PROBABILITY

UDAY KUMAR - FWC22086

13.4.14 [1]**If A and B are two events such that A $\subset$ B and P(B)$\neq$0,then which of the following is correct ?**

a) $P(A|B) = \dfrac{P(B)}{P(A)}$ b)$P(A|B) < P(A)$

c)$P(A|B) \geqq P(A)$ d)None of these

Solution:
if A $\subset$ B and P(B)$\neq$ 0 then

$$\Rightarrow \text{AB} = \text{A}$$
$$\text{also P(A)} < \text{P(B)}$$

$$P(A|B) = \frac{P(AB)}{P(B)} = \frac{P(A)}{P(B)} \tag{13.4.14.1}$$

we know that

$$\text{P(B)} \leq 1$$

$$1 \leq \frac{1}{P(B)}$$

multiply both sides with P(A),we get

$$\text{P(A)} \leq \frac{P(A)}{P(B)}$$

from the above eq 10

$$\text{P(A)} \leq \text{P(A|B)}$$

$$\boxed{P(A \mid B) \geq P(A)} \tag{13.4.14.2}$$

[1]Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)