Question 11.16.3.27
Probability and Random Processes

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If the probabilities for A to fail in an examination is 0.2 and that for B is 0.3, then the probability that either A or B fails is

1) > 0.5
2) 0.5
3) ≤ 0.5
4) 0

Solution:

Event	Description
A	A fails
B	B fails

TABLE 4: Random variable description

Given,

$$\Pr(A) = 0.2 \tag{1}$$
$$\Pr(B) = 0.3 \tag{2}$$
$$\tag{3}$$

$$\Pr(A+B) = \Pr(A) + \Pr(B) - \Pr(AB) \tag{4}$$
$$= 0.2 + 0.3 - \Pr(AB) \tag{5}$$
$$= 0.5 - \Pr(AB) \tag{6}$$

By the first axiom of Probability

$$0 \leq \Pr(AB) \tag{7}$$
$$0.5 - \Pr(AB) \leq 0.5 \tag{8}$$
$$\Pr(A+B) \leq 0.5 \tag{9}$$