VIT
Vellore Institute of Technology

Slot : E1+TE1

School of Computer Science Engineering and Information Systems

Fall Semester 2025-2026

Continuous Assessment Test – I

Programme Name & Branch : MCA
Course Name & code: Java Programming – PAMCA502
Class Number (s): VL2025260106032, VL2025260106024
Faculty Name (s): Prof. Senthil Murugan B, Prof. Shynu P G
Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- **Course Outcomes:**
  CO1: Apply object-oriented principles to develop Java applications
  CO2: Develop multithreaded and exception-handling features in Java programs

Q.No.		Question	Max Marks	CO	BL
1.		A student has the hobby of collecting stamps and the following 2-D array gives the month number and count of the number of stamps he has collected in each month (up to 8 months). Write a program to find the total count of the stamps collected at the end of each month. Eg., At the end of month1 ->10, end of month 2->14, end of month 3->21 and so on. Display the month numbers, month-wise stamp count and the total count in a tabular form.	10	CO1	BL3

Month No	1	2	3	4	5	6	7	8
Nr of stamps	10	4	7	8	2	5	0	12
Cumulative count at the end of each month	**10**	**14**						

2.	A	Explain the potential issues associated with multiple inheritance and describe the approach adopted by Java to overcome these challenges with appropriate syntax.	5	CO1	BL1
	B	How java does support platform independence and ensures secure application development?	5		
3.		Define an interface named TDS consists of a member to hold TDS Percentage as 5%. Implement TDS using the class Employee that consists of data members to store employee id,	10	CO1	BL3

	name, designation {*possible values are Steno, Clerk, Manager and Labour*} and net salary. Provide a parameterized constructor with three arguments to initialize the data members id, name and designation. Design a method to calculate the net salary as follows: **'float calculateSalary(int numberofDaysPresent, float wagesPerDay)'** in which compute the grossSalary = (numberofDaysPresent X wagePerDay) netSalary = grossSalary - (grossSalary*(tdsPercentage/100)) Provide a method to determine the count of number of Stenos getting more than 10000 as net salary Design a main class to create 15 Employees and display number of stenos earning above 10000			
4.	Develop a console based Java application to get the input values for course code and course name, validate and display appropriate message. The validation criteria are as follows: • For Course Code ▪ The first four characters are capital alphabets ▪ Next three characters are digits ▪ Last character is either 'P' or 'L' • The course name should contain alphabets and space only. If the input is not satisfied with the aforementioned criteria throw the exception named "***InvalidCourseCodeException***" with appropriate message stating Course Code is not as per the standard. **Sample Course Code: *PMCA602L***	10	CO2	BL3
5.	Design a program to capture the sentence from the user, reverse each word of a sentence and append the character 'a' to the start and end of each string. Display the original string, its length, modified string and its length. **Input**: The old man and his hut **Output**: aehTa adloa anama asiha atuha **Input Length**: 23 **Output Length**: 35	10	CO1	BL3

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CONTINUOUS ASSESSMENT TEST - I

