UES711225FA-1

Reg No.: _____ Name : _____

Jyothi Engineering College(Autonomous)

B. Tech Degree S1 (R) Examination, December 2025 (2025 Scheme)

25EST105- ALGORITHMIC THINKING WITH PYTHON

Total Mark: 60 Total Time: 2hrs 30 min

		CO	MARK

PART A

(Answer All Questions. Each question carries 3 marks)

1.	You need to organize your study schedule for the week, balancing multiple subjects and limited time. Which problem-solving strategy will you use and why?	CO1	(3)
2.	You are asked to solve a jigsaw puzzle without a reference picture. How will you solve it using the Trial-and-Error method?	CO1	(3)
3.	An electricity board charges the following rates: i) For the first 100 units: ₹5 per unit ii) For the next 200 units: ₹7 per unit iii) Beyond 300 units: ₹10 per unit. Draw a flowchart to input the number of units consumed by a customer and calculate the total electricity bill.	CO2	(3)
4.	Write the pseudocode to find the given number is divisible by 4 but not by 3.	CO2	(3)
5.	Write a Python program using a for loop to display even and odd numbers between 1 and 20 separately.	CO3	(3)
6.	Write a NumPy program to create two 2×2 matrices and perform matrix addition and subtraction using appropriate NumPy functions.	CO3	(3)
7.	What is the brute-force computational problem-solving approach, and how many maximum attempts are required to guarantee opening a four-digit numerical padlock (digits ranging from 0 to 9) using this approach?	CO4	(3)
8.	Compare and contrast the features of Dynamic programming and Greedy Approach.	CO4	(3)

PART B

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

Module - 1

9.	Walk through the six problem-solving steps to find the average of a list of numbers entered by the user. The user will stop the input by giving the value -999.	CO1	(9)

OR

10. a)	Write a Python program using the math module to read a number from the user and display its square root, factorial, and power (raise the number to 3).	CO1	(5)
b)	Explain how the += operator works with an example. How does it differ from the simple = assignment operator?	CO1	(4)

Module - 2

11. An e-commerce site applies a 5% discount for every item in the cart. Draw a flowchart to repeatedly input the price and quantity of each item, apply the discount, and calculate the final bill. Stop when the customer enters "0". CO2 (9)

OR

12. A family records their electricity meter readings every month. The difference between the current month and last month reading gives the units consumed. Write pseudo code and program to input the meter readings of 12 months and calculate the average monthly consumption. CO2 (9)

Module - 3

13. Write a Python program to perform the following set operations:

    1. Create two sets — A and B — with some integer elements.
    2. Display the union, intersection, and difference of the sets.
    3. Display the symmetric difference between the sets.
    4. Check whether set A is a subset of B.
    5. Add a new element to set A and remove one element from set B.
    6. Display the final contents of both sets.

    CO3 (9)

OR

14. What are sequence data types? Explain lists and tuples with examples of creation, indexing, and slicing. CO3 (9)

Module - 4

15. Explain the Brute Force Approach with suitable examples such as padlock combinations and password guessing. Discuss its advantages and limitations. CO4 (9)

OR

16. Calculate the area of a unit circle using a randomized approach, Monte Carlo simulation. Explain the steps in detail and also the python code to estimate values through random sampling. CO4 (9)

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