C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53202

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Computer Science Engineering

15UCS 302 -DATA STRUCTURES

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. Stack is also called as CO1- R

(a) Last in first out (b) First in last out (c) Last in last out (d) First in first out

2. What is the special property of red-black trees and what root should always be? CO2- U

(a) height of the tree

(b) a color which is either red or black and root should always be black color only

(c) pointer to next node

(d) a color which is either green or black

3. The minimum number of elements in a heap of height h is CO3- R

(a) 2^{h+1} (b) 2^{h} (c) 2^{h} -1 (d) 2^{h-1}

4. If several elements are competing for the same bucket in the hash table, what is it called? CO4- R

(a) Diffusion (b) Replication (c) Termination (d) Collison

5. Complete Graph with n nodes will have _____ edges. CO5- R

(a) n/2 (b) n-1 (c) n (n-1)/2 (d) (n-1)/2

PART – B (5 x 3= 15Marks)

6. State the properties of a binary tree. CO1- U

7. Illustrate the splay tree. CO2- U

8. List the properties of binary heap with an example. CO3- U

9. Mention any four application of Hashing. CO4- U

10. What are the kinds of graphs? CO5- App

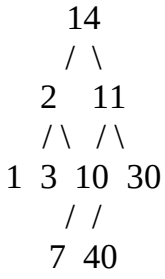
PART – C (5 x 16= 80Marks)

11. (a) Explain binary search and write a function to search an element from a list of n elements. CO1-U (16)

Or

(b) (i) What is tree traversal? Briefly explain each traversal with an Example. CO1 -U (10)

(ii) Here is a small binary tree: CO1 -App (6)



Circle all the leaves. Put a square box around the root. Draw a star around each ancestor of the node that contains 10. Put a big X through every descendant of the node that contains 10.

12. (a) (i) Insert the following sequence of elements into an AVL tree, starting with an empty tree: 10,20,15,25,30,16,18 and 19. Show the resultant tree after deleting 30. CO2 -App (8)

(ii) Write routines for single and double rotations in AVL tree. CO2 -U (8)

Or

	(b)	(i) How will you find maximum and a minimum element in binary search tree?	CO2 -App	(8)
		(ii) Discuss the importance of B-tree and explain the procedure for inserting and deleting an element in B-tree with an example.	CO2 -U	(8)
13.	(a)	(i) What is meant by heap order property? Construct a minimum heap for the following keys. 20, 10, 40 ,3, 2, 7, 60, 1 and 80	CO3- App	(8)
		(ii) Dr. Max has a patient who is very sick. Without further treatment, this patient will die in about 3 months. The only treatment alternative is a risky operation. The patient is expected to live about 1 year if he survives the operation; however, the probability that the patient will not survive the operation is 0.3. Draw a decision tree for this simple decision problem. Show all the probabilities and outcome values.	CO3- App	(8)

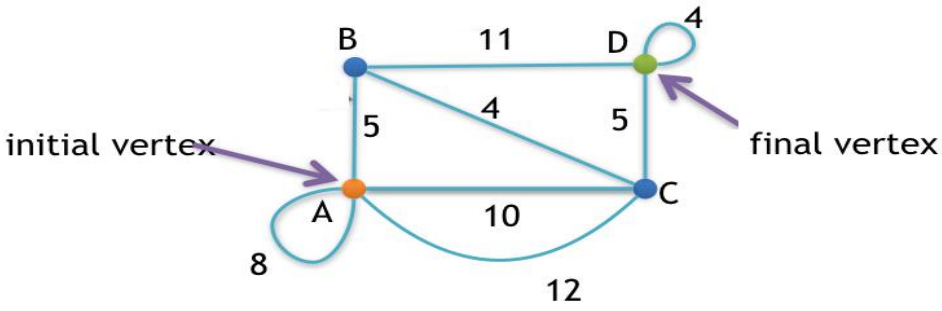
Or

	(b)	(i) Explain Huffman tree in detail.	CO3- App	(8)
		(ii) Explain decision trees in detail.	CO3- App	(8)
14.	(a)	The following is the list of binary keys: 0011, 1100, 1111, 0010, 1011, 0111, 0000, 0001, 0100, 1000, 1001, 0011. Design a hash function and appropriate hash table to store and retrieve the key efficiently. Compare the performance when the set is stored in sequential list.	CO4-App	(16)

Or

	(b)	(i) With example explain in detail the various collision resolution strategies.	CO4 -U	(8)
		(ii) What do you mean by hashing? Explain any five popular hash functions.	CO4 -U	(8)

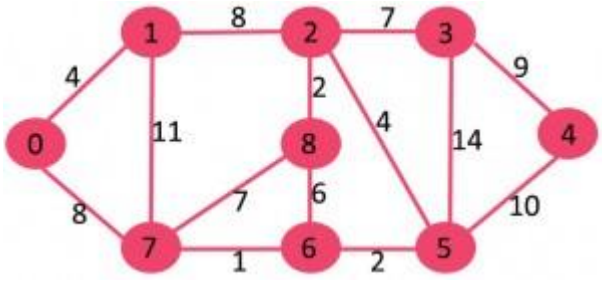
15. (a) (i) Find the shortest path for the following graph using Dijkstra algorithm. CO5- App (8)



(ii) Differentiate between breadth first traversal and depth first traversal with an example graph. CO5- U (8)

Or

(b) (i) Construct a minimum spanning tree for the given graph using Kruskal's algorithm. CO5- App (10)



(ii) Explain topological sort with an example. CO5- App (6)