Suppose an experiment has sample space $S = \{a, b, c, d, e, f, g, h\}$ with equiprobable outcomes. Define the following three events:

$$R = \{a, b, c, d, e\}$$
$$T = S - \{e, h\}$$
$$Q = \{d, g, h\}.$$

Which of the following events is independent of the event RT ?

(a) TQ

(b) $\{a, c\}$

(c) $Q^c R^c$

(d) $R^c Q$

(e) $\{a, b, c\}$

(f) $\{a, b\}$

(g) T^c

(h) $\{a\}$

(i) R^c

(j) None of these

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$$T = \{a, b, c, d, e\}$$
$$R = S - \{e, h\}$$
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Which of the following events is independent of the event TR ?

(a) RQ

(b) $\{a, c\}$

(c) $Q^c T^c$

(d) $T^c Q$

(e) $\{a, b, c\}$

(f) $\{a, b\}$

(g) R^c

(h) $\{a\}$

(i) T^c

(j) None of these

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$$R = \{a, b, c, d, e\}$$
$$Q = S - \{e, h\}$$
$$T = \{d, g, h\}.$$

Which of the following events is independent of the event RQ ?

(a) QT

(b) $\{a, c\}$

(c) $T^c R^c$

(d) $R^c T$

(e) $\{a, b, c\}$

(f) $\{a, b\}$

(g) Q^c

(h) $\{a\}$

(i) R^c

(j) None of these

Suppose an experiment has sample space $S = \{a, b, c, d, e, f, g, h\}$ with equiprobable outcomes. Define the following three events:

$$T = \{a, b, c, d, e\}$$
$$Q = S - \{e, h\}$$
$$R = \{d, g, h\}.$$

Which of the following events is independent of the event TQ ?

(a) QR

(b) $\{a, c\}$

(c) $R^c T^c$

(d) $T^c R$

(e) $\{a, b, c\}$

(f) $\{a, b\}$

(g) Q^c

(h) $\{a\}$

(i) T^c

(j) None of these

Solution: Let

$$Q = \{a, b, c, d, e\}$$
$$R = S - \{e, h\}$$
$$T = \{d, g, h\}.$$

Then, $P(QR) = P(\{a, b, c, d\}) = 1/2$ and $P(QR|RT) = P(QRT)/P(RT) = P(\{d\})/P(\{d, g\}) = 1/2 = P(QR)$, so QR is independent of QR. All the other answers are nonempty and either subsets of, or disjoint from QR.