7): A: part is from supplier 1, B: part conforms to specifications.

a) $P(A|B) = ?$

$$\Rightarrow P(A|B) = \frac{P(B|A)\cdot P(A)}{P(B)}, \quad \cancel{P(B|A) = k_a} \quad P(B \cap A) =$$

$$= \frac{P(A \cap B)}{P(B)} \qquad P(A) = k_a + k_b$$

$$P(B) = k_a + a$$

$$\Rightarrow P(A|B) = \frac{P(B \cap A)}{P(B)} = \frac{k_a}{k_a + a},$$

$$\therefore P(A|B) = \frac{k_a}{k_a + a}$$

b) $$P(\bar{B}|A) = \frac{P(A|\bar{B})\cdot P(\bar{B})}{P(A)} = \frac{P(A \cap \bar{B})}{P(A)}$$

and $P(A \cap \bar{B}) = k_b$, $P(A) = k_a + k_b$

$$\Rightarrow P(\bar{B}|A) = \frac{k_b}{k_a + k_b}$$

$$\therefore P(\bar{B}|A) = \frac{k_b}{k_a + k_b}$$

c) If A and B are independent, then $P(A|B) = P(A)$

note that $P(A|B) = \frac{ka}{ka+a} = \frac{ka}{a(k+1)} = \frac{k}{k+1}$

and $P(A) = ka + kb = k(a+b)$

$\Rightarrow P(A|B) = \frac{k}{k+1} \neq k(a+b) = P(A)$

$\therefore$ Events A and B are not independent.