

Name _____

Lab Day _____

AS 212 ANIMAL NUTRITION

Preliminary Examination

Monday, September 27, 2004

Questions 1 and 2 are compulsory. Answer these and one (1) other question (Question 3 or 4). Points for each question are shown in parentheses.

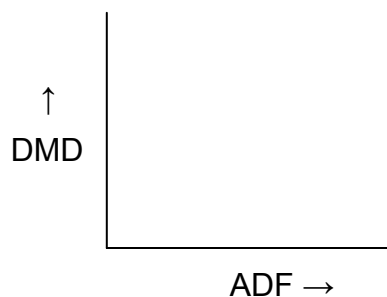
QUESTION 1 (50 points)

(a) Animal feeds that are high in energy and low in fiber are generally called _____. An example that is fed mostly to supply energy is _____. An example that is fed mostly to supply protein is _____. (3 points)

(b) Why does red clover contain more protein than orchard grass at the same stage of maturity? (4 points)

(c) Briefly describe two ways in which heat treatment can improve the nutritive value of feeds. (4 points)

(d) Show the relation between dry matter digestibility (DMD) and acid detergent fiber (ADF) content of forages. (2 points)



(e) List three important requirements for successful completion of a digestion trial for estimation of feed digestibility. (3 points)

(f) How would you classify the rabbit in terms of its gastrointestinal anatomy and function? (2 points)

(g) Considering the very different diets and digestive anatomy of dogs and horses, how is it possible that the concentration of volatile fatty acids (VFA) in the colon is similar in the two species? (4 points)

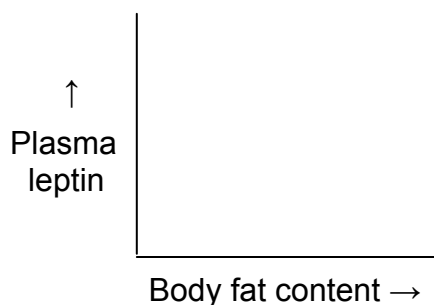
(h) State two functions of saliva in a cat. (2 points)

(i) Name the three major classes of rumen microorganisms and indicate which is most important in rumen fermentation. (4 points)

(j) In a piglet that has just suckled its mother's fat-rich milk, what is the chemical form of absorbed dietary lipid and how does it reach the bloodstream? (4 points)

(k) The function of pancreatic α -amylase is to digest _____ (dietary constituent) in the _____ (organ). (2 points)

(k) Indicate and briefly explain the relation between plasma leptin concentration and body fatness. (4 points)



- (l) Name the two major metabolic requirements for cellular protein synthesis. (4 points)
- (m) Lignin has a gross energy value of 6.5 kcal/g and starch has a gross energy value of 4.2 kcal/g. Does this make lignin a better source of dietary energy? Why or why not? (3 points)
- (n) In the cytoplasmic process of glycolysis, _____ is converted to _____ which, in well-oxygenated cells, is then used to generate ATP via the mitochondrial processes of _____ and _____. Which of the mitochondrial processes yields the most ATP? (5 points)

QUESTION 2 (30 points)

- (a) Discuss the influence of plant maturity on specific indices of forage quality and how this affects decisions about when to harvest forages for hay or silage. (10 points)

- (b) Your cat has just consumed a meal containing 30% crude protein. Outline the processes of protein digestion and absorption she will undergo before her next meal. (10 points)

- (c) Growing pigs at the Cornell Swine Farm are fed high corn diets ad libitum. One day the feeding system broke down and after receiving a portion of their daily feed in the morning, the pigs went without feed for the next 18 h. Outline the effect of this unusual feeding regime on the relative importance of different sources of blood glucose during the 24 h from when the pigs were last fed. (10 points)

QUESTION 3 (20 points)

- (a) Describe and explain how the process of grinding and pelleting of dry forages affects their voluntary intake by ruminant animals. Indicate the degree to which this effect is influenced by forage quality. (10 points)

- (b) Which would have a greater daily water requirement, a lactating dairy cow in Arizona during August or a dry beef cow in Colorado in February? Provide a mechanistic explanation for your answer. (10 points)

QUESTION 4 (20 points)

- (a) Discuss the symbiotic relationship between rumen microbes and their ruminant host animal, detailing the mutual benefits to each.

(OR)

- (b) Discuss the concept of energy balance, indicating the measurements required for its measurement and relating it to the conventional system for partitioning feed energy and derivation of terms for describing the energy feeding value of dietary components.