

Solution of Q12.13.3.80

SUJAL GUPTA - EE22BTECH11052

A flashlight has 8 batteries out of which 3 are dead. If two batteries are selected without replacement and tested, find the probability that both are dead.

Solution: Let the random variable be X_i for denoting the battery being dead.

Variable	Description	Value
X_i	i th battery being dead $\forall i = 1, 2$	$\{0, 1\}$
n	no of batteries selected	2

TABLE 0

DEFINITION OF RANDOM VARIABLES

$$\Pr(X_1 = 0) = \frac{3}{8} \quad (1)$$

$$\Pr(X_2 = 0|X_1 = 0) = \frac{\Pr(X_2 = 0) \Pr(X_1 = 0)}{\Pr(X_1 = 0)} \quad (2)$$

$$\Pr(X_2 = 0) \Pr(X_1 = 0) = \Pr(X_1 = 0) \Pr(X_2 = 0|X_1 = 0) \quad (3)$$

$$= \frac{3}{8} \times \frac{2}{7} \quad (4)$$

$$= \frac{3}{28} \quad (5)$$