

# ASSIGNMENT-4 PROBABILITY

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Question 12.13.3.65

If A and B are independent, then

$\Pr(\text{exactly one of } A, B \text{ occurs})$

$= \Pr(B)\Pr(A') + \Pr(A)\Pr(B')$

**Solution:** If A and B are independent events

$$\Pr(AB) = \Pr(A)\Pr(B) \quad (1)$$

$$\Pr(\text{only } B) = \Pr(A'B) \quad (2)$$

$$= \Pr(A')\Pr(B) \quad (3)$$

$$\Pr(\text{only } A) = \Pr(AB') \quad (4)$$

$$= \Pr(A)\Pr(B') \quad (5)$$

$$\Pr(\text{exactly one of } A, B \text{ occurs}) = \Pr(\text{only } A) + \Pr(\text{only } B) - \Pr(\text{only } AB) \quad (6)$$

$$= \Pr(A'B) + \Pr(AB') - \Pr(A'BAB') \quad (7)$$

$$= \Pr(A')\Pr(B) + \Pr(A)\Pr(B') - 0 \quad (AA' = 0) \quad (8)$$

$$= \Pr(A')\Pr(B) + \Pr(A)\Pr(B') \quad (9)$$

$\therefore$  The statement is true