Total number of printed pages:2 **Programme(UG)/Semester III/UCSE306**

2022

DATA STRUCTURE USING C

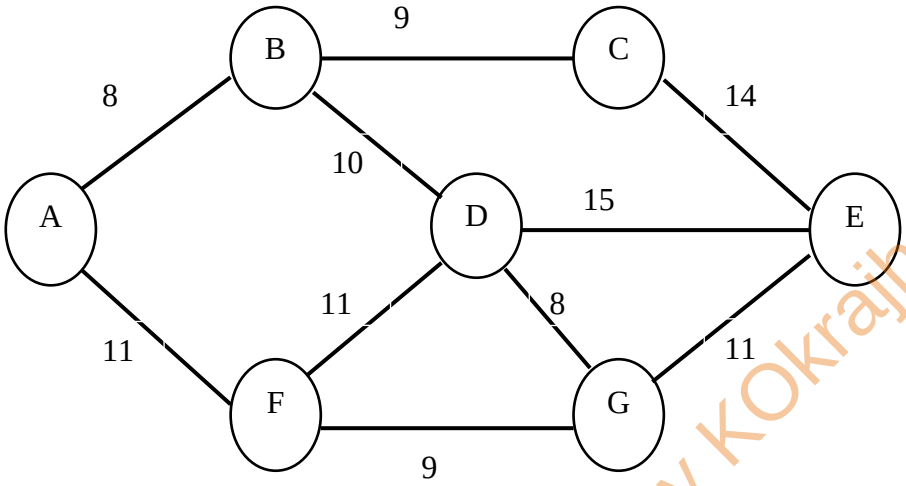
Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Define the best case time complexity? Also, draw the graph of the best case time complexity.	3+2=5
	b)	What is a string? What is the function of gets() and puts()?	1+2*2=5
	c)	Define the following terms in brief:	2*5=10
		i) Time complexity	
		ii) Space complexity	
		iii) Big Oh(O) notation	
		iv) Data structure	
		v) Array	
2.	a)	Why worst case time complexity of selection sort for sorting n elements is $O(n^2)$? Explain.	6
	b)	Write the intermediate steps of selection sort algorithm for sorting the following data: 40 50 60 30 80 70 20 55	7
	c)	Write an algorithm for a queue to perform its operations circularly.	7
3	a)	Write the intermediate steps of quick sort for sorting the following data: 60 35 25 40 65 20 45 70 15	8
	b)	What is the average case time complexity of binary search technique? How would you compute that time complexity?	6
	c)	Write an algorithm for binary search technique.	6
4	a)	Write the algorithmic steps for insertion sort method.	8
	b)	Apply insertion sort on the following data and write the intermediate steps: 55 35 25 15 75 40 30 20 10	6

	c)	You need to search an item in an array of n elements. Write the algorithmic steps for searching the item.	6
5.	a)	What is a spanning tree? How is it different from a minimum spanning tree? Find the minimum spanning trees of the following graph:  	2+2+6=10
	b)	Draw the binary tree from the following given pre-order and in-order traversals: Pre order: C, B, A, H, I, G, D, K, E, F In order: I, F, D, H, A, E, B, C, G, K	10
6.		Write short notes on the followings (any four):	5*4=20
	a)	Average case time complexity	
	b)	Stack	
	c)	Two dimensional array representation in memory	
	d)	Linked list	
	e)	Tree traversal	
	f)	Bubble sort	