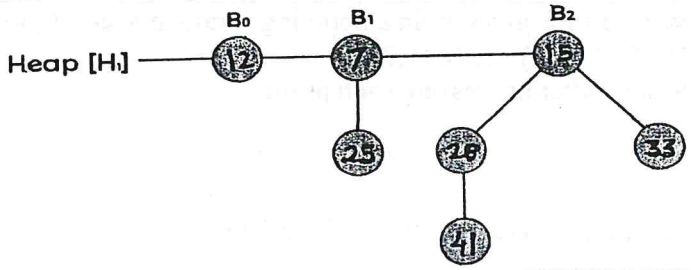
SVKM's
Dwarkadas J. Sanghvi College of Engineering
Acad .Year 2022-2023
YEAR III / Semester VI

Program: B.Tech in Computer Engineering | **Max. Marks: 75**
Subject/Course: Advance Algorithm | **Time: 09:00-12:00**
Date: 24.05.2023 | **Duration: 03:00 Hrs**

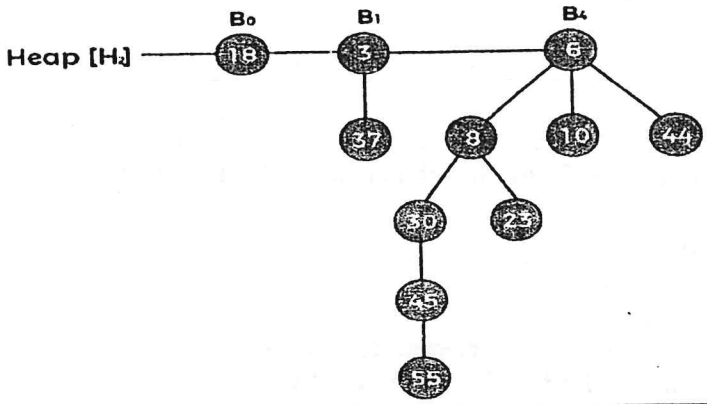
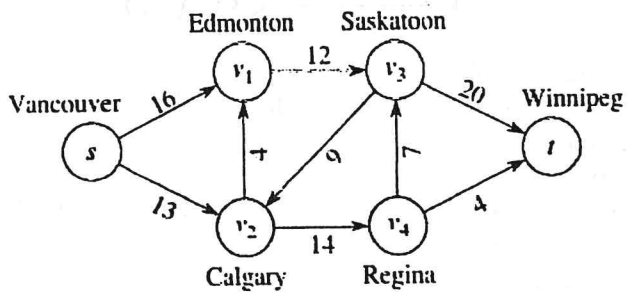
FINAL EXAMINATION

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

(1) This question paper contains 2 pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started 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 short note on following ~~(any 4)~~ (any 3) i. Small-o, Small Omega ii. Accounting Method iii. RAM Model Analysis (Provide suitable example) iv. R Tree v. HyperLogLog	~~[20]~~ [15]
Q2 (a)	What is the hiring problem? Discuss randomized solution for the same with complexity analysis.	[10]
Q2 (b)	Compare Las Vegas and Monte Carlo algorithm with example.	[05]
Q3 (a)	Construct Red-Black Tree that results from successive insertion of keys: 10, -5, 15, 14, 12, 20 and successive deletion of keys: 12 and 15 (Write 'R' for Red node and 'B' for Black node while constructing the tree) **OR** Perform Union operation on given binomial heaps,  	[10] [10]

P.T.O.

		
Q3 (b)	Demonstrate working of Randomized BST for insertion and deletion giving suitable example.	[05]
Q4 (a)	Compute the max-flow of following network using Ford-Fulkerson algorithm. Show Residual Graph after each iteration. (Do not consider reverse residual capacity)  **OR** Illustrate Maximum Bipartite Matching with suitable example.	[10] [10]
Q4 (b)	Analyze the problems associated with Ford-Fulkerson algorithm and discuss the solution for the same using Edmonds-Karp Method.	[05]
Q5 (a)	Generate a convex hull for given points applying Graham scan algorithm: (1,1), (2,3), (4,2), (4,5), (5,7), (6,4), (3,8), (2,7). Show clear stack state after processing each point. **OR** Prove Travelling Salesman Problem is NP Complete.	[10] [10]
Q5 (b)	Define the algorithm classes: P, NP, NP Hard and NP Complete with example.	[05]

All the Best!