

(Please write your Exam Roll No.)

Exam Roll No .....

**Bharati Vidyapeeth's**  
**Institute of Computer Applications and Management**  
**A-4, Paschim Vihar, New Delhi-63**

**THIRD SEMESTER [MCA] Internal Examination, September-2019**

<b>Paper Code: MCA -205</b>	<b>Subject: Java Programming</b>
<b>Time: 2 Hours</b>	<b>Maximum Marks: 45</b>
<b>Note: Attempt THREE questions in all. Question No. 1 is compulsory and attempt one question from each unit.</b>	

1. Answer all the following questions briefly:- 1.5 x 10 = 15
- (a) Identify the differences between type *casting* and *parsing*. Elaborate the difference between `parseInt()` and `valueOf()`. 1.5
  - (b) Justify how does Externalizable interface give programmatic control over serialization? Give names of 3 *Marker Interfaces*. 1.5
  - (c) Determine the significance of Magic Number in a .class file. What is the valid magic number for bytecode files in java? 1.5
  - (d) Can Method Local Inner class access method variables? Why/ Why not? 1.5
  - (e) Elaborate how does JIT Compiler peek in the execution process to perform optimizations. 1.5
  - (f) Compare (in tabular format) process based and thread based multitasking. 1.5
  - (g) Justify the statement '*Livelocks are recoverable but deadlocks aren't*'. How can the main thread lock itself. 1.5
  - (h) Identify 4 *scenarios* when an object becomes eligible for Garbage Collection. How can we suggest the garbage collector for running (function calls)? 1.5
  - (i) Determine some *Thread Communication* and *Object Communication* methods for threads. Why are they part of different class hierarchies? 1.5
  - (j) Elaborate all OOPs features (implemented through code only in java) in the object '*Electric Wire*' 1.5

**UNIT - I**

2. (a) Explain different Java Memory Spaces available and their relevance. Further extend by explaining the Java Heap Memory Model in depth with appropriate diagrams. 5
- (b) Create a Uniform Multidimensional Array ( $n*n$ ) by taking dimensions and array elements as user input. Transpose the matrix in-place without using any other array/structure. 5
- (c) Construct a java program having a method `videoLectures()` that intakes 2 Video objects as arguments. Each object has a String `videoDescription` field. With the help of a method local inner class implementation in the same methods, check the two objects for equality. 5
- Hint- You may have to override some default implementations.
3. (a) Elaborate the different Levels of Abstraction present in Java. Which constructs are used to relate to each level? Elaborate extension/implementation relation between Abstract Class, Concrete Class and Interfaces through short code snippets. 5

- (b) Formulate a java code to evaluate if 2 strings are rotations of each other (eg-xyz and zyx). Attain the same in O(n) time complexity and without using any additional memory structure. Take due user inputs. 5
- (c) Develop a java program to compare a class Department's object. Department has fields dept\_id, dept\_category(Finance/Marketing/Sales). Compare objects on the basis of both fields with the help of an Anonymous Inner Sub Class implementation. 5

## UNIT - II

- 4. (a) Discuss Race Condition in multithreading. How does it lead to the need for Concurrency Control? Explain different Synchronization Mechanisms and pros and cons of each with code. 5
- (b) Construct a code to Parse a CSV File- 'EvenCSV.csv' by reading one row at a time. The CSV file should contain cell values in pair (i.e. even entries separated by commas in one line). On encountering a line with odd number of values raise a Custom Exception - UnevenEnteriesException. Code for the exception class as well as method to parse and evaluate the file. 5
- (c) Explain how Scheduler interferes in the Thread Life Cycle. Explain how various methods transit a Thread to different life stages between its creation and termination. 5
- 5. (a) Discuss the Stream Hierarchy for Byte Stream IO classes. Illustrate each class with small code snippets to instantiate file pointer and read/write from file. 5
- (b) Formulate how Design Patterns differ from Frameworks. List some Design Patterns and their usage. Create a Singleton Logger class that creates a singleton object for Logging Mechanism. Implement the same using Double Entry Locking Check Singleton approach. 5
- (c) Compare the reliability and transmission speed aspect of two methods of Network Communication. Explain the Workflow of each Mode. 5

\*\*\*\*\* **Wish you Luck!** \*\*\*\*\*