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Roll No

CS/IT-224-CBCS

B.E. III Semester

Examination, June 2020

Choice Based Credit System (CBCS)

Discrete Structure

Time : Three Hours

Maximum Marks : 60

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) If U is a universal set and its two subsets A and B , then prove that $(A \cup B)' = A' \cap B'$
b) Show that the set Q of rational numbers is countable.
2. a) Show that $[(p \wedge q) \Rightarrow \neg p] \wedge (q \wedge \neg q)$ is a contradiction.
b) Show that the language $L = \{a^m : m \neq 2^i, i \geq 1\}$ is not a finite state
3. Define eulerian path and circuit of a graph with an example for each. State the necessary and sufficient conditions for existence of an Eulerian path in connected graph.
4. a) Prove :
 - i) $A \times (B \cap C) = (A \times B) \cap (A \times C)$
 - ii) $A \times (B \cup C) = (A \times B) \cup (A \times C)$b) Explain Pigeonhole principle with an example.

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5. a) Test the validity of argument:
if it rains, Ram will be sick
it did not rain

 \therefore Ram was not sick
- b) Explain universal and existential qualifiers with example
6. Define the following with examples:
i) Multigraph ii) Isomorphic graphs
iii) Eulerian graph
7. a) Prove that the set
 $G = \{\dots -4m, -3m, -2m, -m, 0, m, 2m, 3m, 4m\dots\}$
of multiples of integers by a fixed integer m is a group
with respect to addition.
- b) Discuss ring and field with example.
8. Write short notes on :
a) Hasse diagram
b) Lattices
c) Binomial theorem
d) Permutations

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