VIT
Vellore Institute of Technology
CHENNAI

Reg. Number:	23MCA1030

Continuous Assessment Test (CAT) – I FEB 2024

Programme	:	Master of Computer Applications	Semester	:	Winter 23-24
Course Code & Course Title	:	PMCA502L & Java Programming	Class Number	:	CH2023240501379
Faculty	:	Dr. K. Madheswari	Slot	:	D2+TD2
Duration	:	90 minutes	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		Design a Java program to implement a simple student management system by defining a class named "Employee" with the attributes Employee Name, Employee Number, Employee Basic. Include a constructor to initialize the attributes, methods to calculate the Employee Net Salary, and a method to display the Employee details. Write a main class to create objects of the "Employee", input student information, and display employee details. Note: • Net Salary = Employee Basic + HRA + DA – IT; • HRA = 30% of Basic • DA = 20% of Basic • IT = 10% of Basic	10
2		Create a Java program that calculates the grade of a student based on their marks in three subjects: Mathematics, Science, and English. Define a class called "Student" with methods to input marks, calculate the average, and determine the grade as per the criteria given below: • A grade is awarded if the average marks are 90 or above. • B grade is awarded if the average marks are between 70 and 89. • C grade is awarded if the average marks are between 50 and 69. • D grade is awarded if the average marks are between 35 and 49. • F grade is awarded if the average marks are below 35.	10

3		Given the program below. As a programmer predict the output of by printing the values of a, b, c and d. and also explain with proper justification.
		
		public class IncrementDecrementExercise {
		public static void main(String[] args) {
		int a = 15; int b = 17;
		int c = 19; int d = 13;
		int result1 = a++ + b-- + --c * ++d;
		int result2 = ++a * --b + c-- - d++;
		System.out.println("Result 1: " + result1);
		System.out.println("Result 2: " + result2);
		}
		}
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4.		Create a Java program for a simple banking system with the following specifications: • Create a BankAccount class with an instance variables: accountNumber (int), balance (double), ownerName (String), and interestRate (static double) • Implement a static methods setInterestRate(double rate) and getInterestRate() to set and get the interest rate for all accounts. • Implement a constructor that takes parameters to initialize accountNumber, balance, and ownerName. • Implement instance methods deposit (double amount) and withdraw (double amount) to modify the account balance accordingly. • Implement an instance method displayAccountInfo() to display the account information (account number, owner name, balance). • Write a main method to test your BankAccount class. Create multiple BankAccount objects, perform deposit, withdrawal, and display operations, and demonstrate the use of static methods for setting and getting the interest rate.	10
5		Describe in detail the memory allocation techniques of stack and heap for variables, functions, the main function, and static functions. Provide appropriate code examples of your own to illustrate each technique.	10
6		As a programmer, write a Java program to perform addition of two or more integers, floats and double datatypes, by defining at least 3 static methods. Implement the Scanner class for user input. The program should prompt users to input the numbers and output the respective result. Present your solution with clear and concise code accompanied by appropriate comments to elucidate the functionality of each section.	5