FALL SEMESTER 2025-2026

SLOT: B1+TB1

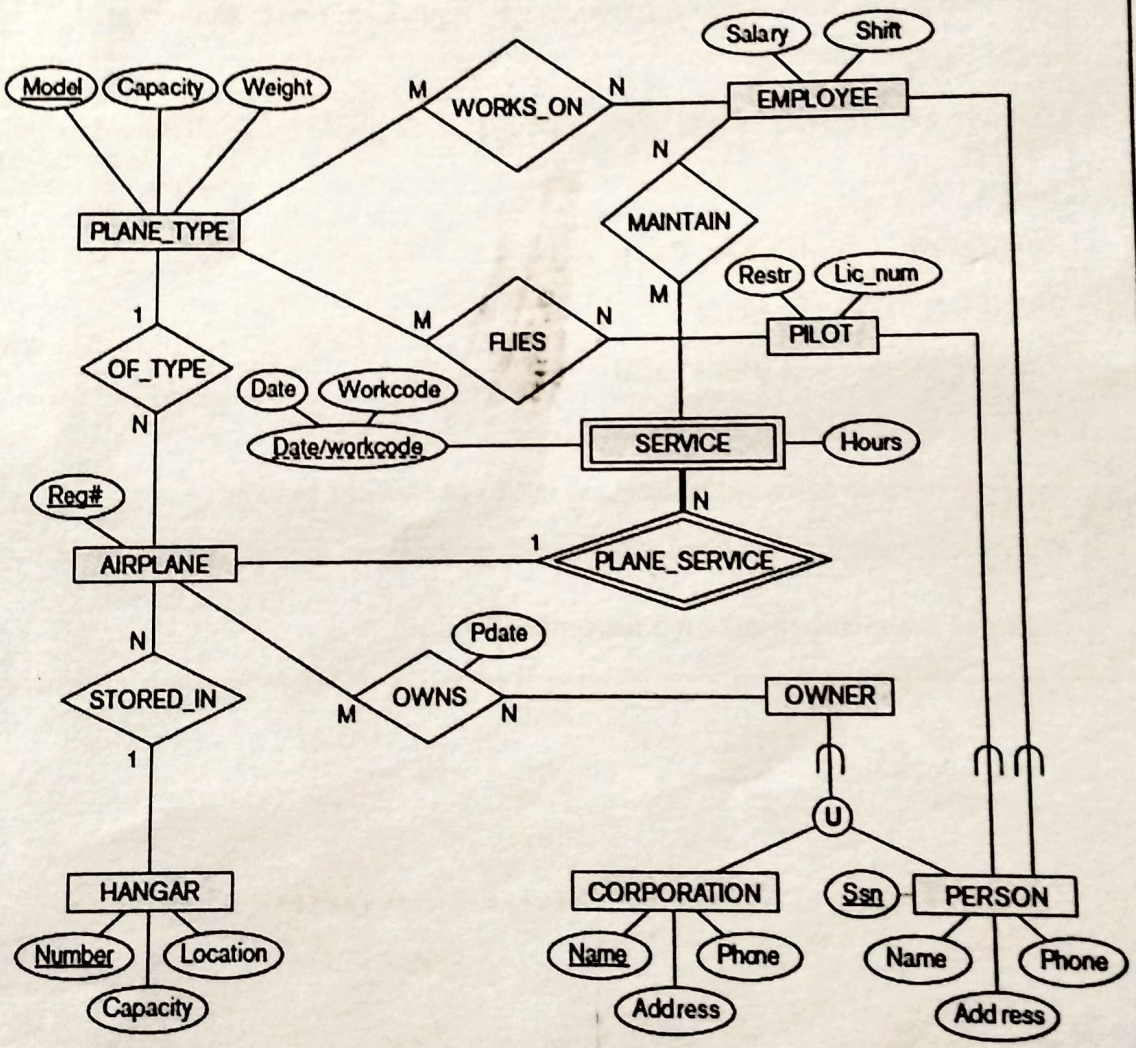
Programme Name & Branch	**: MCA**
Course Code and Course Name	**: PAMCA503 - Database Management Systems**
Faculty Name(s)	**: Dr. BIMAL KUMAR RAY, Dr. JAYARAM REDDY A**
Class Number(s)	**: VL2025260106036, VL2025260106041**
Date of Examination	**: 18-Aug-2025**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
    1. Design normalized relational schemas using ER and EER modeling
    2. Apply relational algebra and normalization techniques for schema optimization

Q. No	Question	M	CO	BL
1.	A multinational bank is redesigning its database system to support multiple branches across countries. The IT team wants to ensure that changes in data storage formats or internal structures do not affect how end-users and applications access the data. As the database consultant, explain the three-schema architecture of a DBMS with a neat diagram, highlighting the roles of the external, conceptual, and internal levels. In this scenario, differentiate between logical data independence and physical data independence, and state which one is harder to achieve, giving reasons.	10	1	2
2.	Consider a database system for a baseball organization such as the major leagues. The data requirements are summarized as follows: ■ The personnel involved in the league include players, coaches, managers, and umpires. Each is identified by a unique personnel id. They are also described by their first and last names along with the date and place of birth. ■ Players are further described by other attributes such as their batting orientation (left, right, or switch) and have a lifetime batting average (BA). ■ Within the players group is a subset of players called pitchers. Pitchers have a lifetime ERA (earned run average) associated with them. ■ Teams are uniquely identified by their names. Teams are also described by the city in which they are located and the division and league in which they play (such as Central division of the American League). ■ Teams have one manager, a number of coaches, and a number of players. ■ Games are played between two teams with one designated as the home team and the other the visiting team on a particular date. The score (runs, hits, and errors) are recorded for each team. The team with the most runs is declared the winner of the game. ■ With each finished game, a winning pitcher and a losing pitcher are recorded. In case there is a save awarded, the save pitcher is also recorded. In baseball, a save	10	1	3

