

Q.3, KB entails α if α is true in all worlds where KB is true. ($KB \models \alpha$)

a] In the truth table, s_1 is true in all worlds where KB is true
hence KB entails s_1 . ($KB \models s_1$)

b] If we change KB to $\text{NOT}(KB)$ & s_1 to $\text{NOT}(s_1)$, there are 2 rows (worlds) where $\text{NOT}(s_1)$ is false but $\text{NOT}(KB)$ is true.
Hence $\text{NOT}(KB)$ does not entail $\text{NOT}(s_1)$
 $\text{NOT}(KB) \not\models \text{NOT}(s_1)$

Q.4

$$\begin{aligned} \text{a]} \quad & A \rightarrow (\neg(C \vee B)) \\ & \neg A \vee (\neg(C \vee B)) \\ & \neg A \vee (\neg C \wedge \neg B) \\ & (\neg A \vee \neg C) \wedge (\neg A \vee \neg B) \end{aligned}$$

$$\begin{aligned} \text{b]} \quad & (\neg(C \vee B)) \rightarrow A \\ & \neg(\neg(C \vee B)) \vee A \\ & C \vee B \vee A \end{aligned}$$