(Please write your Exam Roll No.) Exam Roll No. 754

END TERM EXAMINATION

FIRST SEMESTER [BCA] DECEMBER 2024

Paper Code: BCA-101 **Subject: Discrete Mathematics**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt all questions as directed.

Q1 Answer **Any Five** from the following:

a) Verify De-Morgan's Law for universal set U={1,2,3,4,5,6,7} , A={4,1,2,5} and B={1,2,4,6}. **(4)**

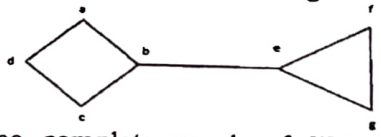
b) Define Hamiltonian circuit and Hamiltonian Path with example. **(4)**

c) Draw the Hasse diagram representing the partial ordering (P(A):⊆),where A={1,2} **(4)**

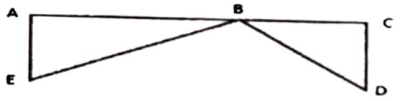
d) Let A={1,2,5,6}, B={2,5,7}, C={1,3,5,7,9}. Verify (AxB) ∩ (AxC) = Ax{B∩C} **(4)**

e) Represent G,considering the graph G (V, E) where V consist of 4 vertices A, B, C and D of five edges Where$e_1 = \{A, B\}, e_2 = \{B, C\}, e_3 = \{C, D\}, e_4 = \{A, C\}, e_5 = \{B, D\}$ **(4)**

f) Find radius and diameter of the given diagraph **(4)**



g) Draw the complete graph of $W_5$and K_5. Also define Euler's circuit and determine whether the graphs shown is a Euler's circuit or not. (Give reason)



(4)

h) Find the explicit formula for the sequence 67, 65,63,61,59. **(4)**

Q2 a) Suppose that A= {1, 2, 3} and B= {1, 2}. Let R be a relation from A to B containing (a,b) if a∈A, b∈B and a>b. Do Matrix representation of $M_{R^{-1}}$ M_RAndM_{R^C} of the relation R. **(5)**

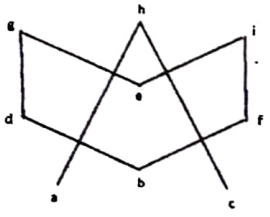
b) Construct the truth table

i) $(\neg q \rightarrow \neg p) \rightarrow (p \rightarrow q)$

ii) $(\neg p \vee q) \vee \neg p$

Is given proposition is Tautology. **(5)**

Q3 a) Find lower bound, upper bound, least upper bound, greatest lower bound of the sets {d,e,f},{a,c} and {b,d} of given graph. **(5)**



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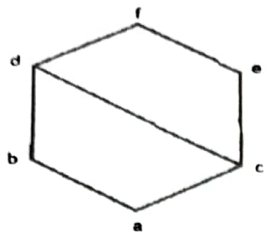
P.T.O.

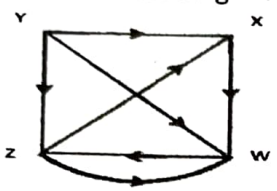
b) Give reason why giver lattice is a distributed lattice but not a complemented lattice.



(5)

Q4 a) Solve the recurrence relation $C_n = 6C_{n-1} - 11C_{n-2} + 6C_{n-3}$ for n≥3, $C_0 = 2, C_1 = 5, C_2 = 15$ **(5)**

b) Use Warshall's Algorithm tofind matrix of a graph **(5)**



Q5 a) Draw the Hasse Diagram of [{12,4,5,10,20},/] and Find is this poset a Lattice, if yes then find out the following subset set of given lattice is a sub lattice?

A={2,4,10,20}, **B**={4,5,10,20}, **C**={1,2,5,10} **(5)**

b) Draw the graph of adjacency matrix also find degree of each vertex and find the incidence matrix of the giver diagraph. **(5)**

	e_1	e_2	e_3	e_4	e_5	e_6
$V1$	1	0	0	0	1	0
$V2$	1	1	0	0	0	1
$V3$	−1	0	0	0	0	1
$V4$	0	0	1	1	0	1

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