SVKM's
Dwarkadas J. Sanghvi College of Engineering
Acad .Year 2022-2023
YEAR III / Semester VI

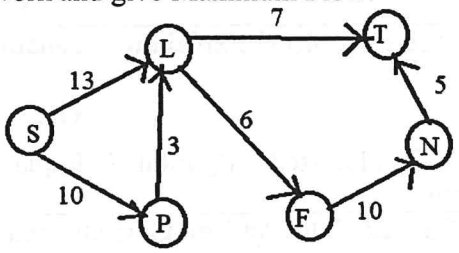
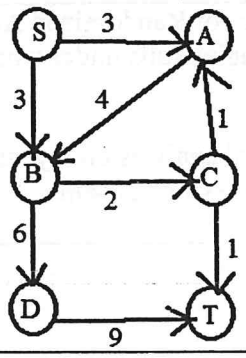
Program: B.Tech in Computer Engineering
Subject/Course: Advance Algorithm
Date: 08.08.2023

Max. Marks: 75
Time: 10:00-13:00
Duration: 03:00 Hrs

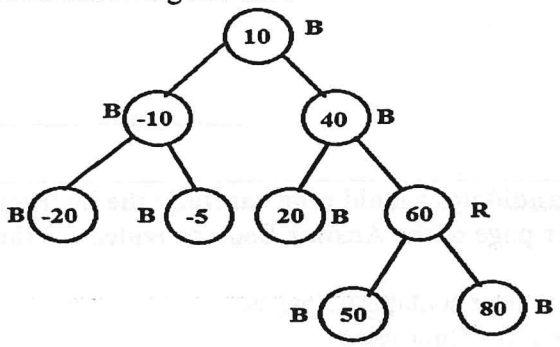
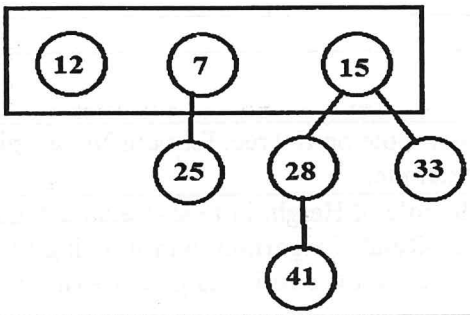
RE-EXAMINATION

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book provided for their use.

(1) This question paper contains **03** pages.
(2) All Questions Are Compulsory.
(3) All questions carry equal marks.
(4) Answer of each new question is to start on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat-labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Write a short note on R Tree. Explain Node-Spilt operation in R Tree using suitable example.	[05]
Q1 (b)	What is the role of Height in Push-Relable Algorithm? Apply Push-Relabel algorithm on following Flow Network. Draw the resultant network and give Maximum Flow.  **OR** Find maximum flow for the following network using Ford Fulkerson **BFS** method ONLY.  	[10] [10]

P.T.O.

Q2 (a)	Construct the Unbalanced KD Tree for following elements where K=2 (6 , 2), (7 , 1), (2 , 9), (3 , 6), (4 , 8), (8 , 4), (5 , 3), (1 , 5), (9 , 5) **OR** What is RB Tree? List all the properties of RB Tree. Delete node "10" from following RB Tree  (Note: Write 'R' for Red node and 'B' for Black node while constructing the RB Tree)	[10] [10]
Q2 (b)	List all the properties of Binomial Heap. What is Min Heap Property? Delete node "15" from the following Root List  	[05]
Q3 (a)	What is Hiring Problem? Explain with suitable diagram and give its probabilistic analysis. **OR** What is Randomized Algorithm? Explain basic 3 rules of Randomized Algorithm.	[05] [05]
Q3 (b)	What is Convex Hull? Perform Graham Scan Algorithm on following elements and draw the Convex Hull: (3,2), (8,3), (9,6), (5,6), (4,8), (1,5), (8,8), (7,4) (Note: Draw Convex Hull and show the clear stack state after each step of Graham Scan Algorithm.)	[10]
Q4 (a)	Give the categories of Randomized Algorithms. Give suitable example of each. Google Search Engine falls under which category? Justify the answer. **OR** Perform Amortized analysis on Dynamic Tables using any **TWO** methods and compare the complexities of same.	[08] [08] **P.T.O**

Q4 (b)	Reduce N-Queen problem using reducibility concept. Assume suitable value of N. **OR** What is NP-Completeness? How it is achieved? Elaborate with simple example.	[07] [07]
Q5 (a)	Prove that TSP Problem is NP-Complete and design an approximation algorithm for TSP.	[10]
Q5 (b)	Explain K-Server problem with simple example. **OR** Write a short note on Beyond Worst Case analysis.	[05] [05]

All the Best!