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Quiz over week 1 .doc file

Question 11:

a) R ^ ¬P

b) (¬P ^ Q) ^ R

c) R --> (Q <--> P)

d) ¬Q --> (P ^ R)

e) ¬Q ^ ¬R

Question 12:

( ¬ P ∧  ( P→ Q)) →¬ Q. Show if this is a tautology.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| P | Q | ¬p | P --> Q | ( ¬ P ∧  ( P→ Q) | ¬Q | ( ¬ P ∧  ( P→ Q)) →¬ Q |
| T | T | F | T | F | F | T |
| T | F | F | F | F | T | T |
| F | T | T | T | T | F | F |
| F | F | T | T | T | T | T |

Answer: Not a tautology as there is a false statement in the table.

Question 13:

(P <--> Q) and (P --> Q) ^ (Q --> P)

Table for P <--> Q

|  |  |  |
| --- | --- | --- |
| P | Q | P <--> Q |
| T | T | T |
| T | F | F |
| F | T | F |
| F | F | T |

Table for (P --> Q) ^ (Q --> P)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P | Q | P --> q | Q --> p | (P --> Q) ^ (Q --> P) |
| T | T | T | T | T |
| T | F | F | T | F |
| F | T | T | F | F |
| F | F | T | T | T |

Answer to 13: They are equivalent because the truth tables are identical (in red)