**Prac 4 Theory Question**

1. M(x) : x is a people. F(x) : x with black hair.

x(M(x)⇒F(x))

G(x) : x boarded the moon.

x(M(x)∧G(x)).

H(x) : x boarded the Jupiter.

￢x(M(x)∧H(x)).

F(x) : x is a student studying in the US.

G(x) : x is Asian.

￢x(F(x)⇒G(x))

2.

（1）tautology

(2) contradiction

3.

True

True

True

True

False

4.

P∧(Q⇒R)⇒S

=￢(P∧(￢Q∨R))∨S

=￢P∨￢(￢Q∨R)∨S

=￢P∨(￢￢Q∧￢R)∨S

=￢P∨(Q∧￢R)∨S

=￢P∨S∨(Q∧￢R)

=(￢P∨S∨Q)∧(￢P∨S∨￢R)

5.

∀ x Even(x) ⇔ ∃ y x=y + y.

∀ x Prime(x) ⇔ ∀ y, z x=y ×z ⇒ y =1 ∨ z =1.

∀ x Even(x) ⇒ ∃ y, z Prime(y) ∧ Prime(z) ∧ x=y + z.