Pr cat ice 4

1.

(Q1.1) Since the individual domain is not proposed in this question, the total individual domain is used

* Assume M(x) x is a people
* Assume F(x) x with black hair
* Propostional symbolization as x(M(x) F(x))
* Assume a is a girl with blonde hair ,then M(a) is true F(a) is false
* So M(a) F(a) is false
* Therefore Propositional is false

(Q1.2)assume G(x) x boarded the moon

* Propositional symbolization as x(M(x)^H(x))
* Assume a is an American who completed the Apollo program on the moon in 1969
* So M(a)^G(a) is true
* Therefore Propostional is true

(Q1.3) Assume H(x) x boarded the Jupter

* Propositional symbolization as x(M(x)^H(x))
* No one has boarded Jupiter so far
* Assume anyone is a then M(a)^H(a) of all is false
* Therefore x(M(x)^H(x)) is false
* So Propostional is true

(Q1.4)Assume F(x), x is a student studying in the US

* G(x) x is Asian
* Propostional symbolization as x(F(x) G(x))
* Therefore Propostional is true

2.

(Q2.1)tautology: just Replacement instance p(qp)

(Q2.2)contradiction: just Replacement instance p(q

(Q2.3)There are two explanatations:

Explanation1-Individual domain N,F(x)x>5,G(x):x>4, formula is true.

Explanation2-Individual domain N,F(x)x<5,G(x):x<4, formula is false

So, there is no permanent satisfaction.

3.

(Q3.1) False |= True is true because False has no models and hence entails every sentence and because True is true in all models and hence is entailed by every sentence.

(Q3.2) (A ∧ B) |= (A ⇔ B) is true because the left-hand side has exactly one model that is one of the two models of the right-hand side

(Q3.3) (A ∧ B) ⇒ C |= (A ⇒ C) ∨ (B ⇒ C) is true because the RHS is false only when both disjuncts are false. When A and B are true and C is false, in which case the LHS is also false. This may seem counterintuitive, and would not hold if Interpreted as ‘causes’ .

(Q3.4) (A ∨ B) ∧ (￢C ∨￢D ∨ E) |= (A ∨ B) is true , removing a conjunct only allows more models.

(Q3.5) (A ∨ B) ∧ (￢C ∨￢D ∨ E) |= (A ∨ B) ∧ (￢D ∨ E) is false, removing a disjunct allows fewer models.

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.

(Q5.1)x Even(x) ⇔y x= y + y

(Q5.2)x Prime(x) ⇔y,z x=y \* z ⇒ y=1 ∨ z = 1

(Q5.3)x Even(x) ⇔y,z Prime(y) ^ Prime(z) ^ x= y + z