Faculty Name: Dr. Y.V. Srinivasa Murthy Exam Duration: 50 +10 Mins Maximum Marks: 30

General instruction(s): Answer any three questions and each question carry 10 marks.

Answer any Three Questions

Sl.No.	Questions	Course Outcome (CO)	BL
1.	What is the loop invariant for insertion sort technique. Develop insertion sort algorithm by providing its pseudo code. Check the proof of correctness for the same.	CO1	L3
2.	Mr. X has taken array having a set of numerals. He would like to find the difference among the maximum and minimum elements of a given array. He would like to develop a findMaxMin() algorithm for the same. However, the time complexity for such algorithm needs 'n' internal operations. Hence, the same has to be reduced to achieve optimality. In such a case, which technique is more suitable. Develop the optimal algorithm using the same technique and discuss its time complexity.	CO2	L5
3.	A thief enters a house for robbing it. He can carry a maximal weight of 15 kg into his bag. There are 5 items in the house with the following weights and values. What items should thief take if he either takes the item completely or leaves it completely?	CO2	L6

Item	Weight (Kg)	Value (€)
IPad	2	300
Mac Book Air	3	450
Laptop	5	200
Desktop	8	180
Paint	3	800

Design an algorithm for the above problem using dynamic programming and apply the same for the given data. Explain each step while constructing a table for the above problem