	is awarded to a relief pitcher who finishes a game for the winning team under specific circumstances. ■ With each finished game, the number of hits (singles, doubles, triples, and home runs) obtained by each player is also recorded. Design an Enhanced Entity–Relationship (EER) diagram for the BASEBALL database. Specify all possible keys for each entity and structural constraints for each relationship.			
3.	The following figure shows an EER schema for a SMALL_AIRPORT database that can be used to keep track of transport ships and their locations for maritime authorities. Map this schema into a relational schema and specify all primary keys and foreign keys	10	1	3



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CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: B1+TB1

4.	Consider the following schema: **Suppliers(*sid:* integer, *sname:* string, *address:* string)** **Parts(pid: integer, *pname:* string, *color:* string)** **Catalog(*sid:* integer, *pid:* integer, *cost:* real)** Write the following queries in ***relational algebra***. (i) Find the *sids* of suppliers who supply some red or green part. (ii) Find the *sids* of suppliers who supply some red part or are at 221 Packer Ave. (iii)Find the *sids* of suppliers who supply some red part and some green part (iv) Find the *sids* of suppliers who supply every part.	10	2	3
5.	Consider the following relation for published books: BOOK (Book_title, Author_name, Book_type, List_price, Author_affil, Publisher) Author_affil refers to the affiliation of author. Suppose the following dependencies exist: **Book_title → Publisher, Book_type** **Book_type → List_price** **Author_name → Author_affil** a. "Find out a keys of the schema" b. What normal form is the relation in? Explain your answer. c. Apply normalization until you cannot decompose the relations further. State the reasons behind each decomposition	10	2	4

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SLOT: A1+TA1+TAA1+V1

SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
CONTINUOUS ASSESSMENT TEST – 1
FALL SEMESTER – 2025 ~ 2026

Programme Name & Branch	:	M.C.A, - Common Question Paper
Course Code & Course Name	:	PAMAT501 & Probability and Statistics
Class Number(s)	:	VL2025260105542 & VL2025260106330
Faculty Name(s)	:	Prof. Manimaran A & Prof. Sreenivasulu T
Date of Examination	:	17-08-2025
Exam Duration	:	90 Minutes Maximum Marks : 50 M

General Instruction(s):

- Answer All Questions.
- M – Max. Marks; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create).
- Course Outcomes:
  CO - 1: Apply probability concepts and random variable distributions to model uncertainties in real-world data. CO - 2: Select and apply suitable probability distributions for practical and experimental scenarios.

Q. No.	Questions	M	CO	BL
1.	A consulting firm rents car from three agencies such that 20% from agency X, 30% from agency Y and 50% from agency Z. If 90% of the cars from X, 80% of cars from Y and 95% of the cars from Z are in good conditions then find (i). What is the probability that the firm will get a car in good condition? (ii). If a car is in good condition, what is probability that it has come from agency Y?	10	1	2
2.	The diameter of an electric cable say X is assumed to be a continuous random variable with probability density function $f(x) = \begin{cases} kx(1-x), & 0 < x < 1; \\ 0, & otherwise, \end{cases}$ then find (i). Find the value of k. (ii). Find the mean and variance of X.	10	1	3

P.T.O.

