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| **PROGRAM** | **MASTER OF COMPUTER APPLICATIONS (MCA)** |
| **SEMESTER** | **4** |
| **COURSE CODE & NAME** | **DCA7102** |
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**Set-I**

**Q1. Explain any five features of Java. 10**

**Ans 1.**

**Features of Java**

Java is a powerful, object-oriented programming language that is widely used for developing cross-platform applications. Developed by Sun Microsystems in 1995, Java has become one of the most popular programming languages in the world due to its versatility, security, and performance. Below are five key features that make Java a preferred language for developers.

**1. Platform Independence**

One of the most notable features of Java is its platform independence. This means that Java programs can run on any device or operating system that has the Java Virtual Machine (JVM)

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**Q2. What are the different types of operators used in Java? 10**

**Ans 2.**

**Operators in Java**

In Java, operators are special symbols used to perform operations on variables and values. They form an essential part of Java programming as they help in executing arithmetic calculations, making decisions, performing logical comparisons, and more. Java supports a wide range of operators which are classified into different categories based on their functionality. Understanding the different types of operators is crucial for developing effective and error-free Java programs.

**1. Arithmetic Operators**

Arithmetic operators in Java are used for performing basic mathematical operations such as addition, subtraction, multiplication, division, and modulus. These operators work on numerical

**Q3. What do you mean by Threads in java? Explain with an example. 10**

**Ans 3.**

**Threads in Java**

A thread in Java is a lightweight subprocess that represents a single path of execution within a program. Java supports multithreading, which allows a program to execute two or more threads concurrently. This is particularly useful in applications where tasks can run simultaneously without interfering with each other—such as downloading files while displaying animations or handling user interactions. Threads are part of the java.lang package and can significantly

**Set-II**

**Q4. What is the difference between errors and exceptions? 10**

**Ans 4.**

**Errors and Exceptions**

In Java, both errors and exceptions are part of the throwable hierarchy and represent unwanted or unexpected events that disrupt the normal flow of a program. Although they appear similar in structure, they serve different purposes and are handled differently within Java applications. Understanding the distinction between errors and exceptions is essential for building robust applications with proper exception-handling mechanisms.

**Definition and Nature of Errors**

Errors are serious issues that arise due to system-level failures or resource constraints. They usually indicate conditions that a program cannot reasonably be expected to recover from. Errors

**Q5. Explain the Synchronization of Threads. 10**

**Ans 5.**

**Need for Synchronization**

In multithreaded Java applications, multiple threads may attempt to access shared resources such as variables, files, or databases simultaneously. When these threads try to read or modify the same resource at the same time, it can lead to data inconsistency or unexpected behavior. This condition is known as a **race condition**. To prevent such issues and ensure data integrity, Java provides a mechanism called **synchronization**.

**What is Synchronization?**

Synchronization is the process of controlling the access of multiple threads to shared resources.

**Q6. Explain the life cycle of a Servlet 10**

**Ans 6.**

**Life Cycle of a Servlet**

A Servlet is a Java class used to extend the capabilities of servers that host applications accessed via a request-response model. Most commonly, Servlets are used in web applications to handle HTTP requests and generate dynamic web content. Servlets run on a web server within a Servlet container (such as Apache Tomcat) and follow a well-defined life cycle managed by the container.

**Overview of the Servlet Life Cycle**

The life cycle of a Servlet consists of **five main stages**: loading and instantiation, initialization,