Assignment 5 (Class 11 Miscellaneous ex 16 7)

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***Abstract*—This document contains the solution to Cbse 11 Probability Miscellaneous problem 7**

PROBLEM

A and B are two events such that $\Pr(A) = 0.54$, $\Pr(B) = 0.69$ and $\Pr(AB) = 0.35$ Find

i) $\Pr(A + B)$
ii) $\Pr(A'B')$
iii) $\Pr(AB')$
iv) $\Pr(A'B)$

SOLUTION

Let the random variables X_i map to the set $\{0, 1\}$ as described in Table

variable	event
X_1 = 1	A
X_2 = 1	B

TABLE I
RANDOM VARIABLES

Given $\Pr(X_1 = 1) = 0.54$, $\Pr(X_2 = 1) = 0.69$ and $\Pr(X_1 = 1, X_2 = 1) = 0.35$

(i)

$$\Pr(X_1 = 1 \cup X_2 = 1) = \Pr(X_1 = 1) + \Pr(X_2 = 1) - \Pr(X_1 = 1, X_2 = 1) \quad (1)$$

on substituting values we will get

$$\Pr(X_1 = 1 \cup X_2 = 1) = 0.54 + 0.69 - 0.35 \quad (2)$$

$$\Pr(X_1 = 1 \cup X_2 = 1) = 0.88 \quad (3)$$

$\therefore$ the value of $\Pr(A + B)$ is 0.88

(ii)

$$\Pr(X_1 = 0, X_2 = 0) = 1 - \Pr(X_1 = 1 \cup X_2 = 1) \quad (4)$$

on substituting value from eq(3) in eq(4) we will get

$$\Pr(X_1 = 0, X_2 = 0) = 1 - 0.88 \quad (5)$$

$$= 0.12 \quad (6)$$

$\therefore$ the value of $\Pr(A'B')$ is 0.12

(iii) for finding $\Pr(X_1 = 1, X_2 = 0)$ we go like below process

$$\Pr(X_1 = 1, X_2 = 0) = \Pr(X_1 = 1) - \Pr(X_1 = 1, X_2 = 1) \quad (7)$$

on substituting values in eq(7) we will get

$$\Pr(X_1 = 1, X_2 = 0) = 0.54 - 0.35 \quad (8)$$

$$= 0.19 \quad (9)$$

$\therefore$ the value of $\Pr(AB')$ is 0.19

(iv) similarly based on eq(7) we can also get for $\Pr(X_1 = 0, X_2 = 1)$ like

$$\Pr(X_1 = 0, X_2 = 1) = \Pr(X_2 = 1) - \Pr(X_1 = 1, X_2 = 1) \quad (10)$$

on substituting values in eq(10) we will get

$$\Pr(X_1 = 0, X_2 = 1) = 0.69 - 0.35 \quad (11)$$

$$= 0.34 \quad (12)$$

$\therefore$ the value of $\Pr(A'B)$ is 0.34