AI1103-Assignment 2

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Download latex-tikz codes from

https://github.com/asishcs2011010/demo/blob/main/Assignment−2/assignment−2.tex

QUESTION NO

Gate-EC Q-38

Question

Let $X \in \{0, 1\}$ and $Y \in \{0, 1\}$ be two independent binary random variables. if P($X = 0$) = p and P($Y = 0$) = q, then P($X + Y \geqslant 1$) is equal to

(A) $pq + (1 - p)(1 - q)$
(B) pq
(C) $p(1 - q)$
(D) $1 - pq$

Solution

Given Pr(X=0) = p , Pr(Y=0) = q and X and Y are independent binary random variables.

X	$X = 0$	$X = 1$
Pr	p	$1 - p$

Y	$Y = 0$	$Y = 1$
Pr	q	$1 - q$

.

P($X + Y \geqslant 1$)= $1 - P(X + Y < 1)$
($X + Y < 1$,implies X=0,Y=0; as $X \in \{0, 1\}$ and $Y \in \{0, 1\}$)

P($X + Y \geqslant 1$)=$1 - (P(X = 0)(Y = 0))$ (as they are independent events)

P($X + Y \geqslant 1$)=$1 - pq$