

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name:<>, Semester:<>
(December, 2024)

Subject Code: BCS 101	Subject: Programming With C
Time :3 Hours	Maximum Marks :60

Note:Q1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1	Attempt All Parts	(2.5*8 =20)	CO Mapping
	a) Design a flowchart to calculate the area of a triangle given its base and height. Explain the steps involved.		CO1
	b) Evaluate the result of the following C expression: int x = 10, y = 20, z = 5; int result = (x > y) ? (x - z) : (y - z); Explain your answer.		CO1
	c) Write a C program that checks whether a number is divisible by both 5 and 10 using a single if-else-if condition. Explain why only one of the conditions executes.		CO2
	d) Consider the following code: char str[] = "Hello"; printf("%s", str + 2); What will be the output of this program? Explain why.		CO2
	e) Analyze the following code and state the output: void func() { int x = 10; printf("%d ", x); } func(); printf("%d", x); Explain the scope of variable x in the given code.		CO3
	f) What could go wrong if you try to free() a pointer that was not dynamically allocated? Illustrate with an example.		CO3
	g) Given a structure Student with fields Name, RollNo, and Marks[], write a code to create an array of Student structures and initialize each student's name and marks. Then, display the details of each student.		CO4
	h) What is the purpose of the #define preprocessor directive in C? Provide an example where using #define improves code readability and maintainability.		CO4
UNIT I			CO Mapping
Q2	Write a C program that evaluates and prints the result of the following complex expression: int a = 10, b = 5, c = 20; a += b * (c / 5) - 2; printf("%d", a);	(10)	CO1

	Explain the order of evaluation and operator precedence in this expression.		
Q3	Write a C program that demonstrates the concept of implicit and explicit type casting with examples. Include a case where type casting may result in loss of data or precision. Provide a scenario where implicit type casting is preferable over explicit casting.	(10)	CO1
UNIT II			CO Mapping
Q4	Write a program that takes two 2D arrays of the same size, performs matrix addition, and prints the result. Ensure that the arrays are passed to a function to handle the addition.	(10)	CO2
Q5	Write a program that accepts two strings and compares them without using the strcmp function. The program should print "Equal" if the strings are the same and "Not Equal" otherwise.	(10)	CO2
UNIT III			CO Mapping
Q6	Design a function that reverses an array of integers. Use recursion to achieve this. Critically analyze the performance implications of recursion compared to using a loop for the same task.	(10)	CO3
Q7	Given the following code, analyze what happens at runtime: <pre>int *arr = malloc(5 * sizeof(int)); arr = realloc(arr, 10 * sizeof(int)); free(arr);</pre> Discuss the possible issues related to memory allocation, resizing, and freeing memory.	(10)	CO3
UNIT IV			CO Mapping
Q8	Write a program that combines structures and unions to represent a "Vehicle" with the following: <ul style="list-style-type: none"> Fields for the vehicle type (car, bike, truck) and vehicle details (using structure fields). A union that stores either fuel capacity (in liters) for cars and trucks, or engine power (in horsepower) for bikes. Implement functions to display the details of each vehicle depending on its type. 	(10)	CO4
Q9	Write a C program that performs the following operations on a file: <ul style="list-style-type: none"> Read a series of records (each containing a student name and marks). Store these records in an array of structures. Write the array of structures back to a new file. Implement error handling if the file cannot be opened or read properly. 	(10)	CO4