Answer only **FOUR** questions. All questions carry equal marks.

1. With reference to pertinent examples, give an account of the beneficial roles of tannins in livestock rations and explain why in many other cases, they are considered to be deleterious for livestock.

2. Discuss the relationship between either:
   
   a. Fermentable carbohydrate availability in grasses, the fermentation process and the sensory attributes and chemical composition of the resulting silage.
   
   b. Diet composition, rumen fermentation and predisposition to metabolic diseases.

3. Explain why this Near infrared reflectance spectroscopy has gained such widespread use and outline the main problems with the technique.


5. Write an essay on the importance and limitations of the nylon bag or in situ degradation technique for estimating the rumen degradability of feeds.

6. Describe the principles underlying the use of alkanes in quantifying feed intake and digestibility.

7. Analyze the differences between precision and accuracy in forage evaluation, and discuss the pros and cons of three methods of assessing the relationship between a predictor and the predicted term.

8. As an adviser to the USDA Director, write a critical report on the general problems associated with forage analysis in the US, and recommend feasible solutions to the problems.