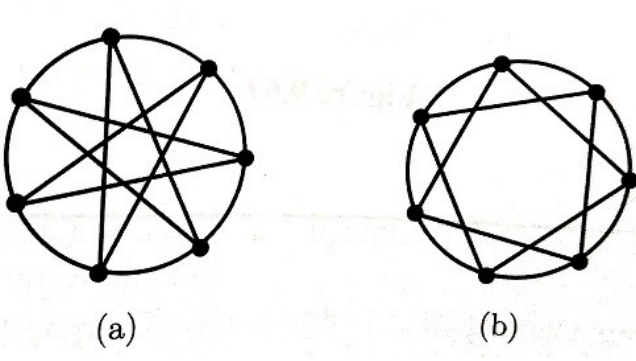
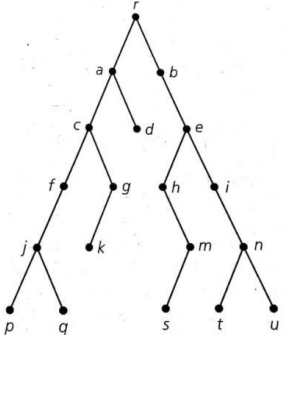


CONTINUOUS INTERNAL EVALUATION- 3

Dept: CSE	Sem / Div: 3 rd A and B	Sub: Discrete Mathematical Structures	S Code: 18CS36
Date: 17/02/2021	Time: 2:30 - 4:00 PM	Max Marks: 50	Elective: N
Note: Answer any 2 full questions, choosing one full question from each part.			

Q N	Questions	Marks	RBT	COs
PART A				
1 a	Define the relation R for two line l_1 and l_2 by $l_1 R l_2$ if l_1 is perpendicular to l_2 . Determine whether the relation is reflexive, symmetric, anti-symmetric or transitive.	5	L3	CO3
b	Let $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$. On this set define the relation R by $(x, y) \in R$ if and only if $x-y$ is a multiple of 4. Verify that R is an equivalence relation.	6	L4	CO3
c	Let $A = \{1, 2, 3, 6, 9, 18\}$ and R on A by xRy if $x y$. Draw the Hasse diagram for the poset(A, R).	6	L3	CO3
d	Let $A = \{1, 2, 3, 4, 5\}$. Define a relation R on $A \times A$ by $(x_1, y_1)R(x_2, y_2)$ if and only if $x_1 + y_1 = x_2 + y_2$. (a) Verify that R is an equivalence relation on $A \times A$. (b) Determine the equivalence classes $[(1, 3)], [(2, 4)]$ and $[(1, 1)]$ (c) Determine the partition of $A \times A$ induced by R.	8	L3	CO3
OR				
2 a	Draw the Hasse diagram representing the positive divisors of 45.	5	L3	CO3
b	Let $A = \{1, 2, 3, 4, 6, 12\}$. On A, define the relation R by aRb if and only if a divides b. Prove that R is a partial order on A. Draw the Hasse diagram for this relation.	6	L3	CO3
c	Consider the Hasse diagram of a poset(A, R) given below: If $X = \{c, d, e\}$, find(if they exist) (a) All upper bounds of X (b) All lower bounds of X (c) The least upper bound of X (d) The greatest lower bound of X .	6	L3	CO3
d	Let $A = \{1, 2, 3, 4\}$ and let R be the relation defined by $R = \{(x, y) \mid x, y \in A, x \leq y\}$. Determine whether R is reflexive, symmetric, antisymmetric or transitive.	8	L3	CO3
PART B				
3 a	Show that a tree with n vertices has $n - 1$ edges.	5	L4	CO4

CONTINUOUS INTERNAL EVALUATION- 3

b	Show that the following two graphs are isomorphic.	6	L3	CO4
				
c	For the trees shown below, find the preorder and postorder traversals.	6	L3	CO4
				
d	Define optimal tree and construct an optimal tree for a given set of weights {4, 15, 25, 5, 8, 16}. Hence find the weight of the optimal tree.	8	L3	CO4
OR				
4 a	Define the following with an example. (a) Simple graph (b) Bipartite graph (c) spanning subgraph (d) Induced subgraph (e) Complement of a subgraph	5	L2	CO4
b	Let T be a complete m-ary tree of order n with p leaves and q internal vertices. Prove the following: (a) $n = mq + 1 = (mp - 1) / (m - 1)$ (b) $p = (m - 1)q + 1 = ((m - 1)n + 1) / m$ (c) $q = (n - 1) / m = (p - 1) / (m - 1)$	6	L3	CO4
c	Apply merge-sort to the list -1, 7, 4, 11, 5, -8, 15, -3, -2, 6, 10, 3.	6	L3	CO4
d	Construct an optimal prefix code for the letters of the message FALL OF THE WALL. Hence deduce the code for this message.	8	L3	CO4