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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S2 (S) / S1 (Challenge Course) Examination December 2025 / January 2026 (2024 Scheme)

Course Code: GXEST204

Course Name: PROGRAMMING IN C

Max. Marks: 60 Duration: 2hours30minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	Calculate and print the result of the following expression in C: *int result = 8 + 3 * (10 - 6) / 2;* *printf("%d", result);*	CO1	(3)
2	Differentiate between **entry-controlled** and **exit-controlled** loops in C. Provide **one example** of each type of loop used in the C programming language.	CO1	(3)
3	Write a C program to **calculate the length of a string** entered by the user, **without using any built-in string handling functions** such as strlen().	CO2	(3)
4	Write a C program to **find the second largest element** in an array.	CO2	(3)

5	Examine the following C program and **identify the storage class** of each variable declared:
	#include <stdio.h>
	int x;
	int main() {
	int y;
	printf("x = %d, y = %d", x, y);
	return 0;
	}
		CO3	(3)

6	How can **structures** and **unions** be created in C? How do they **differ in terms of memory utilization**?	CO3	(3)
7	How would you **pass an array to a function using a pointer**, and how is this **different from passing a single variable**?	CO4	(3)
8	Consider the following statement: `FILE *fp = fopen("data.txt", "w");`	CO5	(3)

What are the implications in each of the following scenarios?

•If data.txt **does not exist** on the disk

• If data.txt **already exists** on the disk

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a)	Write a C program to **check whether a given number is a perfect number**. Hint: *A perfect number is a positive integer that is equal to the sum of its proper divisors (excluding itself).* **Example:** The divisors of 6 (excluding 6) are 1, 2, and 3. Since 1 + 2 + 3 = 6, the number **6 is a perfect number**.	CO1	(6)
	b)	How does the break statement differ from the continue statement in loops? Include a **simple code example** to illustrate the difference.	CO1	(3)
10	a)	Write a program to **count how many times each digit** (0–9) occurs in a given number.	CO1	(6)
	b)	What are the **rules** that govern the formation of **valid identifiers** in the C programming language?	CO1	(3)

Module -2

11	a)	Write a C program to check whether a given **square matrix** A is **symmetric** or not. Hint: *A matrix is symmetric if it is equal to its transpose (i.e., $A = A^T$).*	CO2	(5)
	b)	Write a C program for an institution that stores a list of allotted seat numbers for an exam hall using an array. The program should allow the user to: 1. Input the total number of allotted seats, followed by the seat numbers. 2. Prompt the student to enter a seat number they want to check. 3. Use a **linear search algorithm** to determine whether the entered seat number exists in the list of allotted seats. 4. Display an appropriate allotment message.	CO2	(4)
12	a)	Write a C program that reads a string from the user and **counts the number**	CO2	(5)

of vowels, **consonants**, **digits**, and **whitespace characters** present in the string.

b) Write a C program to simulate a simple **login system** where the user is prompted to enter a **username** and **password**. The program should: CO2 (4)

1. Compare the entered credentials with predefined values (for example, username = "admin" and password = "1234").
2. Display a **success message** if both match.
3. Display an **error message** indicating that the login has failed if the credentials do not match.

Module -3

13 a) An online movie streaming platform wants to sort a list of movies based on **user ratings** to highlight the top-rated content. Write a C program that: CO3 (5)

1. Accepts the names of movies along with their corresponding ratings (out of 10).
2. Sorts the list in **ascending order** based on the ratings.
3. Displays the **top 5 highest-rated movies** from the list.

b) Write a C program that uses a **user-defined function** to convert a **decimal number** to its **binary equivalent**. CO3 (4)

The program should:

1. Prompt the user to enter a **positive decimal number**.
2. Pass the number to a function named `decimalToBinary(int num)`.
3. Display the **binary representation** of the number.
   The function should perform the conversion **without using built-in libraries**.

14 a) Write a C program that defines a structure named **CricketPlayer** with the following members: `name`, `team`, `matches_played`, `runs_scored` CO3 (6)

The program should:

1. Input details for **10 players**.
2. Use **functions** and **structure pointers** to find and display the

player with the highest runs scored.

3. Finally, display the details of **all the players.**

b) Write a C program to compute the **nth Fibonacci number** using **recursion.** CO3 (3)

Module -4

15 a) Write a C program that: CO5 (6)

1. Creates a file named **"output.txt"**.
2. Writes each character of the string **"Learning C is fun!"** individually using the `putc()` function inside a loop.
3. Reopens the file in **read mode** and uses `getc()` to read each character until the **end of the file.**
4. Ensure the file is properly **closed** after both operations.

b) Compare malloc() and calloc() in terms of **dynamic memory allocation.** CO4 (3)

16 a) What are the uses of the ftell() and fseek() functions in C? CO5 (3)

b) Write a C program that uses a structure named `Time` with two members: CO4 (6)

- `hours` (of type `int`)
- `minutes` (of type `int`)

Implement functions to **add** and **subtract** two-time values, ensuring that minutes are properly adjusted (for example, **90 minutes** should be converted to **1 hour and 30 minutes**).

- Use **pointers to structures** as function parameters.
- Display the final result in a readable **hh:mm** format.

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