Question 6)

part a)

Need to prove that the following implication is wrong.

B is a L.C. of a KB → B is a logically consequence of each fact Aiof KB.

It is sufficient to give an example to prove this is wrong.

Example

Let the KB : p,q

From the following truth table p ∧ q is a logically consequence of a kb with p,q facts

|  |  |  |  |
| --- | --- | --- | --- |
| p | q | p ∧ q | p∧q→ p ∧ q |
| T | T | T | T |
| T | F | F | T |
| F | T | F | T |
| F | F | F | T |

Table 1

|  |  |  |  |
| --- | --- | --- | --- |
| p | q | p ∧ q | p ∧ q → p |
| T | T | T | T |
| T | F | F | T |
| F | T | F | T |
| F | F | F | T |

Table 2

|  |  |  |  |
| --- | --- | --- | --- |
| p | q | p ∧ q | p ∧ q → q |
| T | T | T | T |
| T | F | F | T |
| F | T | F | F |
| F | F | F | T |

Table 3

From the table 2 p is a logically consequence of p ∧ q

From the table 3 q is not a logically consequence of p ∧ q

Hence p ∧ q is not a logically consequence of each fact p and q of the KB.

Question 6) b)

1. Show that the following reasoning is correct: *if B is a logical consequence of at least of one of the components of the knowledge base A1, A2, A3, … An then B is a logical consequence of this knowledge base.*

Question 6) part b)

Show the following is correct(true).

B is a logical consequence of at least one Ai → B is a logical consequence of the KB with Ai ∧ A2 ∧ …. ∧ An

p → q is equivalent to ¬ q → ¬ p

This means proving the following is equivalent to the above

B is a not a logical consequence of the KB with Ai ∧ A2 ∧ …. ∧ An

→ B is not a logical consequence of any Ai

Let’s assume that B is a not a logical consequence of the KB with Ai ∧ A2 ∧ …. ∧ An

Then Ai ∧ A2 ∧ …. ∧ An → B is not a valid proposition.

This means that there is at least one proposition where Ai ∧ A2 ∧ …. ∧ An → B is False

In that case Ai ∧ A2 ∧ …. ∧ An has to be True and B has to be false.

For Ai ∧ A2 ∧ …. ∧ An to be true all Ai s has to be True.

Thus Ai → B is F for all Ai s

This means B is not a logical consequence of any Ai

Thus ¬ q → ¬ p is correct hence p → q is also correct.