CS1231–Midterm 1, 2016

Name: **Matric No:**

1.

Yes.

p	q	r	$p \vee \neg q$	$q \vee \neg r$	$p \to r$	$(p \vee \neg q) \wedge (q \vee \neg r) \wedge (p \to r)$
T	T	T	T	T	T	T
T	T	F	T	T	F	F
T	F	T	T	F	T	F
F	T	T	F	T	T	F
T	F	F	T	T	F	F
F	T	F	F	T	T	F
F	F	T	T	F	T	F
F	F	F	T	T	T	T

2. Yes. $(p, q, r) = (T, T, T), (F, F, F)$.

3. $\forall x \in D, S(x) \to K(x)$ or $\forall x, S(x) \to K(x)$.

4. (a) Each box contains a card.

(b) Each card is in a box.

(c) Each box contains at most one card.

5. $\exists i, \exists j, \exists k, Q(i, j) \wedge P(i, k) \wedge P(j, k)$

There is a box that contains 2 different cards.

6. The answer is yes.

If $\exists x \forall y P(x, y)$ is true, then there is particular x_0 such that $P(x_0, y)$ is true for all y. This in turn implies that $\forall y \exists x P(x, y)$ is true.

7.

1. $\neg t$, (c)

2. $\neg t \to \neg p$ (d)

3. $\neg p$, (from 1, 2)

4. $\neg p \vee q$, (from 3).

5. r, (from 4, (a)).

6. $\neg p \wedge r$, (from 3, 5)

7. $\neg s$, (from e).

8. $\neg q$, (from b).