Date: Saturday	S-2019-2557	**Time:** 02.30 PM TO 05.30 PM
Day: 11/05/2019		**Max Marks: 60**

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data if necessary.

Q.1	**a)**	Explain different factors that affect efficiency of an algorithm with a suitable example	**(05)**

	b)	To implement "Bus Reservation System" with following functionality:
		   i) Inquiry about available seat
		   ii) Reserve a particular seat
		   iii) Find out a window seat
		   iv) Status of waiting queue
		Which data structure we can select? Justify your answer.
			(05)

OR

Q.1	**a)**	How will you differentiate linear data structures from non-linear ones, outline with suitable examples.	**(05)**
	b)	Explain stack implementation using an array with suitable example.	**(05)**
Q.2	**a)**	Differentiate singly linked list with double linked list. Which one is more efficient and in which cases?	**(05)**
	b)	How to swap any two nodes in a singly linked list.	**(05)**

OR

Q.2	**a)**	Define queue. What are the conditions to be fulfilled for QueueEmpty and QueueFull for an array-implemented queue? Explain with suitable examples.	**(05)**

	b)	Compare array & linked list structures in detail w. r. t. following points,
		   i) Type of stored data ii) Memory allocation
		   iii) Node Traversal iv) Flexibility of structure.
			(05)

(P.T.O.)

Q.3 Define a binary search tree, how is it different from binary tree, construct **(10)** the binary search tree from following samples, 2,18,5,24,19,6,18, also stepwise traverse it in preorder, postorder and inorder.

OR

Q.3 Explain the following data structures with suitable examples, **(10)**
a)AVL Tree
b) B Tree
c) B+ Tree

Q.4 Sort the set of numbers, (23,05,67,12,44,07,04,09,16) with respect to **(10)** following sorting mechanisms with proper stepwise illustration,
   a) Merge Sort b) Insertion Sort c) Quick Sort

OR

Q.4 Define minimum spanning tree, construct a minimum spanning tree for **(10)** following graph using Kruskal's algorithm,
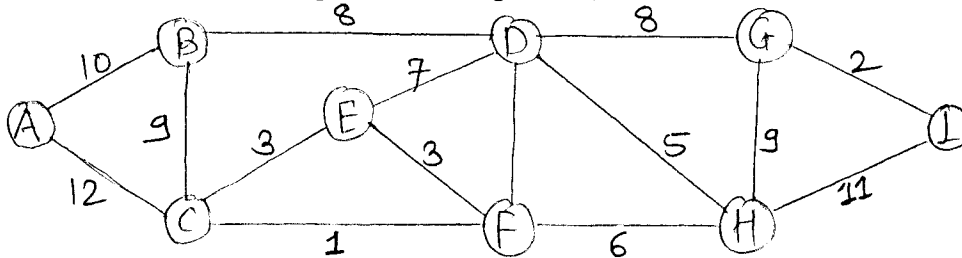
Q.5 Write an algorithm to solve 0/1 knapsack problem using dynamic **(10)** programming. Illustrate with example how is it efficient than a greedy approach.

OR

Q.5 a) Write short notes on: **(06)**
1. Dynamic Programming
2. Code Optimization

b) Explain AND-OR graph with suitable example. **(04)**

Q.6 a) What is a graph coloring problem? Explain which algorithmic strategy is **(05)** efficient to solve it?

b) Give the solution for 8-queens problem using backtracking. **(05)**

OR

Q.6 Sort following list using heap sort, **(10)**
10, 12, 1, 14, 6, 5, 8, 15, 3, 7, 4, 11, 13.

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