

Seat No.	
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S.Y. B.Tech. (Computer Science and Engineering (AIML))

(Semester - III) (CBCS) Examination, January - 2024

DISCRETE MATHEMATICAL STRUCTURES

Sub. Code : 86161

Day and Date : Thursday, 04 - 01 - 2024

Total Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- Instructions :**
- 1) Question no. 6 is compulsory.
 - 2) Solve any four questions from Q.No. 1 to Q.No.5.
 - 3) Assume suitable data wherever necessary.
 - 4) Figures to the right indicate full marks.

Q1) a) If $A = \{\alpha, \beta\}$ and $B = \{1, 2, 3\}$, what are $A \times B, B \times A, A \times A, B \times B$ and $(A \times B) \cap (B \times A)$? [8]

b) Determine whether the conclusion C follows logically from the premises H1 and H2.

i) $H1 : P \rightarrow (Q \rightarrow R)$ $H2 : P \wedge Q$ $C : R$. [7]

Q2) a) Let $X = \{1, 3, 5, 12, 15\}$ and the relation $\leq$ be such that $x \leq y$ if x divides y. Draw the Hasse diagram of $(X, \leq)$. [8]

b) Explain PERT and related techniques with an example. [7]

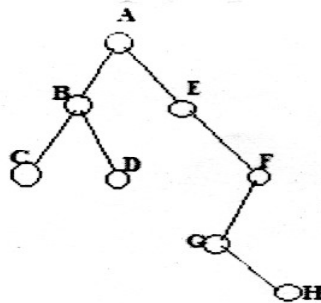
Q3) a) Let $R = \{<1, 2>, <3, 4>, <2, 2>\}$ and $S = \{<4, 2>, <2, 5>, <3, 1>, <3, 1>\}$ [8]
Find

- i) RoS
- ii) SoR
- iii) $Ro(SoR)$
- iv) $RoRoR$

b) Define Function with its types. [7]

P.T.O.

- Q4) a)** Write the Boolean expressions in an equivalent sum-of products canonical form in three variables x_1, x_2 and x_3 : $x_1 \oplus x_2$. [8]
- b)** Give different representation for tree given below: [7]



- Q5) a)** Explain Group and Subgroup with example. [8]
- b)** Explain covering of a set. Show that $S = \{1,2,3\}$ and subset of S is $A = \{\{1, 2\}, \{2, 3\}\}$ is the covering of set S . [7]

Q6) Write a short note on: (Any 2) [10]

- Greatest Lower Bound and Least Upper Bound of lattice.
- Algebraic system.
- Reachability and Path in Graph.

