



UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: B. Sc. ANIMAL SCIENCE III

COURSE CODE: APH 304

TITLE OF PAPER: NUTRITIONAL BIOCHEMISTRY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER FOUR (4) QUESTIONS, AT
LEAST TWO FROM EACH SECTION

**THIS PAPER MAY NOT BE OPENED UNTIL THE CHIEF
INVIGILATOR HAS GRANTED PERMISSION.**

SECTION A**QUESTION 1**

Explain and illustrate the following:

- a. Transamination (13 marks)
- b. Pyruvate dehydrogenase complex (12 marks)

QUESTION 2

Describe and illustrate the energy yielding steps in the Krebs's cycle (25 marks)

QUESTION 3

Discuss cellular metabolism under the following topics:

- a. Categories (7 marks)
- b. Key participants (4 marks)
- c. Enzymic control (9 marks)
- d. Compartmentation (5 marks)

SECTION B**QUESTION 4**

In a feeding trial, two groups of six steers were fed with concentrate and mature grass hay respectively at 3% of their body weight. Animals had unlimited access to clean drinking water. Steers that were fed with concentrate quickly finished their meal while the ones fed with mature grass hay consumed half the amount.

- a. Discuss the possible reasons of such behaviour. (15 marks)
- b. Steers that were fed with concentrates developed a certain nutritional disorder. Discuss one possible disorder of feeding a concentrate only in such a feeding system with respect to its *cause, symptoms, treatment and prevention*. (10 marks)

QUESTION 5

Protein degradability of dairy meal was evaluated using the *in sacco* technique and yielded results indicated in Figure 1. The concentrate had 700 g/kg DM crude protein and 0.25 g/kg DM acid-detergent insoluble nitrogen (ADIN). The outflow rate, r was 0.05 and fraction c was 0.06.

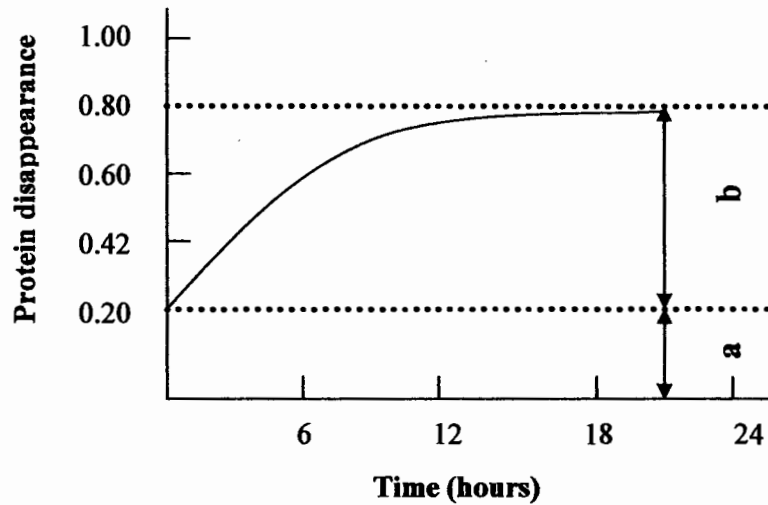


Figure 1: Protein disappearance during 24 hours of incubation

- a. Determine the effective rumen degradable protein (ERDP) of the concentrate. (6 marks)

- b. Determine the truly digestible undegradable true protein, DUP. (4 marks)

- c. Describe fully the Cornell Net Carbohydrate Protein System. (15 mark)

QUESTION 6

- a. Voluntary feed intake is mostly controlled by the central-nervous system (CNS) in non-ruminants as opposed to ruminants. Discuss how the CNS control voluntary feed intake in non-ruminants. (14 marks)**

- b. Briefly describe the use of indirect calorimetry in estimation of energy usage by the animal. (7 marks)**

- c. How is the indirect calorimetry different from direct calorimetry? (4 marks)**