Question Paper Code: R18A21CS01

R18

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech. I Semester Supplementary Examinations, June/July – 2024

DISCRETE MATHEMATICAL STRUCTURES

(COMPUTER SCIENCE AND ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)

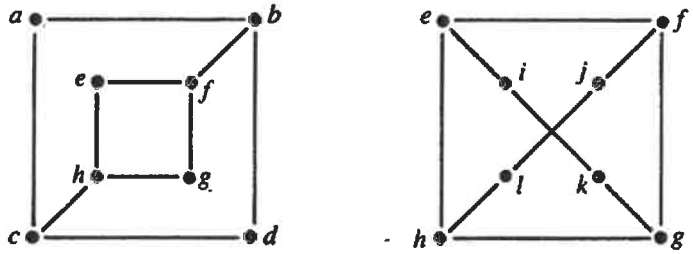
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Let $A=\{1,2\}$, $B=\{x,y,z\}$ and $C=\{3,4\}$ then find $A\times B\times C$	CO1	L1	3M
2.	Show that $A-(A-B)=A\cap B$	CO1	L2	2M
3.	Suppose that the license plate of a certain state requires 3 English letters followed by 4 digits. How many plates are possible if only the letters can be repeated?	CO2	L2	2M
4.	Find the value of n if $2(np_2)+50=2np_2$	CO2	L1	3M
5.	What is a homogeneous recurrence relations	CO3	L1	2M
6.	Use substitution method to solve $a_n=a_{n-1}+3n^2+3n+1$ where $a_0=1$	CO3	L2	3M
7.	Define a Group and explain with an example.	CO4	L1	2M
8.	Define Lattice and write its properties.	CO4	L1	3M
9.	What is Chromatic number?	CO5	L1	2M
10.	Define Euler Circuit. Give an example	CO5	L1	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Construct the Truth Table for the following $\neg(p\vee(q\wedge r))\Leftrightarrow((p\vee q)\wedge(p\vee r))$	CO1	L3	10M
	OR			
B)	Show that $\{[p\rightarrow(q\vee r)]\wedge\neg q\}\rightarrow(p\rightarrow r)$ is a Tautology.	CO1	L2	10M
12. A)	There are four bus routes between the places A and B and 3 bus routes between the places B and C. Find the number of ways of a person can make a round trip from A to A via B if he does not use a route more than once.	CO2	L2	10M
	OR			
B)	How many ways are there to arrange the nine letters of the word MISSISSIPPI taken all together?	CO2	L3	10M
13. A)	Find a general expression for a solution to the recurrence relation $a_n-5a_{n-1}+6a_{n-2}=n(n-1),$, for $n\geq 3$	CO3	L2	10M
	OR			
B)	Solve the recurrence relation $a_n-7a_{n-1}+6a_{n-2}-12a_{n-3}=0,\quad n\geq 0$	CO3	L3	10M

14. A)	The set $A=\{1,\ \omega,\ \omega^2\}$ where 1, ω, ω^2 are cube roots of unity and $\omega^3=1$ forms a group with respect to multiplication composition.	CO4	L3	10M
	OR			
B)	Define Adjacency Matrix. Let $A=\{a,b,c,d,e\}$ and let $R=\{(a,a),(a,b),(b,c),(c,d),(c,e),(d,e)\}$. Compute the transitive closure of R using Adjacency Matrix technique.	CO4	L4	10M
15. A)	Verify the Isomorphism of the following graphs 	CO5	L3	10M
	OR			
B)	State and prove Euler formula	CO5	L3	10M