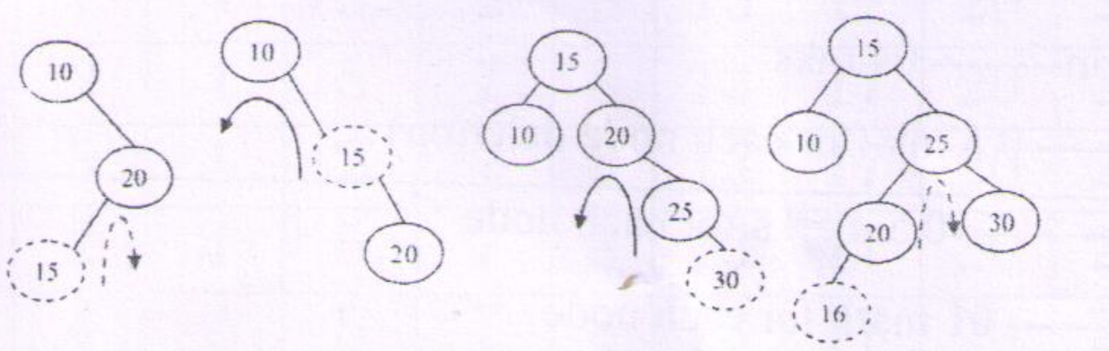
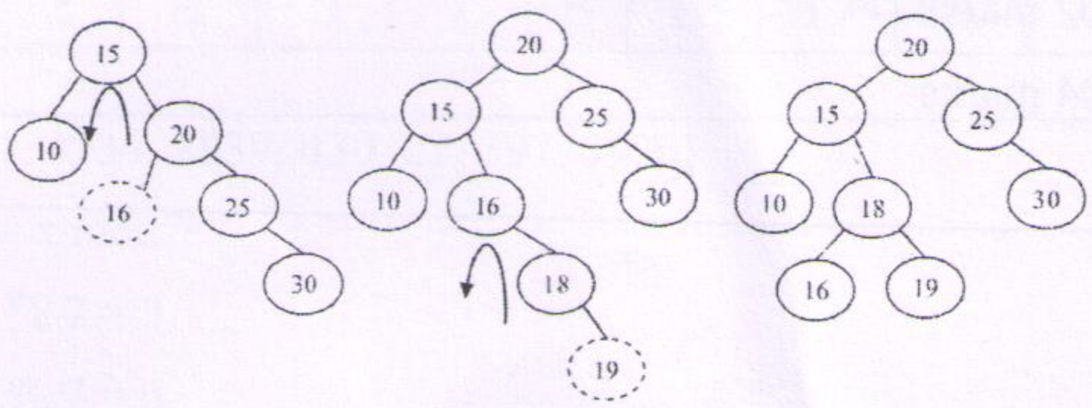
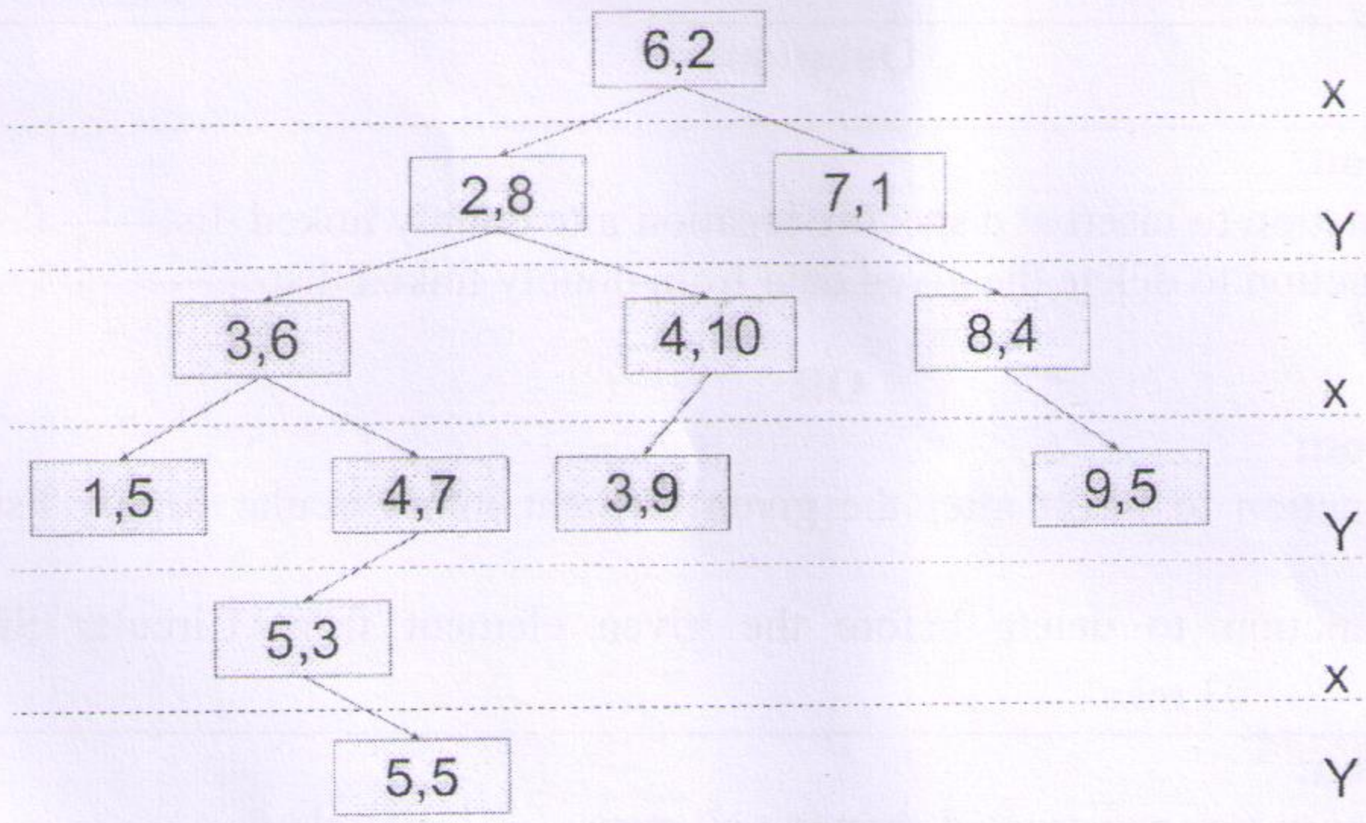
Synoptic

