## Logic Tutorial 2 Solutions

1) a.

| | | |
|---|---|---|
| i) | False | *A sees B* is false, and *B sees C* is true. *False* $\leftrightarrow$ *True* is False. |
| ii) | True | *B next-to D* is True. *True* $\vee$ *anything* is True. |
| iii) | True | *F above A* is False. *anything* $\wedge$ *False* is False, and $\neg$ *(False)* is True. |
| iv) | True | *A sees E* is False. So $\neg$*[A sees E]* is True, and *anything* $\rightarrow$ *True* is True. |
| v) | True | Consider $\neg$([B above E] $\leftrightarrow$ [B next-to C]). This is $\neg$(True$\leftrightarrow$ False) which is $\neg$(False) which is True. |

b. The following is an example:

| | | |
|---|---|---|
| A | B | D |
| F | C | E |



2.

a. Contingency



| P | Q | P$\vee$Q | P$\wedge$(P$\vee$Q) |
|---|---|---|---|
| T | T | T | T |
| T | F | T | T |
| F | T | T | F |
| F | F | F | F |

b. Contingency

| P | Q | P$\vee$Q | P$\rightarrow$Q | (P$\vee$Q)$\wedge$(P$\rightarrow$Q) |
|---|---|---|---|---|
| T | T | T | T | T |
| T | F | T | F | F |
| F | T | T | T | T |
| F | F | F | T | F |

c. Inconsistency

| P | Q | ¬P | Q→P | P∨(Q→P) | Q∧¬P | Given wff c. |
|---|---|---|---|---|---|---|
| T | T | F | T | T | F | F |
| T | F | F | T | T | F | F |
| F | T | T | F | F | T | F |
| F | F | T | T | T | F | F |

d. Tautology

| P | Q | Q∨P | P∧(Q∨P) | P∧(Q∨P)↔P |
|---|---|---|---|---|
| T | T | T | T | T |
| T | F | T | T | T |
| F | T | T | F | T |
| F | F | F | F | T |

e. Tautology

| P | Q | P→Q | ¬P | ¬P∨Q | Given wff in e. |
|---|---|---|---|---|---|
| T | T | T | F | T | T |
| T | F | F | F | F | T |
| F | T | T | T | T | T |
| F | F | T | T | T | T |



f. Tautology – I leave the details to you!