1. Briefly define the following properties of a sentence or set of sentences:
   (a) Satisfiable
   (b) Unsatisfiable
   (c) Tautology

2. Briefly define the following properties of inference rules:
   (a) Soundness
   (b) Completeness

3. One rule of thumb for faculty hiring might be that a person who is not sociable (¬S) is tenurable (T) if he or she is brilliant (B), but otherwise is not tenurable. Which of the following are correct representations of this assertion?
   (a) (¬S ∧ T) ⇐⇒ B
   (b) ¬S ⇒ (T ⇐⇒ B)
   (c) ¬S ⇒ ((B ⇒ T) ∨ ¬T)

4. Use resolution to prove the sentence ¬A ∧ ¬B from the following set of clauses:
   S1: A ⇐⇒ (B ∨ E)
   S2: E ⇒ D
   S3: C ∧ F ⇒ ¬B
   S4: E ⇒ B
   S5: B ⇒ F
   S6: B ⇒ C

   Hints: (1) Resolution requires conversion to a particular form. (2) To prove a conjunction it suffices to prove each conjunct separately.

5. Briefly explain why a knowledge base that can be expressed entirely as Horn clauses might be A Good Thing.