November/December 2019

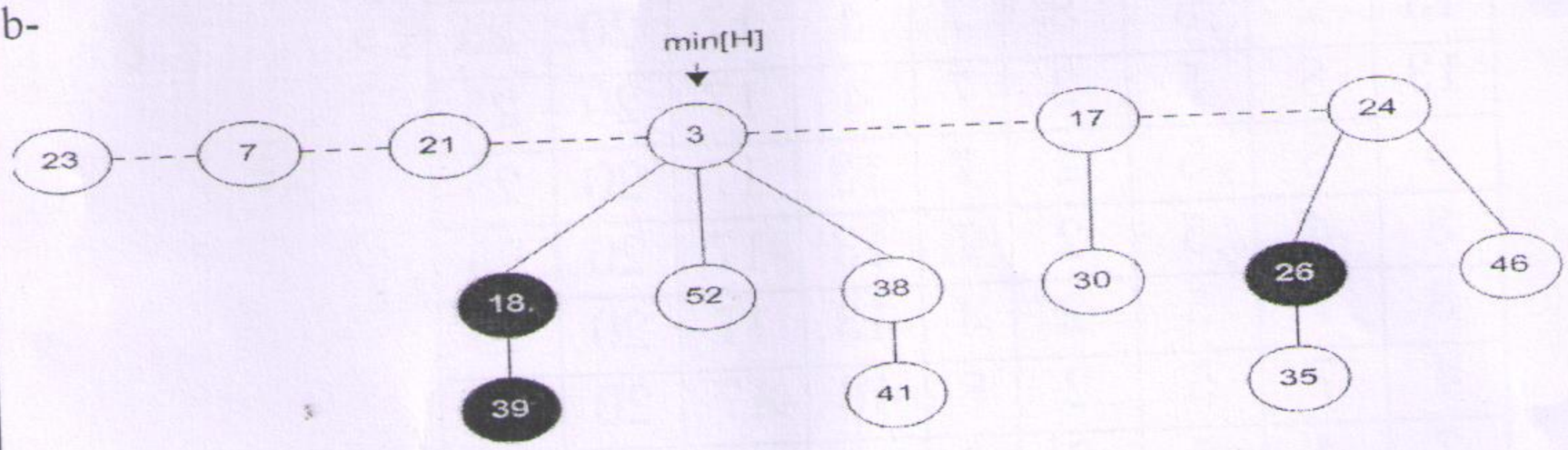
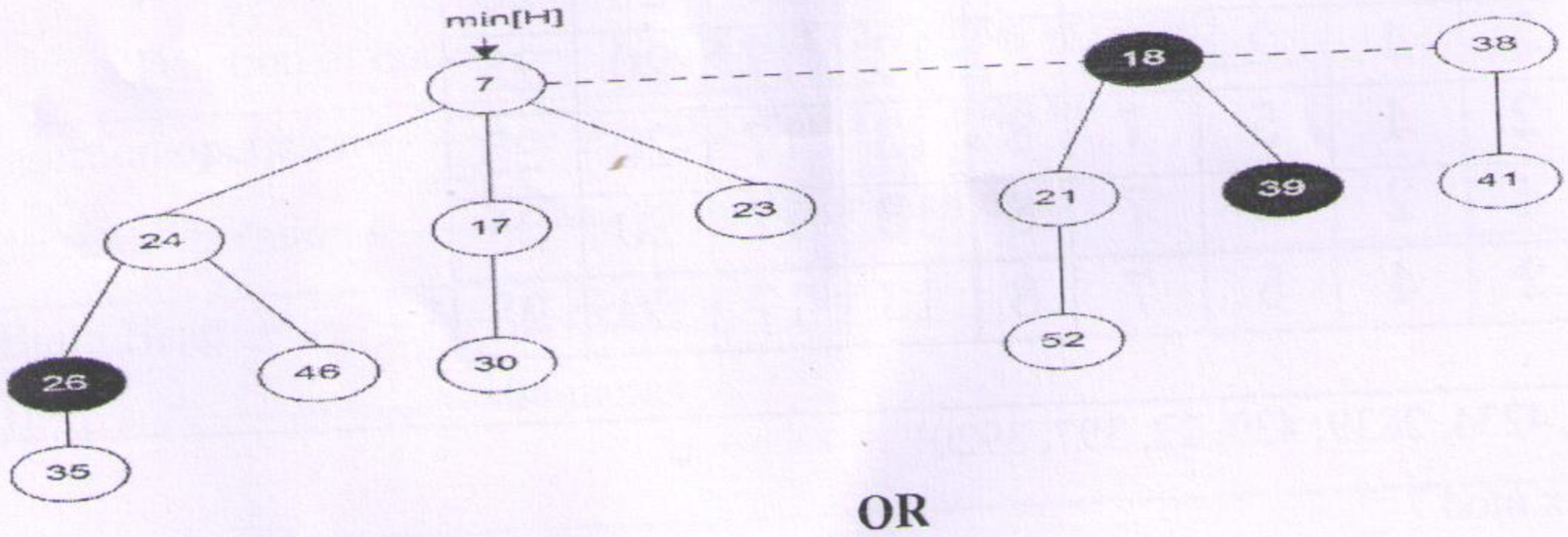
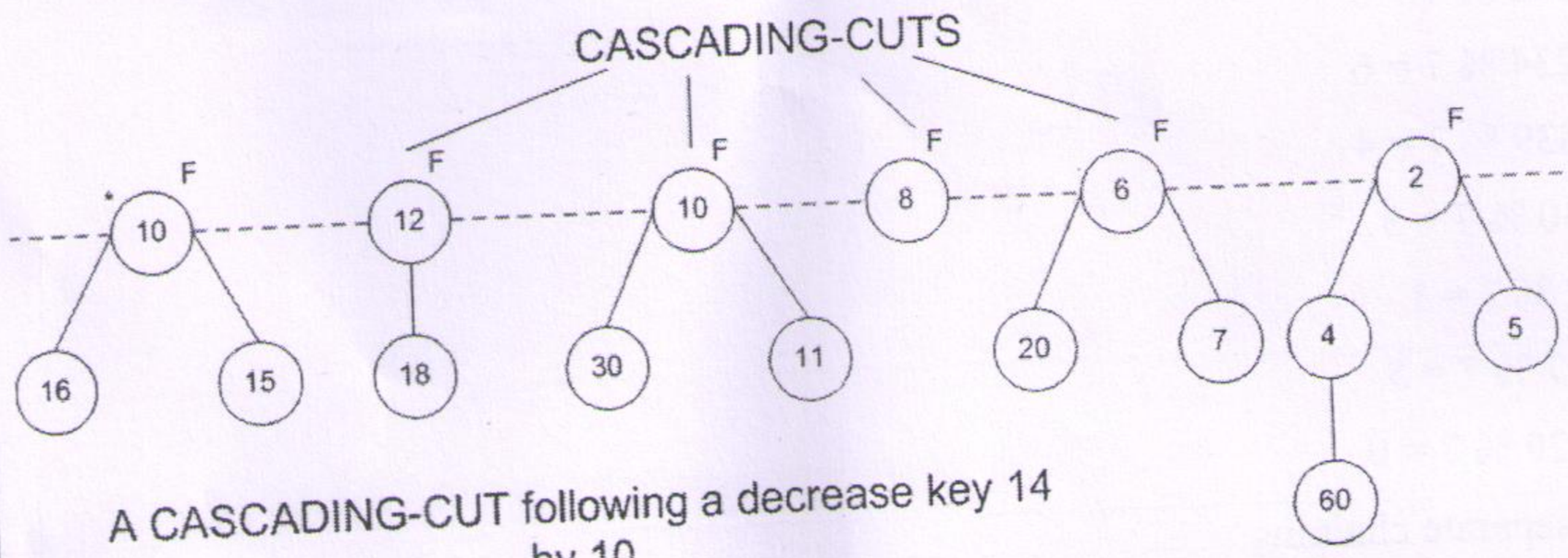
Max. Marks: 60 | **Duration: 3 hrs**
Class: S.E. | **Semester: III**
Course Code: CE31/IT31 | **Branch: COMP/IT**
Name of the Course: Advanced Data Structures

