MATHEMATICS FOR COMPUTER SCIENCE

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**Scenario:**

In a login system, users must be logged in **and** must be admins to access sensitive settings.

**Proposition P: “**user is logged in”.

**Proposition Q:** “user is admin**”.**

**Logical Expression: P ꓥ Q** (“user is logged in AND is admin”)

**Truth Table for PꓥQ:**

ꓲP (Logged In) ꓲ Q (Admin) ꓲ P ꓥ Q (Access Granted) ꓲ

ꓲ--------------ꓲ----------ꓲ-------------------------ꓲ

ꓲ T ꓲ T ꓲ T ꓲ

ꓲ T ꓲ F ꓲ F ꓲ

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**200 Words Explanation:**

This logic is used in access control systems where multiple conditions must be met before granting access, in our Scenario, condition **P ꓥ Q** ensures logged in (P) and have admin rights (Q) can proceed. The truth table helps visualize all combinations of inputs and the resulting system behaviour. If either condition is false, access is denied. This ensures security and protects critical sittings from unauthorized users. Such logic is essential in programming when creating **if** **statements or conditions in code**, for example:

Python

If user\_ logged \_ in and

User \_ is \_ admin:

Allow \_ access ( )

In digital electronics, this same logic is implemented using **AND gates** in circuits, when both inputs are HIGH (1), the output is HIGH (1), just like the logic tables shows. This assignment demonstrates how Boolean logic translates between code and physical hardware. Understanding this builds a foundation for secure, functional system.

**LOGIC DIAGRAM**

**P**

**Output =**

**User is logged in**

**P ꓥ Q**

**AND**

**Q**

**PPLKJPMO**

**TRUE**

**User i admin**

Demonstrates understanding of propositional logic and truth tables.

Shows ability to apply logic to **computer science problems.**

**LEARNING OUTCOME**

**HAND WRITTEN NOTE**