No. of Pages: 02
Roll No: …….

A-03

B. Tech. CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE I/II Semester Examinations (Dec 2025)

Problem Solving Using "C" (BT-CSE-101A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Distinguish between Linker and Loader with respect to when they operate and what tasks they perform.	2
(b)	List the three levels of programming languages and give one example of each.	2
(c)	Differentiate between the break and continue statements in C.	2
(d)	Write a program to generate the first n terms of the Fibonacci Sequence.	2
(e)	What is an array? Explain its types. Also write the syntax of declaring an array.	2
(f)	Consider the following code. Write the output of each printf() statement. Let's assume memory address **6487628**.	2

```c
#include <stdio.h>
#include <conio.h>
int main() {
    int x = 10;
    int *y = &x;

    printf("%d\n", x);
    printf("%u\n", &x);
    printf("%u\n", y);
    printf("%d\n", *y);
    printf("%u\n", &y);
}
```

UNIT-I

Q.2(a)	Explain the working of a computer with the help of a neat block diagram. Describe the function of each unit in detail.	6
Q.2(b)	Perform Following Operations: (1). $(DEF.2A)_{16} \Rightarrow (\ )_{10}$ (2). $(849.705)_{10} \Rightarrow (\ )_{8}$ (3). $(DCBA.EF7)_{8} \Rightarrow (\ )_{16}$ (4). Add $(FFF)_{16}$ and $(DAD)_{16}$ (5). Perform the following operation using 2's compliment method: 58-33 (6). $(1101101.11011)_{2} \Rightarrow (\ )_{10}$	6
Q.3(a)	Define flowchart. Draw a detailed flowchart to input three numbers from the user, compare them using appropriate decision structures, and display the largest number.	6
Q.3(b)	What is an algorithm? Explain the different types of algorithms, and describe the characteristics and properties of a good algorithm.	6

UNIT-II

Q.4(a) Explain the different data types available in the C programming language. Classify them. Describe each category with suitable examples and discuss the memory size and purpose of the commonly used data types. 6

Q.4(b) Write a C program to determine the grade of a student using a **if-else/switch case statement**. The grade should be assigned based on the marks obtained, as per the following criteria: 6

Number in Marks	Grade Conversion
90-100	O
80-89	A
70-79	B
60-69	C
50-59	D
40-49	E
Less than 40	Fail

Q.5(a) Differentiate between the following: 6

(1) fprint and fscanf
(2) fputc and fputs
(3) fopen and fclose
(4) getc and getw

Q.5(b) Write a program to find the roots of a Quadratic Equation. 6
$ax^2+bx+c=0$

UNIT-III

Q.6(a) Write a C program to apply the concept of two-dimensional arrays to perform the addition of two matrices. Also display the resultant matrix. 6

Q.6(b) What is recursion? Write a program to check that the input string is a Palindrome or not (with and without inbuilt function). 6

Q.7(a) Write a main function in 'C' that declares an array of type integer, named marks[ ] containing 7 elements. The main function calls a function named display() that displays the elements of the array as defined in main function. Use following methods: 6

(i) Passing Array Name (Pointer Method)
(ii) Passing Array Using Pointer

Q.7(b) Explain the parameter passing techniques in C programming. Then, apply the concept of parameter passing to write a C program that swaps the values of two variables using an appropriate technique. 6
Assume: X = 400 and Y = 7000

UNIT-IV

Q.8(a) Write a C program using a structure to store and display student details (name, age, and grade) and determine the size of the structure. 6

Q.8(b) Differentiate between Structure and Union. Illustrate with syntax also. 6

Q.9(a) Explain and write a C program using mutual recursion to print odd and even numbers alternately up to 10. 6

Q.9(b) Apply an appropriate looping construct to write and execute a C program that reads two integers and computes their Greatest Common Divisor (GCD). 6

---- ---- -----

No. of Pages: 2
Roll No: …….

