

# PROBABILITY

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**13.4.14** <sup>1</sup>If 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  $P(B) \neq 0$  then

$$\Rightarrow AB = A \quad (13.4.14.1)$$

$$\Pr(A) < \Pr(B) \quad (13.4.14.2)$$

$$P(A|B) = \frac{\Pr(AB)}{\Pr(B)} = \frac{\Pr(A)}{\Pr(B)} \quad (13.4.14.3)$$

we know that

$$\Pr(B) \leq 1 \quad (13.4.14.4)$$

$$1 \leq \frac{1}{\Pr(B)} \quad (13.4.14.5)$$

multiply both sides with  $P(A)$ , we get

$$\Pr(A) \leq \frac{\Pr(A)}{\Pr(B)} \quad (13.4.14.6)$$

from the above (13.4.14.3)

$$\Pr(A) \leq \Pr(A|B) \quad (13.4.14.7)$$

$$\Pr(A|B) \geq \Pr(A) \quad (13.4.14.8)$$

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<sup>1</sup>Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)