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Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Fourth Semester B. Tech. (Computer Science & Engg.)

Summer – 2018

Course Code: CSU402

Course Name: Data structure

Time: 2 hrs. 30min. **Max. Marks: 60**

Instructions to Candidate

1) All questions are compulsory.
2) Assume suitable data wherever necessary and clearly state the assumptions made.
3) Diagrams/sketches should be given wherever necessary.
4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5) Figures to the right indicate full marks.

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1. a) What is time-space tradeoff explain with proper example. 06
   b) Write and explain slow pattern matching algorithm. 06

2. a) Write a procedure which finds the location LOC1 of the largest element and the location LOC2 of the second largest element in array. Also find the values of largest and second largest elements. 06
   b) Derive the table and corresponding graph by mentioning step by step procedure for the given pattern P=aaabb using fast pattern matching

algorithm. 06

3. **Solve any TWO**

a) Write binary search algorithm with example. 06

b) Write all required algorithms to insert a given item in sorted linked list.
An algorithm to find location of item in linked list.
An algorithm to insert an item into linked list at its proper position. 06

c) Suppose a linked list LIST is in memory. Give an algorithm which deleted the given item of information from the LIST. 06

4. **Solve any TWO**

a) Using stack translate following infix expression into its equivalent postfix expression, show all the steps.
((A+B) * (C-D) ↑ (E * F) / G) 06

b) Write recursive procedure for Tower of Hanoi problem and show shat recursive solution requires $f(n)=2^n-1$ moves for n disks. 06

c) Write and explain non recursive procedure for solving Tower of Hanoi problem using stack. 06

5. **Solve any TWO**

a) Write the algorithm for insertion into heap tree and build a max heap tree from the given list of numbers: 06
44, 30, 50, 22, 60, 55, 77, 55

b) Write algorithm for DFS. Consider a given adjacency list of a graph G. Find and print all the nodes reachable from node J using DFS, show all steps. 06

Adjacency List			
Node	Adjacent Nodes	Node	Adjacent Nodes
A	F, C, B	F	D
B	G, C	G	C, E
C	F	J	D, K
D	C	K	E, G
E	D, C, J		

c) Sort the following numbers using Radix sort.
348, 143, 361, 423, 538, 128, 321, 543, 366 06