

Department of Computer Science and Engineering
CEG Campus, Anna University, Chennai
CS23101 COMPUTATIONAL THINKING
Continuous Assessment Test - 1 for Theory

Name: _____

Reg. No.: _____

Date of Test: _____

Year: _____

Sem: _____

Batch: _____

Max. Marks: 25

Max. Duration: 1 Hour

ANSWER ALL THE QUESTIONS

Question 1: Problem Decomposition (5)

Scenario: Organizing a Community Clean-Up Event

You are a volunteer coordinator for a local community organization planning a clean-up event in a neighborhood park. Decompose the process of organizing this event into manageable steps.

Question 2: Testing Skill on Spreadsheet Software (8)

Write appropriate formulae/function/steps for the following:

- a) You have a list of expenses in cells A1 to A5. Write the formula to calculate the total expenses.
- b) In cell B1, you have a date (e.g., "2024-10-23"). Write a function to extract the year from this date.
- c) In cell C1, you have a score (e.g., 75). Write a formula using the IF function to determine if the score is a "Pass" (if the score is 50 or above) or "Fail" (if below 50).
- d) You have values in cells D1 and D2. Write a formula that uses the MAX function nested within an IF function to display "High" if the maximum value is above 100 and "Normal" if it is 100 or below.
- e) You have a list of sales figures in column E and a category in column F. Write a formula to count how many sales in column E are greater than 200 in the category "Electronics."
- f) You have a table with product IDs in column A and prices in column B. Write a VLOOKUP formula to find the price of the product with ID "P123" (assuming IDs are in cells A1 and prices in B1).
- g) How would you apply conditional formatting to highlight cells in column G that are greater than 50?

- h) You have sales data for each month in cells H1 to H12. Describe how you would create a line chart to visualize this data.

Question 3: Logical Thinking and Reasoning (1+2+3=6)

- a) Pattern Recognition: Identify the next number in the sequence: 2, 3, 5, 8, 12, 17, __. Explain the pattern.
- b) Logical Reasoning: A farmer has chickens and cows. If the total number of heads is 50 and the total number of legs is 150, how many chickens and cows does the farmer have?
- c) Nonogram: Given a 7x7 nonogram with the following clues:
- Row clues: [2, 1], [1, 1], [3], [1, 1], [2, 2], [1, 1], [3]
- Column clues: [2, 2], [1, 1], [1, 1], [3], [1, 2], [2], [1]
- What is the filled grid for this nonogram?

Question 4: Data Encryption and Compression (1+2+3=6)

- a) Decoding: What is the original message of the encoded string "GUR DHVPX" using a ROT13 cipher where ROT13 shifts each letter by 13 places?
- b) Data Encryption with Custom Ciphers: You are tasked with creating a substitution cipher where each letter of the alphabet is replaced with the letter 3 places back (e.g., A becomes X, B becomes Y, etc.). Encode the phrase "MEET ME AT DAWN" using your cipher.
- c) Huffman Encoding: Given the string "AAAABBBCCDAAAE", describe how to create a Huffman tree for the characters based on their frequency and then provide the Huffman Code of the compressed string.