12.13.3.96

EE22BTECH11010 - Aryan Bubna

question: state True or False for the given statement:

if A and B are mutually exclusive events then they will be independent also.

Solution: As given in the question $\Pr(AB) = 0$ But for these events to be independent

$$\Pr(AB) = \Pr(A) \times \Pr(B) \tag{1}$$

$$0 = \Pr(A) \times \Pr(B) \tag{2}$$

But $\Pr(A) \times \Pr(B) \neq 0$ can also hold good if the events are disjoint.

Example:There are two Events A and B for a pack of cards.

A:Card<5 is drawn

B:Face card is drawn

Now,

$$\Pr(AB) = 0 \tag{3}$$

$$\Pr(A) = \frac{12}{52} \tag{4}$$

$$\Pr(B) = \frac{12}{52} \tag{5}$$

$$\Pr(A) \times \Pr(B) = \frac{144}{2704} \neq \Pr(AB) \tag{6}$$

The given events are mutually exclusive but not independent.

Hence this contradication leads that the given statement is false.