Roll No. : ……

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FIRST SEMESTER [MCA] Internal Examination, December 2022

Paper Code: MCA–109 **Subject: Object Oriented Programming and Java**

Time: 2 Hours **Maximum Marks: 45**

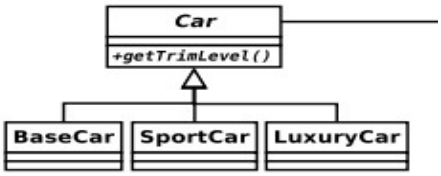
Note: Attempt THREE questions in all. Question No. 1 is compulsory, and attempt one question from each section.

1.	Answer all the following questions briefly: -		1.5 × 10 = 15	
	(a)	***class Test{ int a; long l; l=a; }*** Interpret the compiler output of the above code in terms of why it is permitted in Java?		CO1
	(b)	Identify the condition types permitted inside an if block?		CO1
	(c)	Describe the differences between primitive types and objects in Java. Consider: (i) the values they contain (ii) where they are stored in memory		CO1
	(d)	Identify how does the JVM determine that an input .class file belongs to Java?		CO1
	(e)	Compare an interface and an abstract class in Java?		CO1
	(f)	Illustrate through suitable examples the usage of break keyword in Java?		CO1
	(g)	Contrast the String and StringBuilder classes in Java?		CO1
	(h)	Complete the table below to justify the purpose of different access modifiers?		CO1
	(i)	Explain what is meant by Java bytecode. Give two advantages of distributing Java software as bytecode rather than source code		CO1
	(j)	Demonstrate the contrast between method overloading and method overriding using appropriate example?		CO1

Access modifier				
Defining class				
Class in same package				
Subclass in different package				
Non subclass in different package				

SECTION - I

2.	(a)	Your application displays the number of days in a month which is input by the user as an integer value. Elaborate the Java class for the same through a multiway branch statement?	5	CO1
	(b)	A car manufacturer uses Java software to track current vehicles being built. The diagram below shows an excerpt of the current software structure. Assume the presence of other appropriate fields and methods.	5	CO1

				
	(c)	What are auto-boxing and auto-unboxing? Give an example of how they might cause an exception to be thrown.	5	CO1
3.	(a)	Create a stack to maintain plates in a birthday party. Ask the organizer how many plates they want initially. Maintain track of each plate used and number of plates added. Finally print the number of total number of plates in the stack, plates used and number of plates left in the stack.	5	CO1
	(b)	Define an abstract class Bankaccount to store the balance of each user. Provide getBalance(), deposit() and withdraw() methods to access the balance of each BankAccount. Let SavingsAccount and CheckingAccount be two types of BankAccount. If numberofWithdrawls in a savingsaccount is >5 no more withdrawls are permitted in a month. There is no such limit on a Current Account. Implement the withdraw() accordingly. Also elaborate the advantage of abstract class through the above code?	10	CO1
SECTION - II				
4.	(a)	A Lecturer wishes to create a program that lists his students sorted by the number of practical assignments they have completed. The listing should be greatest number of assignments first, sub-sorted by enrollment number? Use appropriate data structure to store and sort this data. *HINT- A class StudentInfo stores the enrollmentno and number of assignments completed for a student.*	5	CO1
	(b)	Elaborate through suitable commented code how the final keyword can be used with a variable, method and class in Java?	5	CO1
	(c)	Demonstrate the working of a Static Inner Class through a class Electronics and within it create Static Inner Class Television that has a method cost() which displays cost of television object passed in constructor of Television class.	5	CO1
5.	(a)	The human body has different organs. Every organ has a different function to perform; the heart is responsible for blood flow, lungs for breathing, brain for cognitive activity, and kidneys for excretion. So we have a standard method function that performs differently depending upon the organ of the body. Compose a solution to realize the above using dynamic method dispatch .	10	CO1
	(b)	Create appropriate classes to reverse a palindrome using String class and StringBuilder. Try to compute which solution computes faster?	5	CO1