**Tute -7**

Q1.For each of these sets of premises, what relevant conclusion or conclusions can be drawn? Explain the rules of inference used to obtain each conclusion from the premises.

a) “If I play hockey, then I am sore the next day.” “I use the whirlpool if I am sore.” “I did not use the whirlpool.”

b) “If I work, it is either sunny or partly sunny.” “I worked last Monday or I worked last Friday.” “It was not sunny on Tuesday.” “It was not partly sunny on Friday.”

c) “All insects have six legs.” “Dragonflies are insects.” “Spiders do not have six legs.” “Spiders eat dragonflies.”

d) “Every student has an Internet account.” “Homer does not have an Internet account.” “Maggie has an Internet account.”

e) “All foods that are healthy to eat do not taste good.” “Tofu is healthy to eat.” “You only eat what tastes good.” “You do not eat tofu.” “Cheeseburgers are not healthy to eat.”

f) “I am either dreaming or hallucinating.” “I am not dreaming.” “If I am hallucinating, I see elephants running down the road.”

Q2.What is wrong with this argument? Let S(x, y) be “x is shorter than y.” Given the premise ∃s S(s, Max), it follows that S(Max, Max). Then by existential generalization it follows that ∃x S(x, x), so that someone is shorter than himself.

Q3.Determine whether each of these arguments is valid. If an argument is correct, what rule of inference is being used? If it is not, what logical error occurs?

a) If n is a real number such that n > 1, then n2 > 1. Suppose that n2 > 1. Then n > 1.

b) If n is a real number with n > 3, then n2 > 9. Suppose that n2 ≤ 9. Then n ≤ 3.

c) If n is a real number with n > 2, then n2 > 4. Suppose that n ≤ 2. Then n2 ≤ 4.

Q4.

a) Use a direct proof to show that the product of two rational numbers is rational.

b) Prove or disprove that the product of a nonzero rational number and an irrational number is irrational.

Q5. Show that the propositions p1, p2, p3, and p4 can be shown to be equivalent by showing that p1 ↔ p4, p2 ↔p3, and p1 ↔ p3.