POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS PGDCA-(NEW)

PGDCA-NEW/ASSIGN/SEMESTER-II

ASSIGNMENTS

(July – 2026 & January – 2027)

MCS-206, MCS-207, MCS-208, MCSL-209, MCSL-210

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to PGDCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the PGDCA Programme Guide.
4. The viva voce is compulsory for the assignments. For any course, if a student submitted the assignment and not attended the viva-voce, then the assignment is treated as not successfully completed and would be marked as ZERO.

Course Code	**:**	**MCS-206**
Course Title	**:**	**Object Oriented Programming Using Java**
Assignment Number	**:**	**PGDCA_NEW(II)/206/Assignment/2026-27**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**31st October, 2026 (for July session)** **30th April, 2027 (for January session)**

Note: This assignment has eight questions of 80 Marks. Answer all the questions. The remaining 20 marks are for viva voce. You may use Java code, illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Question1:

(a) Explain different operators available in the Java programming language, providing a brief explanation for each category. **(5 Marks)**

(b) Define the paradigm of Object-Oriented Programming (OOP) and detail its core architectural features. Additionally, analyze the structural role and significance of the Java Virtual Machine (JVM) in achieving platform independence. **(5 Marks)**

Question2:

(a) Define a class within the context of Java Programming. Explain how a class is declared, and evaluate the scope and visibility of the access specifiers (public, private, protected, and default) using Java code snippets. **(5 Marks)**

(b) Explain the uses of ***this, final*** and ***super*** keywords in Java with the help of example code snippets. **(3 Marks)**

(c) What is the purpose of the Character wrapper class in Java? Explain the operational utility of any four methods of this class. **(2 Marks)**

Question 3:

(a) Write a Java program to find the product of two matrices. Define proper class(es) and methods in your program. **(4 Marks)**

(b) Describe how file handling and I/O operations are managed in Java. Explain the use of the Java File class and its methods using Java code. **(6 Marks)**

Question 4:

(a) Define the concept of inheritance in object-oriented systems and outline its primary advantages. Discuss the specific types of inheritance supported (and not supported) by Java, and demonstrate its implementation using a clear programming example. **(6 Marks)**

(b) What is an abstract class? Explain its advantages. Critically compare it with an interface in Java. **(4 Marks)**

Question 5:

(a) Define polymorphic behavior. Explain the advantages of Polymorphism with example code in Java. **(4 Marks)**

(b) Define an exception and analyse the primary systemic and logical causes behind exception generation. How are exceptions handled in Java? Design a custom, user-defined exception class to validate human age inputs (e.g., throwing an exception if the input is negative or exceeds a realistic biological threshold). **(6 Marks)**

Question 6:

(a) Explain the concept of multithreading and differentiate between the two primary mechanisms used to create threads in Java. Write a Java program that demonstrates the practical implementation of thread synchronization. **(7 Marks)**

(b) Explain the use of the List interface and the Vector class in Java with the help of suitable examples. **(3 Marks)**

Question 7:

(a) Detail the architectural and package hierarchy of the Java Swing component library. Provide a comprehensive technical comparison between the Abstract Window Toolkit (AWT) and the Swing framework. **(6 Marks)**

(b) What is FXML? Explain event handling in JavaFX with the help of a code snippet. **(4 Marks)**

Question 8:

(a) Write a complete Java Database Connectivity (JDBC) program to manage a relational user schema for a library management system. Make necessary design assumptions for the database structure and ensure proper exception handling is implemented. **(8 Marks)**

(b) Explain the architectural role and lifecycle of the ResultSet interface in JDBC programming. Demonstrate how to traverse and retrieve data from a query outcome, using a short and focused code snippet. **(2 Marks)**