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D - 44 [2037]

B.Sc. (BI) (Semester - 1st)

DISCRETE MATHEMATICS (B.Sc. (BI) - 105)

Time : 03 Hours **Maximum Marks : 75**

Instruction to Candidates:

1) Section - A is **compulsory.**
2) Attempt any **Nine** questions from Section - B.

Section - A

Q1) ***(15 x 2 = 30)***

a) What is relation?

b) What is Distributive Law?

c) Find power set C = {2, 3}.

d) Prove De Morgan's Law.

e) Simplify $X'Y'Z + X'YZ + XY'Z + XYZ$

f) How many integers between 1000 and 10,000 have no digits other than 4, 5 or 0.

g) Define Logic. Give an example.

h) Define Conditional and Biconditional implication.

i) Prove $P \rightarrow Q = \sim P \vee Q$.

j) Define Binary relation.

k) What is union of two sets?

l) Find truth table $A \vee B \wedge C$.

m) If R is the relation "Is greater than" from A = {4, 5, 6, 7} to B = {1, 3, 5, 7}. Write R as set of ordered pairs.

n) Describe all possible relations in the set A = {0, 1}.

o) Define Contradiction.

P.T.O.

Section - B

(9 x 5 = 45)

Q2) Give a relation, which is both a partial ordering relation and an equivalence relation?

Q3) What is Minimum Spanning Tree? Explain with an example.

Q4) Explain Shortest Path Algorithm.

Q5) Explain difference between directed and undirected graphs.

Q6) What basic set operations? Explain each of them with example.

Q7) Construct truth table for $(P \wedge \sim Q) \vee (R \wedge P)$.

Q8) Describe principle of mathematical induction.

Q9) Explain Dijkstra's Algorithm.

Q10) Find truth table for $[P \rightarrow ((Q \wedge (\sim R)) \vee S)] \wedge [\sim T \leftrightarrow (S \wedge R)]$.

Q11) By induction method show that $2^n > n^3$ for $n \geq 10$.

Q12) What are various methods of graph traversal? Explain each of them with an example.

Q13) Prove by mathematical induction $10^{2n-1} + 1$ is divisible by 11.

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