	Reg. No.:	
	Name :	

VIT® BHOPAL
www.vitbhopal.ac.in

TERM END EXAMINATIONS (TEE) – December 2021- January 2022

Programme	:	**B.Tech (BAI, BCE, MIM)**	Semester	:	**Fall 2021-22**
Course	:	**Design and Analysis of Algorithms**	Code	:	**CSE3004**
Faculty	:	**Dr. Muneeswaran V**	Slot/ Class No.	:	**B11+B12+B13/0286**
Time	:	**1 ½ hours**	Max. Marks	:	**50**

Answer ALL the Questions

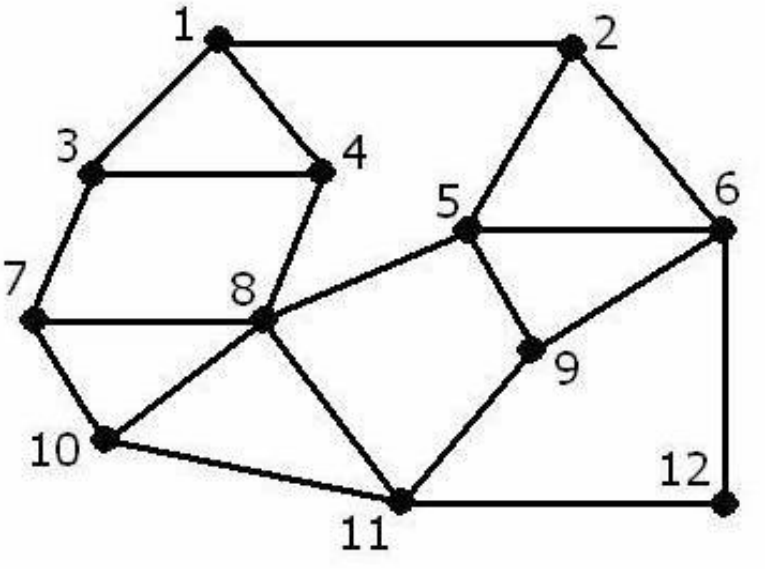
Q. No.			Question Description	Marks
			PART - A (30 Marks)	
1	(a)		Show that the Hamiltonian-path problem is NP-complete	**10**
			OR	
	(b)	i.	Construct the possible binary search trees with keys ***K, L, M,*** and ***N***.	
		ii.	Construct the optimal binary search tree with the following root matrix with P, Q, R, S, T, U keys.	**5**

01	01	02	02	03	03
	02	03	03	04	04
		03	03	04	05
			04	04	06
				05	06
					06

5

2	(a)		Create a suffix tree for given string S = "***KDFRFRETREK***". Find the pattern "***FRE***" from the suffix tree, and analyze the complexity of this algorithm.	**10**
			OR	
	(b)		Determining whether any pair of segments intersects using Plane sweep algorithm. Explain with relevant pseudo code	**10**
3	(a)		Prove that in the procedure **GRAHAM-SCAN**, points $\mathbf{p_1}$ and $\mathbf{p_m}$ must be vertices of CH(Q) with the algorithm. Write the relevant pseudo code.	**10**
			OR	

(b) Write an efficient greedy algorithm that finds an optimal vertex cover for the following graph



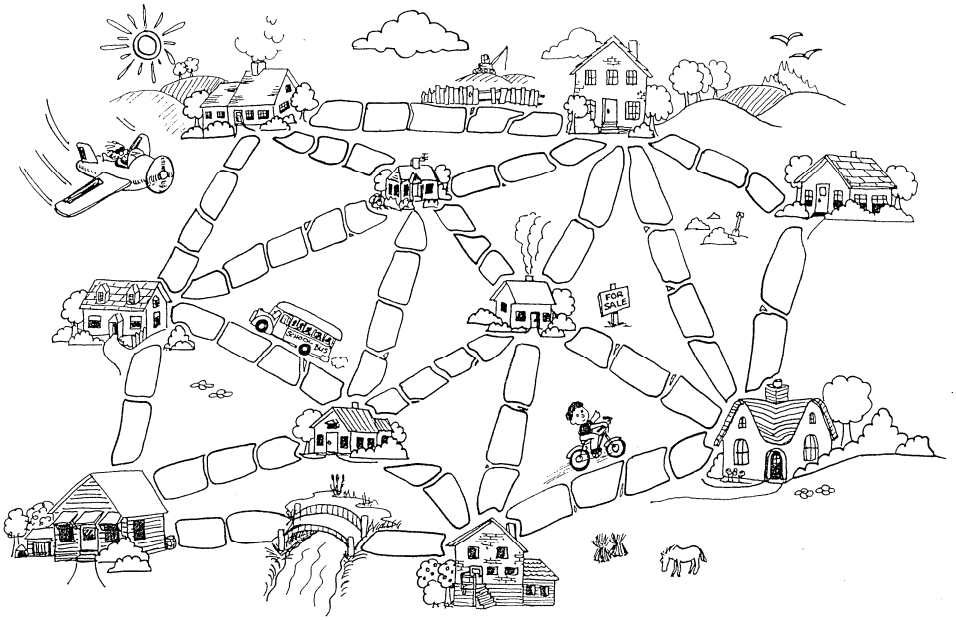
10

:

PART - B (20 Marks)

4 You received a file contains the Huffman codes "**1111101101110100011101110101000111110111100**". Try to decode these codes using the 7 characters **A, B, E, N, S, T** and **Blank Space** with frequencies **10, 15, 12, 3, 4, 13** and **2** respectively. Construct the Huffman Tree and using the codes try to decode. **10**

5 Muddy City, where the roads get too muddy to use when it rains. The mayor decided to pave some of the streets, but did not want to spend more money than necessary. Such that everyone can travel from their house to anyone else's house using only paved roads. Find the minimum set cover with the relevant pseudo code for the following:



10

⇔⇔⇔