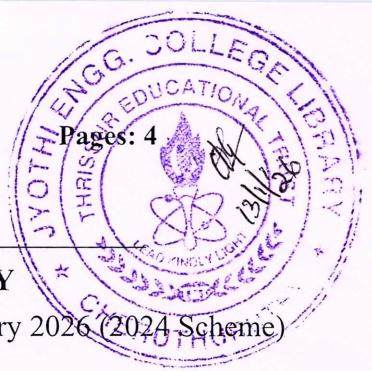


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

## 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:  <code>int result = 8 + 3 * (10 - 6) / 2; printf("%d", result);</code>	CO1	(3)
2	Differentiate between <b>entry-controlled</b> and <b>exit-controlled</b> loops in C.  Provide <b>one example</b> of each type of loop used in the C programming language.	CO1	(3)
3	Write a C program to <b>calculate the length of a string</b> entered by the user, <b>without using any built-in string handling functions</b> such as <code>strlen()</code> .	CO2	(3)
4	Write a C program to <b>find the second largest element</b> in an array.	CO2	(3)
5	Examine the following C program and <b>identify the storage class</b> of each variable declared:  <code>#include &lt;stdio.h&gt; int x; int main() {     int y;     printf("x = %d, y = %d", x, y);     return 0; }</code>	CO3	(3)
6	How can <b>structures</b> and <b>unions</b> be created in C? How do they <b>differ in terms of memory utilization</b> ?	CO3	(3)
7	How would you <b>pass an array to a function using a pointer</b> , and how is this <b>different from passing a single variable</b> ?	CO4	(3)
8	Consider the following statement:  <code>FILE *fp = fopen("data.txt", "w");</code>	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.** CO1 (6)

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**.

b) How does the break statement differ from the continue statement in loops? CO1 (3)  
Include a **simple code example** to illustrate the difference.

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. CO2 (5)

Hint: *A matrix is symmetric if it is equal to its transpose (i.e.,  $A = A^T$ ).*

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.

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:

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:

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**.

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**

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  $n^{\text{th}}$  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:

- `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.

\*\*\*