Condensed written final practice question

Tuberculosis bacteria cause very high mortality rates in the United States. Therefore, figuring out the mechanisms through which the pathogens (disease causing organisms) cause disease is of great interest. Tuberculosis infection of mice can be used as a model system for studying host-pathogen interactions. Studies of animal cell cultures show that tuberculosis causes illness by secreting harmful molecules, to the outside of the bacterial cell in order to affect the host organism. This experiment studied a secreted protein called p60. P60 is an antigen (an agent seen by the host immune system) that might regulate bacterial cell wall breakdown. The objective of this study was to examine if p60 determines how harmful tuberculosis bacteria is? To examine this question, I constructed a tuberculosis strain lacking p60. When p60 lacking tuberculosis was tested in a mouse, none of the mice died. This discovery suggests that p60 is indeed a key factor in the disease-causing ability of tuberculosis. Future studies will focus on the precise role of p60 in tuberculosis pathogenesis (how harmful it is). This work increases our understanding of such diseases as tuberculoses, various food poisonings, and meningitis.

Use the abstract above to answer the questions below.

1. Write the research question(s) to the experiment.
2. What is the independent variable?
3. What is the dependent variable?
4. Write down a possible hypothesis that could be tested.
5. What are three variables that would have to remain constant to ensure the validity of the experiment?
6. What is the relationship between the variables tested?
7. What is the conclusion from this experiment?

Many organisms live within a limited pH range. Rising CO2 levels have made the oceans more acidic. Sea butterflies are snails found in the Southern Ocean near the Antarctica. The snails are the size of the head of a pin. A Sea butterfly’s shell will dissolve in lower pH water therefore, snails become less frequent at lower pH levels. A research ship took five ocean water samples. The water samples were taken every 200 m. The 200 meter sample contained 3000 snails, the 400 m sample contained 2800 snails, at 600 m 2500 snails, 800 m 1000 snails and 1000 m 200 snails.

1. What is the research question?
2. What is the independent variable?
3. What is the dependent variable?
4. Write down a possible hypothesis that could be tested.
5. What is the relationship between the variables tested?
6. What is the conclusion of the study?