NCERT 11.16.3.33

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Question:11.16.3.33
If A and B are two candidates seeking admission in an engineering College. The probability that A is selected is 0.5 and the probability that both A and B are selected is atmost 0.3. Is it possible that the probability of B getting selected is 0.7?

Solution:
Let, $\Pr(A)$ = Probability that A is selected
$\Pr(B)$ = Probability that B is selected
Given that,

$$\Pr(AB) \leq 0.3 \tag{1}$$
$$\Pr(A) = 0.5 \tag{2}$$

We know that,

$$\Pr(A+B) \leq 1 \tag{3}$$
$$\Pr(A+B) = \Pr(A) + \Pr(B) - \Pr(AB) \tag{4}$$
$$\implies \Pr(AB) = \Pr(A) + \Pr(B) - \Pr(A+B) \tag{5}$$

Therefore,

$$\implies \Pr(A) + \Pr(B) - \Pr(A+B) \leq 0.3 \tag{6}$$
$$\implies \Pr(A) + \Pr(B) \leq 0.3 + \Pr(A+B) \tag{7}$$
$$\implies \Pr(A) + \Pr(B) \leq 0.3 + 1 \tag{8}$$
$$\implies 0.5 + \Pr(B) \leq 1.3 \tag{9}$$
$$\implies \Pr(B) \leq 0.8 \tag{10}$$

$\therefore$ It is possible that the probability of B getting selected is 0.7.

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