1.

a. If one leaves Accra at 6:00AM, then they will get to campus by 8:00AM.
b. If Willy cheats, then he will get caught.
c. If you pay a subscription fee, then you can access the website.
d. If you know the right people, then you will get elected.
e. If there are winds from the south, then there is a spring thaw.
f. If Abena did not miss the bus, then she will go to Accra.

2.

a.

| **p** | **p⊕p** |
|---|---|
| T | F |
| F | F |

b.

| **p** | **q** | **¬q** | **p⊕q** | **p⊕¬q** | **(p⊕q) v (p⊕¬q)** |
|---|---|---|---|---|---|
| T | T | F | F | T | T |
| T | F | T | T | F | T |
| F | T | F | T | F | T |
| F | F | T | F | T | T |

3.

| | |
|---|---|
| $[\neg p \wedge (p \vee q)] \rightarrow q$ | *apply 2nd distributive law* |
| $\equiv [ (\neg p \wedge p ) \vee ( \neg p \wedge q ) ] \rightarrow q$ | *apply 2nd Commutative law* |
| $\equiv [ ( p \wedge \neg p ) \vee ( \neg p \wedge q ) ] \rightarrow q$ | *apply 2nd Negation Law* |
| $\equiv [ F \vee ( \neg p \wedge q ) ] \rightarrow q$ | *apply 1st Commutative Law* |
| $\equiv [ ( \neg p \wedge q ) \vee F ] \rightarrow q$ | *apply 2nd Identity law* |
| $\equiv [ ( \neg p \wedge q ) ] \rightarrow q$ | *apply Conditional-Disjunction law* |
| $\equiv [ \neg ( \neg p \wedge q ) ] \vee q$ | *apply 1st De Morgan's Law* |
| $\equiv p \vee \neg q \vee q$ | *apply 1st Negation Law* |
| $\equiv p \vee T$ | *apply 1st Domination Law* |
| $\equiv T$ | |

This proves that compound proposition $[\neg p \wedge (p \vee q)] \rightarrow q$ is a tautology