



Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Advisory Scheme 12 of 2011)
University under section 2(f) of UGC Act, 1956

END SEMESTER EXAMINATION-2025

B. Tech First Semester

Roll no.....

Name of the Program & Semester: B.Tech I SEM.

Name of the Course: Fundamentals of Computers & Introduction to Programming

Course Code: TCS 101

Time: 3 hours

Maximum Marks: 100

Note:

- (I) All questions are compulsory.
- (II) Answer any two sub questions among a, b and c in each main question.
- (III) Total marks assigned in each main question are twenty.
- (IV) Each question carries 10 Marks

Q.1	(20 marks)	
a)	Briefly discuss the types of Computer Networks with an example for each. Ram transferred a file from Node P to node Q at a transmission rate of 80 MBps (megabytes per second). The transfer was completed in 5 minutes. Calculate the total size of the file, assuming that all other potential network bottlenecks—such as noise, jitter, and packet loss—are negligible. Assume 1000 Bytes = 1KB and so on.	CO1
b)	Assume a videographer is recording a show for 20 hours. About how much data will be recorded in GB and TB? (Assume HD (1080p) video will use as much as 12MB per minute).	CO1
c)	The memory hierarchy in a computer system ranges from registers to cloud storage. Explain each level of the memory hierarchy in terms of speed, cost and capacity. Why is the hierarchy designed in this way instead of having a single large fast memory?	CO1
Q.2	(20 marks)	
a)	Explain unary, binary, and ternary operators. Write a C program that takes three numbers from the user, finds the smallest number using the ternary operator, subtracts this smallest value from the total sum of the three numbers, and then divides the result by 2. What operation does the program finally achieve? Explain.	CO2
b)	Draw a flowchart to read an integer number and check whether that number is perfect square number or not. (Note: Example of Perfect number: 4, 9, 16, 25)	CO3
c)	Draw a flowchart to print following pattern till n rows. <pre>@ @@@ @@@@@ @@@@@@@ @@@@@@@@@</pre>	CO3
Q.3	(20 marks)	
a)	Develop a 'C' code to input a 6-digit positive integer number and swap its first and last digit.	CO4



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b)	Differentiate between Entry controlled & Exit Controlled loops with appropriate examples. Demonstrate the use of break & continue with a fragment of C code.	CO4				
c)	Write a C program using switch-statement to find the frequency of vowels in a stream of N characters accepted from the user.	CO4				
Q.4	(20 marks)					
a)	Explain 1-D array initialization at compile time and run time with a relevant example in C. Develop a 'C' code to input N integer elements in an array and print the final array by converting each positive number to negative and each negative number to positive.	CO6				
	<table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>Number of elements: 5 Inputted Elements: 2 -3 0 5 -4</td><td>Final array: -2 3 0 -5 4</td></tr></table>	Sample Input	Sample Output	Number of elements: 5 Inputted Elements: 2 -3 0 5 -4	Final array: -2 3 0 -5 4	
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Number of elements: 5 Inputted Elements: 2 -3 0 5 -4	Final array: -2 3 0 -5 4					
b)	Draw a flowchart and write a C program that performs a Binary Search to locate a user-entered key within an array of N elements.	CO6				
c)	Write a 'C' program to read n characters in an array. Display all the elements of array by displaying each digit into its equivalent number name.	CO6				
	<table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>Total Number of characters: 30 Inputted Characters: Pin code of Dehradun is 248001.</td><td>Pin code of Dehradun is Two Four Eight Zero Zero One.</td></tr></table>	Sample Input	Sample Output	Total Number of characters: 30 Inputted Characters: Pin code of Dehradun is 248001.	Pin code of Dehradun is Two Four Eight Zero Zero One.	
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Q.5	(20 marks)					
a)	What is recursion? Explain how recursion works using the concept of activation record and function call stack. Write a C program to print first n terms of Fibonacci series using a recursive function.	CO5				
	<table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>Number of terms (n): 7</td><td>0 1 1 2 3 5 8</td></tr></table>	Sample Input	Sample Output	Number of terms (n): 7	0 1 1 2 3 5 8	
Sample Input	Sample Output					
Number of terms (n): 7	0 1 1 2 3 5 8					
b)	Predict the output of the following C programs and justify your answer. Assume below programs are free from syntax errors.	CO2, CO4, CO5				
	<table><tr><td>i) #include <stdio.h> int main() { int n = 0; if(n--) printf("Inside if"); else printf("Inside else"); return 0; }</td><td>ii) #include<stdio.h> int main() { char ch = '7'; ch = ch - '0'; printf("%d", ch); return 0; }</td></tr><tr><td>iii) #include<stdio.h> int main() {</td><td>iv) #include<stdio.h> int Disp() {</td></tr></table>	i) #include <stdio.h> int main() { int n = 0; if(n--) printf("Inside if"); else printf("Inside else"); return 0; }	ii) #include<stdio.h> int main() { char ch = '7'; ch = ch - '0'; printf("%d", ch); return 0; }	iii) #include<stdio.h> int main() {	iv) #include<stdio.h> int Disp() {	
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	<pre>int True=0; while(!True) { printf("Welcome to the World of C "); if (!True) { True=1; } printf("\n C is wonderful."); } return 0; }</pre>	<pre>static int x=1; printf("%d\n", x--); } int main() { int i; for(i=0;i<4;i++) Disp(); return 0; }</pre>	
	<pre>v) #include <stdio.h> int main() { int i; for(i = 1; i <= 10; i++) { if(i % 3 == 0) continue; if(i > 7) break; printf("%d ", i); } return 0; }</pre>		
c)	What is the significance of storage classes in 'C'? Explain all the storage classes available in 'C' with their characteristic and uses with suitable example.		CO5