Solution 3.
CIS 471/571, Fall 2014

1.
   a. Wrong
   When A and B are both false, this statement is false.

   b. Correct
   When B is true and A is false, this statement is true.

   c. Correct

   d. Correct
   x=x is always true. So this statement is weak which does not give much information.

   e. Correct
   It is Correct in Logic. But it will still take some time that UO gets the first NC in football. The team members played for UO will get the NC.

   f. Correct
   Statement equals to ∃x(play_Football_for(x, UO) ∧ National_Champion(x)), which is Correct in logic. But it will still take some time that UO gets the first NC in football.

   g. Wrong
   They do not imply each other. They are not equivalent. The left is:
   ∀x likes(x, broccoli) ∧ ¬has_cancer(x).
   The right can be converted to existential quantifier:
   ∃x likes(x, broccoli) ∧ ¬has_cancer(x).

2.
   Backward chaining would work in this situation since all the rules are in Horn form. It is faster than resolution and forward chaining. Since we have a goal to work from, and there are 10 parts, backward chaining is the best. Forward chaining is going to produce a lot of extraneous information at each step.

3.
   Rules:
   ∀x StudentofUDuck(x) ∧ Science_Major(x) ∧ Take_course(x,y) ∧ Science_Course(y) ∧ Good_Socre(x,y) => Degree(x)
   ∀x Take(x, IntroToCIS) => Good_Sience_Socre(x, IntroToCIS)

   Statements:
   A: Marcus is a student at U of Ducks: StudentofUDuck(Marcus)
B: Marcus take course: Take_Course(Marcus, IntroToCIS)
C: IntroToCIS is science course: Science_Course(IntroToCIS)
D: A student x finishes his degree: Finish_Degree(x)

Backward chaining:

In this case we cannot make a conclusion because we do not know Marcus's major. Football player Marcus may be in science major or may be not. If he is, it seems he will finish a degree.