B-03

B. Tech. CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE II Semester Examinations (Dec 2025)

Programming with Python (BT-CSE-102A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Write a lambda function to find the square of a user-input number.	2
(b)	Explain the different membership operators in Python with suitable examples.	2
(c)	What will be the output of the following code: a = 'python' i = 'w' while i in a: print(i)	2
(d)	Describe unordered data structure in Python.	2
(e)	Create a numpy array of first 10 multiples of 5 using the arange() function.	2
(f)	Describe the map() function with its syntax and an example.	2

UNIT-I

Q.2(a)	Develop a program to insert a substring at a specific index in the user-input string.	6
Q.2(b)	Explain, with examples, different ways to find substrings within a string.	6
Q.3(a)	Develop a python program to print all prime numbers within a range.	6
Q.3(b)	Explain the match-case statement in Python with an example.	6

UNIT-II

Q.4(a)	Create a list in Python and apply any five list operations on it.	6
Q.4(b)	Explain how elements can be deleted from a dictionary using del, pop(), and popitem(), with suitable examples.	6
Q.5(a)	Using List Comprehension, develop a program to find the Length of each string in a list.	6
Q.5(b)	Differentiate a tuple from a list. Demonstrate the use of slicing and indexing on a tuple.	6

UNIT-III

Q.6(a)	Using dictionary comprehension, create a dictionary where the first ten even natural numbers are the keys and their squares are the values.	6
Q.6(b)	Explain different built-in exceptions with example?	6
Q.7(a)	Describe reduce() function. For the given list list_input = [25, 70, 56, 75, 65], use the reduce() function to find and print the largest number in the list.	6
Q.7(b)	Explain the use of map and filter functions with a suitable example.	6

UNIT-IV

Q.8(a)	Create a 2D numpy array and apply slicing and indexing operations on it.	6
Q.8(b)	How datasets can be combined in Pandas using the merge() and join() operations. Describe the inner and left merge with example.	6
Q.9(a)	Explain the different aggregation operations that can be performed on a DataFrame, with suitable examples.	6
Q.9(b)	Explain the following in data visualization: a) Scatter Plot b) Q1, Q2, Q3, IQR in a Box Plot.	6

------ ----- ------

No. of Pages: 02
Roll No: …….

C-13

B. Tech. Computer Science & Engineering III Semester Examinations (Dec 2025)

Database Management System (BT-CSE-201A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Discuss the different types of data independence	2
(b)	Define the intention and extension of database.	2
(c)	What undesirable dependencies are avoided when a relation is in 2NF?	2
(d)	Explain the term partial key, candidate key.	2
(e)	Distinguish between serial and serializable schedule.	2
(f)	Explain the Recovery control for distributed databases	2

UNIT-I

Q.2(a)	Explain the 3 level database architecture.	6
Q.2(b)	Construct an ER diagram for university registrar's office. The office maintains data about each class, including the instructor, the enrollment and the time and place of the class meetings. For each student class pair a grade is recorded. Determine the entities and relationships.	6
Q.3(a)	Consider the following relational schema: EMPLOYEE(EmpNo,Name,DoB,Address,Gender,Salary,DNumber) DEPARTMENT (DNumber, Dname, ManagerEmpNo, MnagerStartDate) Formulate queries using relational algebra for the following: (i) Display all employees in Department named 'Marketing'. (ii) Display the name of highest salary paid 'female' employee. (iii) Which employee is oldest manger in company?	6
Q.3(b)	Explain domain and tuple constraints with suitable examples.	6

UNIT-II

Q.4(a)	Consider the following schema: Suppliers (sid, sname, address) Parts (pid, pname, color) Catalog (sid, pid, cost). Write the SQL queries for the following: i) Find the sids of suppliers who supply every red or green part ii) Find the pids of parts supplied by at least two different suppliers.	6
Q.4(b)	Write one difference between HAVING and WHERE clauses.	6
Q.5(a)	Write short notes on: a) NOT NULL constraint b) UNIQUE constraint c) CHECK constraint	6

Q.5(b)	Design an example showing the use of nested queries and aggregate functions to find top performers in a student database.	6

UNIT-III

Q.6(a)	Given a relation R with 5 attributes ABCDE and the following FDs: A→B, BC→E, and ED→A. Is R in 3NF? Justify	6
Q.6(b)	What is a join dependency? How does it lead to 5NF?	6
Q.7(a)	Explain index sequential file organization with the help of a diagram.	6
Q.7(b)	Explain B-tree and B+ tree structures used in indexing. Discuss their advantages for large databases.	6

UNIT-IV

Q.8(a)	Explain the wait die and wound wait schemes of deadlock prevention with their pros and cons.	6
Q.8(b)	What is need of lock in DBMS? Explain shared lock and exclusive lock with the help of example	6
Q.9(a)	Discuss Role-Based Access Control (RBAC) and its advantages.	6
Q.9(b)	Explain the concept of intrusion detection in database security.	6

--- -------- ---

No. of Pages: 02
Roll No: …….

C-14

B. Tech. Computer Science & Engineering III Semester Examinations (Dec 2025)
Data Structures (BT-CSE-203A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit, and Question 1 is compulsory.

Each Question carries 12 marks.