Q. No.	Question	Mks
Q1 (a)	**Marks Distribution** Correct function to insert at a specific location into doubly linked list------ 03mks Correct function to delete the given data from doubly linked list---------- 03 mks **OR** **Marks Distribution:** Correct function to insert after the given element into Circular Singly list----- 03mks Correct function to delete before the given element from Circular Singly list---------- 03 mks	*06*
Q1 (b)	**Marks Distribution:** Correct Binary tree constructed showing all steps--------- 04mks Correct Binary tree constructed with few steps shown--------- 02mks	*04*
Q2 (a)	  **Marks Distribution:** Solved problem correctly------ 03mk Rotation type Mentioned----- 0.5mk Stated the balance factor for each node-------- 0.5mk Delete each node 1 mk	*06*
Q2 (b)	**Marks Distribution:** Correct B-Tree constructed with all steps of insertion shown------ 06 marks Correct B-Tree constructed with few steps of insertion shown------ 04 marks	*06*

	Correct B-Tree constructed with no steps of insertion shown------ 02 marks **OR** **Marks Distribution:** Correct B+ Tree constructed with all steps of insertion shown------ 06 marks Correct B+ Tree constructed with few steps of insertion shown------ 04 marks Correct B+ Tree constructed with no steps of insertion shown------ 02 marks	
Q3 (a)	 **K-D Tree** **Marks Distribution:** K-d tree construction-------- 04 mks Deletion of node------- 0.5 mk (for each node deletion)	*06*
Q3 (b)	insertion operation---------- 0.5 marks for each node deletion operation---------- 01 mark for each node	*06*
Q4 (a)	Build Heap ----------02 marks Heap sort ----------04 marks	*06*

5	13	2	25	7	17	20	8	4
5	13	20	25	7	17	2	8	4
5	25	20	13	7	17	2	8	4
25	5	20	13	7	17	2	8	4
25	13	20	5	7	17	2	8	4
25	13	20	8	7	17	2	5	4
4	13	20	8	7	17	2	5	25
20	13	4	8	7	17	2	5	25
20	13	17	8	7	4	2	5	25
5	13	17	8	7	4	2	20	25
17	13	5	8	7	4	2	20	25
2	13	5	8	7	4	17	20	25
13	2	5	8	7	4	17	20	25
13	8	5	2	7	4	17	20	25
4	8	5	2	7	13	17	20	25
8	4	5	2	7	13	17	20	25
8	7	5	2	4	13	17	20	25
4	7	5	2	8	13	17	20	25
7	4	5	2	8	13	17	20	25
2	4	5	7	8	13	17	20	25
5	4	2	7	8	13	17	20	25
2	4	5	7	8	13	17	20	25
4	2	5	7	8	13	17	20	25
2	4	5	7	8	13	17	20	25

Q4 (b)	{2341, 4234, 2839, 430, 22, 397, 3920} h(x) = x mod 7 2341 % 7 = 3 4234 % 7 = 6 2839 % 7 = 4 430 % 7 = 3 22 % 7 = 1 397 % 7 = 5 3920 % 7 = 0 1. separate chaining 0 [3920] 1 [22] 2 [ ] 3 [2341, 430] 4 [2839] 5 [397] 6 [4234]	***03***

	2. double hashing with second hash function h'(x) = (2x - 1) mod 7 0 [3920] 1 [430] 2 [22] 3 [2341] 4 [2839] 5 [397] 6 [4234] (2*430-1) % 7 = 5 430 = 3 = 3+1*5 = 8 % 7 = 1 (2*22-1) % 7 = 1 22 = 1 = 1 + 1*1 = 2	*03*
Q5 (b)	a- $\Phi(H) = t(H) + 2\,m(H)$ *–t(H): the number of trees in root list of H =5* *–m(H): the number of marked nodes in H =3* $\Phi(H) = 5 + 2 * 3 = 11$	*02*
	b-  	*02*
	c-  	*04*
	OR	
	 A CASCADING-CUT following a decrease key 14 by 10	*08*
	4 cascade cuts each carries 2 marks each cut should be with proper justification and procedure	