1. **Describe the differences among essential, nonessential, and conditionally essential amino acids.**
   Essential amino acids cannot be made in the body and must be obtained from the diet. Nonessential amino acids can be manufactured in the body when enough nitrogen, carbon, hydrogen, and oxygen are available. Conditionally essential amino acids are amino acids that your body makes under normal circumstances, but when one has certain deficiencies and disorders the body can no longer produce them and they must be obtained from the diet.

2. **List the functions of body proteins.**
   - Structural and mechanical functions
   - Immune function
   - Enzymes
   - Hormones
   - Acid-base balance
   - Transport functions
   - Fluid balance
   - Source of energy and glucose

3. **How is protein related to immune function?**
   Antibodies are blood proteins that attack and inactivate bacteria and viruses that can cause infection. Each protein antibody has a specific shape that allows it to attack and destroy a specific foreign invader.

4. **What is meant by nitrogen balance? Give examples of conditions associated with positive and negative nitrogen balance.**
5. What are complementary proteins? List three examples of food combinations that contain complementary proteins. Although the protein in one plant food may lack certain amino acids, the protein in another plant food may be a complementary protein that completes the amino acid pattern. So the protein in one plant food can provide the essential amino acid(s) that the other plant food is missing.

1) Beans and rice
2) Peanut butter on bread
3) Pasta with beans

6. Describe a vegan diet.
Vegans eat no animal-based foods and usually avoid cosmetics and other products made with animal-based ingredients.

7. List the potential health benefits of a vegetarian diet.
Vegetarian diets:
- contain less fat, saturated fat, and cholesterol
- contain vegetables and fruits high in antioxidants and that contain dietary fiber and phytochemicals.

Vegetarians:
- have lower blood cholesterol levels
- are less likely to develop heart disease
- have lower weight
- are less likely to have high blood pressure
- have lower rates of cancer

8. What health effects occur if you are protein deficient?
A deficiency of protein, energy, or both in the diet is called protein-energy malnutrition, or PEM. Severe PEM takes two forms:
Kwashiorkor: characterized by edema in the feet and legs, bloated belly due to edema and accumulation of fat in the liver, stunted height and weight, increased susceptibility to infection, dry flaky skin, skin sores, dry brittle hair, and changes in skin color.
Marasmus: develops more slowly than kwashiorkor and results from chronic PEM. Protein, energy, and nutrient intakes are all grossly inadequate, depleting body fat reserves and severely wasting muscle tissue, including vital organs like the heart. Growth slows or stops, and children are both short and very thin for their age. Metabolism slows and body temperature drops as the body tries to conserve energy.

9. What health effects can occur over time from consuming too much protein?
Intake of too much protein may contribute to obesity, heart disease, and certain forms of cancer. These links, however, may be attributed to the high fat intake that often accompanies high protein intake.