Total No. of Questions : 4]

SEAT No. :

PA-4976

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S.E. (Computer /A.I. & D.S.) (Insem)

DATA STRUCTURES AND ALGORITHMS

(2019 Pattern) (Semester - II) (210252)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4.***
2) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) We have a hash table of size 10 to store integer keys, with hash function h(x) = x mod 10. Construct a hash table step by step using linear probing without replacement strategy and insert elements in the order 31,3,4,21,61,6,71,8,9,25. Calculate average number of comparisons required to search given data from hash table using linear probing without replacement. **[6]**

b) Explain the concept of quadratic probing using example. What are the advantages and disadvantages of quadratic probing over linear probing? **[5]**

c) What is hashing? Explain the properties of good hash function with examples. **[4]**

OR

Q2) a) Insert the following data in the hash table of size 10 using linear probing with chaining by applying with replacement : 11, 33, 20, 88, 79, 98, 68, 44, 66, 24. Calculate average number of comparisons required to search given data from hash table. **[6]**

b) Add following keys in hash table by applying extendible hashing mechanism. Assume capacity of each directory to store buckets is 3. Keys are 10, 20, 15, 12, 25, 30, 7, 11, 08. **[5]**

c) Write short note on skip list. **[4]**

P.T.O.

Q3) a) Write an algorithm to delete a node from Threaded binary Search Tree. **[6]**

b) The following numbers are inserted into an empty binary search tree in the given order : G, C, B, A, D, E, F, I, H. Construct tree step by step. Represent the constructed tree using static memory allocation. **[5]**

c) Let characters a, b, c, d, e, f has probabilities 0.07, 0.09, 0.12, 0.22, 0.23, 0.27 respectively. Find an optimal Huffman code and draw Huffman tree. **[4]**

OR

Q4) a) Construct threaded binary tree step by step if the preorder traversal is G, B, D, C, A, K, Q, P, R & in-order traversal is B, A, C, D, G, K, P, Q, R. Delete G and redraw a tree. **[6]**

b) Write a non-recursive function to display data in Binary Search Tree in descending order. **[5]**

c) Explain how to convert general tree to binary tree with example. **[4]**

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PA-4977

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S.E. (Computer /Artificial Intelligence & DataScience)(Insem)
SOFTWARE ENGINEERING
(2019 Pattern) (Semester-II) (210253)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat Diagram must be drawn wherever necessary.***
3) ***Assume Suitable data if necessary.***

Q1) a) List and explain the activities in software process frame work. **[6]**

b) Explain with neat diagram incremental model and state its disadvantages. **[5]**

c) Compare Plan driven and agile approach. **[4]**

OR

Q2) a) Elaborate how software engineering is a layered technology. **[6]**

b) Describe the Unified process. **[5]**

c) What is agility? List any three principles of agility. **[4]**

Q3) a) List all the tasks in requirement engineering. Explain it in brief. **[6]**

b) Define QFD. Explain the types of requirements defined by QFD. **[5]**

c) Design use case diagram for user interaction with ATM system. **[4]**

OR

Q4) a) Explain the importance of Requirement engineering. **[6]**

b) Explain the requirement Elicitation. **[5]**

c) What are the components of use case diagram? Explain usage of it with example. **[4]**

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