Seat No.

Total No. of Pages : 3

OCT-NOV 2025 WINTER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Discrete Mathematical Structures

Sub. Code: 63525/73277

Day and Date: Thursday ,18-12-2025 **Total Marks: 70**

Time: 02:30 PM To 05:00 PM

Instructions:
1. **All questions are compulsory**
2. **Assume suitable data wherever necessary and mention it boldly**
3. **Draw neat labelled diagrams wherever necessary**
4. **Figures to the right indicate full marks**

Q1) Solve following MCQ. **[14]**

i.

What is the Cardinality of the Power set of the set {0, 1, 2}.

A. 8

B. 6
C. 7
D. 9

ii.

In which of the following sets A – B is equal to B – A?

A. A = {1, 2, 3}, B = {2, 3, 4}
B. A = {1, 2, 3}, B = {1, 2, 3, 4}
C. A = {1, 2, 3}, B = {2, 3, 1}
D. A = {1, 2, 3, 4, 5, 6}, B = {2, 3, 4, 5, 1}

iii.

Which of the following is not a binary property?

A. Trivial
B. Antisymmetric
C. Transitive
D. Irreflexive

iv. Power set of empty set has exactly _____ subset.

A. One
B. Two
C. Zero
D. Three

v. Let X = {a, b, c}. Which of the following is a Reflexive relation?

A. {(a, a), (b , a), (a,c) }
B. {(b, b), (c, c), (a, a)}
C. {(b, a) , (a, a), (c, b)}
D. {(a, c) , (c, a), (c, c)}

vi. Suppose a relation R = {(3, 3), (5, 5), (5, 3), (5, 5), (6, 6)} on S = {3, 5, 6}. Here R is known as _____

A. equivalence relation
B. reflexive relation
C. symmetric relation
D. transitive relation

vii. The Cartesian Product B x A is equal to the Cartesian product A x B for A={1,2,3) and B= {1,2,3,4}

A. True
B. False
C. None of the above
D. Cant be told

Q2) Solve any 2 of the following (7 Marks Each) [14]

a. Find AUB, BUC and AUC If A={1,2}, B= {x,y}, C = {3,4}.
b. Explain Infix, Prefix and Suffix notations
c. Obtain PDNF of (PVQ)

Q3) Solve any 2 of the following (7 Marks Each) [14]

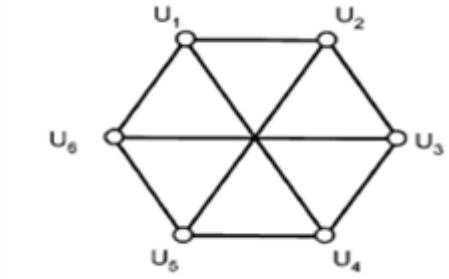
a. Define Group. Prove that set of Natural numbers is an Abelian group
b. Explain properties of lattices.
c. Given S= {a1, a2, a3...a8}, What Subsets are represented by B17 and B31? Also, how will you designate the subsets {a2, a6, a7} and {a1, a8}?

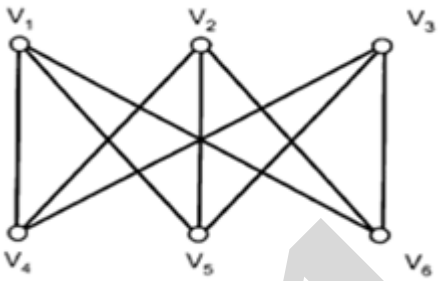
Q4) Solve any 2 of the following (7 Marks Each) [14]

a. Explain the concept of semigroup and monoid in detail.

b. Let □ = {□, □, □, d} and(□) be its power set, draw a Hasse diagram of□□(□), ⊆□.

c. Explain whether G1 and G3 are isomorphic or not if yes then give substitution instance and if no then explain the reason





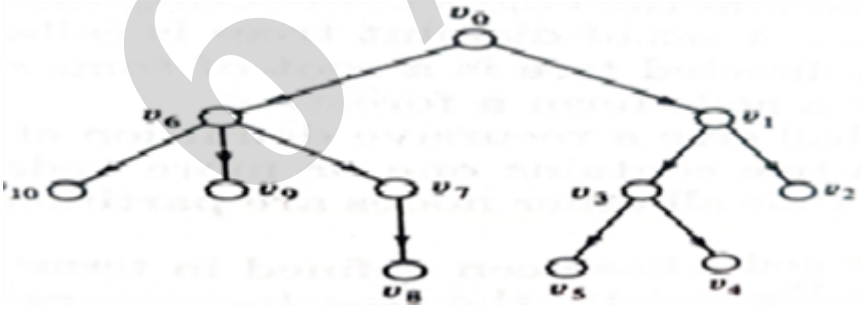
Q5) Solve any 2 of the following (7 Marks Each) [14]

a) Define the following in relation with graph

i. Loop
ii. Cycle
iii. Directed graph
iv. Undirected graph
v. Null graph
vi. Strong and weak component of grap
vii. viiWeighted graph

b)Write a note on Lattice as a partially ordered set

c) Give different representations of a given tree



End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (1154) B.Tech. CBCS (73277) Discrete Mathematical Structures Part 2 SEM 3

2] (101) Bachelor of Engineering (63525) Discrete Mathematical Structures Part 2 SEM 3