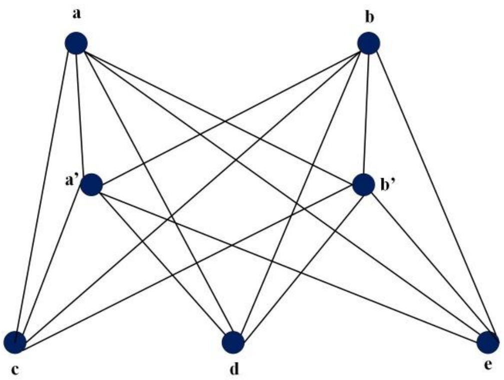
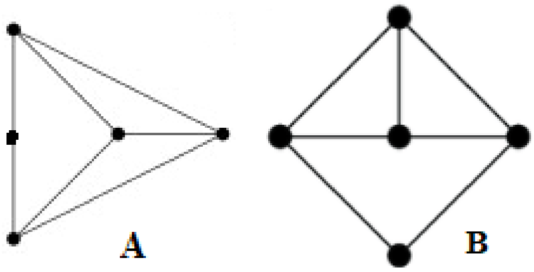
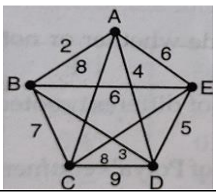
Reg. No.:	
Name :	

TERM END EXAMINATIONS (TEE) – October 2022

Programme	**B.Tech**	**Semester**	**Fall 2022-2023**
Course Name	**Discrete Mathematics And Graph Theory**	**Course Code**	**MAT2002**
Faculty Name	**Dr. Navneet Kumar Verma**	**Slot / Class No**	**(A21+A22+A23)/0134**
Time	**1½ hours**	**Max. Marks**	**50**

Answer ALL the Questions

Q. No.		Question Description	Marks
		PART - A – (3 x 10 = 30 Marks)	
1	(a)	The relation matrices M_R & M_S are given as $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$ $M_S = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 0 \end{bmatrix}$ find M_{ROS}	10
		OR	
	(b)	• Without adopting a truth table, demonstrate that $\left[p \wedge (\sim p \vee q)\right] \vee \left[q \wedge \sim (p \wedge q)\right] \cong q$ and list the applicable laws for each step. • The Peirce arrow $\downarrow$(NOR) is a logical binary operation, which is defined as follows: $p \downarrow q = \sim (p \vee q)$ then show that p write as $(p \rightarrow q)$ using Peirce arrow only.	10
2	(a)	• If a graph $G(V,E)$ contains 'n' number of vertices and 'e' number of edges. Then using the concept of Handshaking" prove that the maximum number of edges in a simple is equal to sum of (n-1) natural numbers. • Using the concept of maximum and minimum degree, show that the size of **k-regular graph** is equal to the half of the product of "degree of any vertex of regular graph and number of vertices. If '**n**' is the total number of vertices and '**e**' is the total number edges of regular-graph $G(V,E)$.	10
		OR	
	(b)	Show that $K_{2,2,3}$ is non-Planar	10

			
3	(a)	With the help of matrix method, show that the graphs $G \, and \, G'$ are isomorphic. 	10
	OR		
	(b)	• Prove that in a non-trivial tree T with n vertices, there are atleast two pendent vertices. • Consider a tree T with 3 vertices of degree 2, 4 vertices of degree 3 and 3 vertices of degree 4. Calculate the number of pendent vertices in a tree be m.	10
Part - B – (2 x 10 = 20 Marks)			
4		Conversion of Disjunctive Normal Form (DNF) of a Boolean function to its Conjunctive Normal Form (CNF) and Vive-versa. "Convert the Boolean function $f(x,y) = x.y' + x'.y + x'.y'$ into conjunctive normal form".	10
5		Apply Kruskal's algorithm to determine minimal spanning tree to the graph given below spanning tree for the following graph. 	10
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