⑤ Let A and B be Two independent events such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{6}$, Then which of the following is True?

(a) $P(A/(A \cup B)) = 1/4$

(b) $P(A/\bar{B}) = 1/3$

(c) $P(A/B) = 2/3$

(d) $P(\bar{A}/\bar{B}) = 1/3$

Soln:

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

A and B are independent

$$\therefore P(A \cap B) = P(A) \cdot P(B)$$

$$\therefore P(A/B) = \frac{P(A) \cdot P(B)}{P(B)} = P(A).$$

$$\therefore P(A/B) = 1/3. \quad \text{—— (c)}$$

$$P(A/\bar{B}) = P(A) = 1/3 \quad \text{—— (b)}.$$

$$P(\bar{A}/\bar{B}) = \frac{P(\bar{A} \cap \bar{B})}{P(\bar{B})} = P(\bar{A}) = 1 - P(A)$$

$$= 1 - \frac{1}{3} = \frac{2}{3} \text{ —(}$$

$$P(A/A \cup B) = \frac{P(A \cap (A \cup B))}{P(A \cup B)} = P(A) = \frac{1}{3} \text{ —(a)}$$

(b) is True