfaces in Java. Explain how an interface is declared and implemented. |
| 14. | Explain multiple inheritance using interfaces with a Java example. |

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| 15. | Write notes on:<br>a) Default methods in interfaces<br>b) Static methods in interfaces<br>c) Functional interfaces<br>d) Annotations in interfaces |

## Unit-IV

| S.No | Part-A Questions |
|---|---|
| 1. | What is a package in Java? |
| 2. | How do you define a package in Java? |
| 3. | What is the purpose of the import statement? |
| 4. | What is the difference between Path and ClassPath? |
| 5. | List any two classes from the java.lang package. |
| 6. | What is auto-boxing in Java? |
| 7. | What is the difference between auto-boxing and auto-unboxing? |
| 8. | Name any two classes in the java.util package. |
| 9. | What is the use of the Random class in Java? |
| 10. | What is an exception in Java? |
| 11. | What is the difference between checked and unchecked exceptions? |
| 12. | What is the purpose of the try-catch block? |
| 13. | What is the role of the finally block in exception handling? |
| 14. | What is a byte stream in Java I/O? |
| 15. | What is the use of the Scanner class in Java? |

| S.No | Part-B Questions |
|---|---|
| 1. | Explain the concept of packages in Java. How are packages defined and imported into programs? |
| 2. | Describe the role of the **Path** and **ClassPath** in Java with examples. |
| 3. | Explain access control in packages with examples. |
| 4. | Discuss important classes in the **java.lang** package, such as Object, Math, and wrapper classes. |
| 5. | Explain auto-boxing and auto-unboxing in Java with examples. |
| 6. | Describe the classes and interfaces in the java.util package, including Formatter and Random. |
| 7. | Explain the java.time package and discuss the Instant and TemporalAdjuster classes with examples. |
| 8. | Explain exception handling in Java. Discuss the try, catch, and finally blocks with examples. |
| 9. | Explain the hierarchy of standard exception classes in Java with a neat diagram. |
| 10. | Write short notes on:<br>a) throws and throw keywords<br>b) Checked exceptions<br>c) Unchecked exceptions |
| 11. | Write a Java program to handle multiple catch clauses and demonstrate exception propagation. |
| 12. | Explain the concept of byte streams and character streams in Java with examples. |
| 13. | Discuss the standard I/O streams in Java. How do System.in, System.out, and System.err work? |

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| 14. | Explain file handling in Java. Write a program to read and write text files using file streams. |
| 15. | Write short notes on:<br>a) Scanner class<br>b) Formatter class<br>c) File I/O operations<br>d) Exception handling during file operations |

## Unit-V

| S.No | Part-A Questions |
|---|---|
| 1. | What is a String in Java? |
| 2. | Differentiate between String, StringBuffer, and StringBuilder. |
| 3. | What is the purpose of the CharSequence interface? |
| 4. | How do you compare two strings in Java? |
| 5. | Mention any two methods used for extracting characters from a string. |
| 6. | What is multithreading in Java? |
| 7. | What is the difference between a process and a thread? |
| 8. | What are the different states of a thread? |
| 9. | What is thread synchronization? |
| 10. | What is a deadlock in multithreading? |
| 11. | What is JDBC? |
| 12. | What are the main components of the JDBC architecture? |
| 13. | What is the role of the ResultSet interface in JDBC? |
| 14. | What is JavaFX used for? |
| 15. | What is the purpose of JavaFX Scene Builder? |

| S.No | Part-B Questions |
|---|---|
| 1. | Explain the concept of **String handling** in Java. Discuss various methods of the String class with examples. |
| 2. | Explain the CharSequence interface and its implementing classes in Java. |
| 3. | Describe how to **extract, compare, modify, and search** characters in a string with example programs. |
| 4. | Discuss the **StringBuffer class** and demonstrate how it supports mutable strings. |
| 5. | Explain the concept of **multithreading** in Java. Why is it needed for multi-core processors? |
| 6. | Describe the **life cycle of a thread** with a neat diagram. |
| 7. | Explain **thread creation** using both the Thread class and Runnable interface with example programs. |
| 8. | Discuss **thread synchronization**, **deadlock**, and **race conditions** with examples. |
| 9. | Write short notes on:<br>a) Thread Priority<br>b) Thread States<br>c) Inter-thread Communication<br>d) Suspending and Resuming Threads |
| 10. | Explain the **JDBC architecture** and describe its major components. |
| 11. | Explain the steps to **set up a JDBC environment** and connect Java with a MySQL database. |
| 12. | Write a Java program using JDBC to insert, update, and display records from a database table. |
| 13. | Describe the role of the **ResultSet** interface and its methods in JDBC. |

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| 14. | Explain the **structure of a JavaFX application window** and how to handle GUI events. |
| 15. | Write short notes on:<br>a) JavaFX Scene Graph<br>b) Event Handling<br>c) Layout of Nodes<br>d) Handling Mouse Events in JavaFX |