

Roll No. 223112320007
Hasei

Exam Code : D-24

Subject Code—62442

B. Sc. EXAMINATION

(Main/Re-appear)

(Batch 2020 Onwards)

(Fifth Semester)

COMPUTER APPLICATIONS

CCaL-503

Paper-I

Object Oriented Programming Using Java

Time : 3 Hours

Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Question No. 1 is of short answer type and is compulsory. All questions carry equal marks.

(7-19-5-1224) J-62442

P.T.O.

Compulsory Question

1. (a) Difference between JVM, JRE, and JDK.
- (b) What is the difference between instance variable and a class variable ?
- (c) Explain the difference between `>>` and `>>>` operators.
- (d) What happens if you don't provide a constructor in a class ?
- (e) Can Java be said to be the complete object-oriented programming language ? Justify your answer.
- (f) Differentiate between instance and local variables.
- (g) What happens when the `main()` isn't declared as static ?
- (h) How to copy an array in Java ? $8 \times 2 = 16$

Unit I

2. (a) Explain the paradigms of programming languages. Discuss how the evolution of object-oriented methodology addressed the limitations of procedural programming. 8
- (b) Explain the concepts of abstraction and encapsulation in OOPs. How do these principles contribute to data security and software robustness ? 8
3. (a) What are the key benefits of OOPs, and how does OOPs improve software reusability and maintenance ? Provide examples. 8
- (b) What is inheritance in OOPs and how does it promote code reusability and modularity ? Give an example. 8

Unit II

4. (a) What is the Java Virtual Machine (JVM), and how does it enable Java's platform independence ? Outline the steps involved in executing a Java program within the JVM. 8
- (b) What are primitive and non-primitive data types in Java ? Provide examples of each, and explain how Java handles type conversions between primitive types. 8
5. (a) What is the purpose of constructors in Java ? Explain constructor overloading and provide a programming example to show how it enhances flexibility in object creation. 8
- (b) What is garbage collection in Java and how does it aid memory management ? Explain the role of the `finalize()` method in object cleanup. 8

Unit III

6. (a) What is the role of the CLASSPATH environment variable in Java ? Explain how it affects package accessibility and provide examples of setting and using CLASSPATH for Java packages. 8
- (b) Discuss the use of both extends and implements keywords in Java. With programming examples, explain how a class can extend another class while also implementing an interface. 8
7. (a) Compare interfaces and abstract classes in Java. With relevant programming examples, explain scenarios where interfaces provide better design solutions than abstract classes and vice versa. 8

- (b) How can multiple exceptions be caught in a single try-catch block in Java ? Explain best practices for handling multiple exceptions and provide examples of catching exceptions based on type hierarchy. 8

Unit IV

8. (a) Discuss the concept of thread priorities in Java. Explain how thread priorities affect the execution order of threads and provide programming examples to show how to set and manage thread priorities. 8
- (b) Explain, how Java handles file I/O. With programming examples, describe the process of reading from and writing to files in Java. 8

9. (a) Describe the purpose of the transient and volatile modifiers in Java. With programming examples, explain their roles in serialization and concurrency. 8
- (b) Explain the need for synchronization in Java. With programming examples, describe how synchronized blocks and methods can be used to handle data consistency issues in multithreaded applications. 8