Q. No.	Questions	M	CO	BL
3.	The following table represents the joint probability distribution of the two dimensional discrete random variable (X, Y). Y \ X: 1 | 2 | 3 1 | 1/12 | 1/6 | 0 2 | 0 | 1/9 | 1/5 3 | 1/18 | 1/4 | 2/15 Find all the marginal and conditional probability distributions.	10	1	3
4.	Out of 800 families with 4 children each, how many families would be expected to have (i). 2 boys and 2 girls, (ii). at least 1 boy, (iii). at most 2 girls and (iv). children of both sexes. Assume equal probabilities for boys and girls.	10	2	3
5.	A random variable X has a uniform distribution over $(0, 10)$ compute (a). $P(X < 2)$ (b). $P(X > 8)$ (c). $P(3 < X < 9)$	10	2	3

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SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CONTINUOUS ASSESSMENT TEST - I

FALL SEMESTER 2025-2026

SLOT: C1+TC1+ TCC1

Programme Name & Branch	**: MCA – Computer Applications**
Course Code and Course Name	: PAMCA601 & Cloud Computing
Faculty Name(s)	**: Dr.Daphne Lopez & Dr.E.Sathiyamoorthy**
Class Number(s)	: VL2025260106368, VL2025260106367
Date of Examination	**: 19/8/2025**
Exam Duration	**: 90 minutes**

Maximum Marks: 50

General instruction(s):

- Answer All Questions
- Course Outcomes
  - Analyze the convergence of computing paradigms and virtualization in cloud environments.

Q. No	Question	M	CO	BL
1.	Improving customer experience has become a cornerstone in the evolution of the banking industry, with cloud computing playing a pivotal role in reshaping how financial institutions operate and interact with their clients. Elaborate on the cloud architecture that would support this use case.	10	1	1
2.	Explain the characteristics of cloud computing in healthcare that enable users to access the patient's data remotely, saving the extraction time from physical systems in hospitals. Also, what deployment model would be best suited for this application.	10	1	2
3.	What are the benefits of virtualization and with an illustration explain how it transforms businesses by enabling them to optimize resource utilization, enhance agility and reduce costs?	10	1	3
4.	Compare and Contrast full and para virtualization with appropriate scenarios.	10	1	4
5.	Consider a Company that needs servers for three functions: Running an Internal HR System, hosting a public website and storing large volume of customer data. Each of these functions has different configuration requirements for which the company has to make a high initial investment. How can Virtualization be used to create virtual representations of the resources?	10	1	5

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SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

CONTINUOUS ASSESSMENT TEST - I

FALL SEMESTER 2025-2026

SLOT: D1+TD1

Programme Name & Branch : MCA
Course Code and Course Name : PAMCA501 - Data Structures and Algorithms
Faculty Name(s) : Dr.E.P.Ephzibah & Dr. Ramalingam M
Class Number(s) : 6014, 6018
Date of Examination : 20-8-2025
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
  1. Analyze time and space complexity of algorithms using asymptotic notation.
  2. Compare searching, sorting, and nonlinear data structure techniques.

Q. No	Answer all the Questions	M	CO	BL
1.	Determine the time complexity of a function of your choice (write the code snippet) using the Divide and Conquer approach. Identify the recurrence relation and solve the recurrence using substitution method to find the time complexity in Big-O notation.	10	1	2
2.	You are given a stack S containing n integers. Use the functions push(x), pop(), top(), isEmpty(), isFull() to do the following tasks: 1) Move the contents of one stack to another stack and print the resultant stack 2) Display the contents of the stack that are positive numbers and pop only those numbers and push the negative numbers again into the stack without changing the order.	5 5	1	2
3.	A hospital maintains a sorted linked list of patient IDs in ascending order. Each patient ID is unique and stored in a singly linked list node along with their name. The hospital's IT team wants to allow fast searches for a patient by ID. Although binary search works best with arrays (due to random access), you are tasked with implementing a program using binary search logic for this sorted linked list.	10	1	3
4.	A group of players is arranged in a circle for a team selection game. Each player has a unique player ID stored in the order they are currently standing. To make the selection fair, the list is rotated n times to the left. Each rotation means the first player moves to the end of the line. After n rotations, the first player in the list is chosen as the team captain. Given the head of a linked list with more than n players, write a program to rotate the list to the left by n places for Team captain and the next k players after the captain form the starting team. Hint: You can use a circular Queue or a singly circular linked list as data structure	10	2	3
5.	In the National City Marathon, each runner is assigned a bib number (unique identification number) between 1 and 5000 based on registration order. After the marathon, officials need to list the runners in ascending order of their bib numbers to match them with race times. The number of runners can be very large (thousands), but the range of bib numbers is fixed and known in advance. Using a non-comparison based sorting algorithm, design an efficient program to sort the bib numbers.	10	2	3

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