

Assignment 1

Ncert Exemplar

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I. QUESTION-11.16.3.43

Match the following:

(a) if E_1 and E_2 are the two mutually exclusive events	(i) $E_1 \cap E_2 = E_1$
(b) if E_1 and E_2 are the mutually exclusive and exhaustive events	(ii) $(E_1 - E_2) \cup (E_1 \cap E_2) = E_1$
(c) if E_1 and E_2 have common outcomes, then	(iii) $E_1 \cap E_2 = \phi, E_1 \cup E_2 = S$
(d) if E_1 and E_2 are two events such that $E_1 \subset E_2$	(iv) $E_1 \cap E_2 = \phi$

TABLE 0

Solution:

(a) If E_1 and E_2 are mutually exclusive events, then $E_1 E_2 = \phi$.

(b) If E_1 and E_2 are mutually exclusive and exhaustive events, then $E_1 E_2 = \phi$ and $E_1 + E_2 = S$

(c) If E_1 and E_2 have common outcomes, then let

$$E_1 = E_2 = E \quad (1)$$

$$\therefore E_1 = E E \quad (2)$$

$$= (E - E) + (E E) \quad (3)$$

$$= (E_1 - E_2) + (E_1 E_2) \quad (4)$$

(d) If E_1 and E_2 are two events such that $E_1 \subset E_2$, then let E be subset of E_2 containing elements other than E_1 . So,

$$E_1 + E = E_2 \text{ and } E_1 E = E_2 \quad (5)$$

Referring to equation (5):

$$E_1 E_2 = E_1 (E_1 + E) \quad (6)$$

$$= (E_1 E_1) + (E_1 E) \quad (7)$$

$$= E_1 \quad (8)$$

Hence,

$(a) \leftrightarrow (iv), (b) \leftrightarrow (iii), (c) \leftrightarrow (ii), (d) \leftrightarrow (i)$