Q.1		**Marks**
(a)	Differentiate between linear and non-linear data structures.	2
(b)	What is recursion? Explain the concept with a simple example.	2
(c)	How are stacks used in computer science? Mention two applications.	2
(d)	What is a circular linked list?	2
(e)	Differentiate between a normal queue and a priority queue.	2
(f)	What is an adjacency matrix?	2

UNIT-I

Q.2(a)	Discuss the various built-in and user-defined data structures, along with their applications in computer science and real life.	6
Q.2(b)	What is asymptotic notation? Why is it important? Discuss using a suitable example.	6
Q.3(a)	Write the algorithm for linear search. In what scenario is linear search preferred over binary search? Justify your answer.	6
Q.3(b)	Explain the Insertion Sort algorithm and analyze its time complexity.	6

UNIT-II

Q.4(a)	What is a circular queue? Explain the advantages of a circular queue over a simple queue.	6
Q.4(b)	Describe how the Merge Sort algorithm divides and merges an array. Illustrate the process with a suitable example.	6
Q.5(a)	How are elements added and removed from a stack? Illustrate the process with algorithmic steps.	6
Q.5(b)	Explain how stack operations are applied step-by-step to convert the following infix expression into its postfix form. Q: A + (B * C – (D / E ^ F) * G) * H	6

UNIT-III

Q.6(a)	What are the main differences between static and dynamic data structures? Illustrate how linked lists provide better memory utilization than arrays.	6

Q.6(b)	Discuss the dynamic implementation of a queue with an example.	6
Q.7(a)	Write and explain the steps involved in deleting a node from a singly linked list, along with a suitable example.	6
Q.7(b)	What is a header-linked list? Explain with an example how traversal can be implemented in a header-linked list.	6

UNIT-IV

Q.8(a)	What is a Binary Search Tree? What are the main operations performed on a Binary Search Tree?	6
Q.8(b)	Write and explain the steps involved for traversing a binary tree using preorder traversal.	6
Q.9(a)	Write an algorithm for Heap Sort and explain each step with an example, emphasizing the use of tree structures.	6
Q.9(b)	Write and explain the DFS algorithm using a suitable example.	6

----- -------- -------

No. of Pages: 2
Roll No: …….

C-15

B. Tech. Computer Science & Engineering III Semester Examinations (Dec 2025)

Object Oriented Programming (BT-CSE-205A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	List any three main features of the Java programming language.	2
(b)	What is the default value of a boolean variable in Java?	2
(c)	What is the purpose of the import statement?	2
(d)	Can we override a static method in Java? Justify your answer.	2
(e)	What is the superclass of all other classes in Java?	2
(f)	Name the method that is the entry point for the execution of a Java application.	2

UNIT-I

Q.2(a)	Explain the difference between instance variables and static variables. How is memory allocated for each?	6
Q.2(b)	What are constructors? Explain the concept of constructor overloading with an example.	6
Q.3(a)	Describe the structure of a multidimensional array. Write a program to add two 3x3 matrices.	8
Q.3(b)	Explain the significance of the static keyword when applied to a method. What are the restrictions on a static method?	4

UNIT-II

Q.4(a)	What is exception handling? Explain the usage of the throw and throws keywords with examples.	6
Q.4(b)	"The finally block is always executed." Discuss this statement and explain what scenarios can prevent the finally block from executing.	6
Q.5(a)	How does Java determine which package a class belongs to? Explain the relationship between the directory structure and package names.	4
Q.5(b)	Create a user-defined exception class named InvalidAgeException. Write a program that throws this exception if the entered age is less than 18.	8

UNIT-III

Q.6(a)	What is the Object class? List and explain any three of its methods that are commonly overridden.	5
Q.6(b)	Explain the concept of method hiding. How does it differ from method overriding?	7
Q.7(a)	What are wrapper classes? Explain the concept of autoboxing and unboxing with examples.	5
Q.7(b)	Design a class hierarchy for Shape (with an abstract method calculateArea()). Create subclasses Circle and Rectangle that override this method. Demonstrate polymorphism using a reference of type Shape.	7

UNIT-IV

Q.8(a)	Write a Java program to create two threads that print even and odd numbers sequentially, demonstrating inter-thread communication.	8
Q.8(b)	What is a daemon thread? How is it different from a user thread?	4
Q.9(a)	Discuss a scenario that leads to a deadlock in a multithreaded program. How can deadlocks be prevented?	8
Q.9(b)	Provide a brief overview of the JavaFX architecture. What is the role of the Stage and Scene classes?	4

---------- ---------- ----------