

PROBABILITY

UDAY KUMAR - FWC22086

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

- (a) $\Pr(A | B) = \frac{\Pr(B)}{\Pr(A)}$
- (b) $\Pr(A | B) < \Pr(A)$
- (c) $\Pr(A | B) \geq \Pr(A)$
- (d) None of these

Solution:

if $A \subset B$ and $\Pr(B) \neq 0$ then

$$\Rightarrow AB = A \quad (13.4.4.1)$$

$$\Pr(A) < \Pr(B) \quad (13.4.4.2)$$

$$P(A|B) = \frac{\Pr(AB)}{\Pr(B)} = \frac{\Pr(A)}{\Pr(B)} \quad (13.4.4.3)$$

we know that

$$\Pr(B) \leq 1 \quad (13.4.4.4)$$

$$1 \leq \frac{1}{\Pr(B)} \quad (13.4.4.5)$$

multiply both sides with $\Pr(A)$, we get

$$\Pr(A) \leq \frac{\Pr(A)}{\Pr(B)} \quad (13.4.4.6)$$

from the above (13.4.4.3)

$$\Pr(A) \leq \Pr(A | B) \quad (13.4.4.7)$$

$$\Pr(A | B) \geq \Pr(A) \quad (13.4.4.8)$$

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