

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
DISCIPLINE OF ANIMAL AND POULTRY SCIENCE
SUPPLEMENTARY EXAMINATION: 25 NOVEMBER 2013
SUBJECT, COURSE & CODE: INTRODUCTION TO RUMINANT
NUTRITION ANSI312

DURATION: 3 HOURS

TOTAL MARKS: 100

External Examiner: DR. MARION YOUNG

Internal Examiner: PROF IV NS AHLAI

NOTE: THIS PAPER CONSISTS OF 2 PAGES, PLEASE SEE THAT YOU HAVE THEM ALL.

Answer **ALL** questions. *You are reminded of the necessity for good English, legibility and orderly presentation of material in your answers.*

QUESTION ONE [22]

- a) Digestibility of feeds is usually determined using an apparent digestibility coefficient. State the formula for calculation [2]
- b) Give reasons why it is termed apparent digestibility [1].
- c) List materials you would need when determining digestibility. [3]
- d) In order to evaluate the effects of concentrate (DM 90%) and forage legume (87%) on the digestibility of a poor quality roughage (DM 90%), an experimenter used three treatments. In treatment one (the control) sheep were fed on roughage alone. In treatment TWO, sheep received 300g each of concentrate, and in treatment THREE sheep received 300g of forage legume. Assume that the concentrate has a digestibility of 80% on its own, and the legume has a digestibility of 65% on its own and that animals in each treatment consumed a total of 700 g DM. The following table shows the faecal parameter of animals in each treatment.

Measurements	Treatment one	Treatment Two	Treatment Three
Faeces output, g	750	745	693
Faeces DM (%)	48	44	44

Given the information above:

- i. Calculate the digestibility of roughage in the three diets [12].
- ii. Discuss the effect of concentrate and legume on the digestibility of the roughage [4].

QUESTION TWO [25]

- Give a detailed description of the adaptation of the intestines for digestion and absorption. Diagrams or Figures may help. [15].
- With the help of a diagram, describe the mechanism of absorption of amino acids [10].

QUESTION THREE [25]

- i A farmer grazes beef steers weighing on average 300 kg on pasture and wishes to elicit daily gains of 0.8 kg per calf day. On pasture calves consume 10 kg grass (DM=0.35; ME=9.2 MJ/kg DM; OM=900g/kg DM; CP=10.5%). How much concentrate (DM=0.93; ME=12.5 MJ/kg DM; OM=890g/kg DM; CP=15%) should he feed assuming that the maintenance energy cost increases by 60% due to movements in the

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pasture. [20]

ii Is your solution feasible? [5]

[You may find some of the information below useful

$$k_m = 0.35q_m + 0.503 \quad \text{Or} \quad k_m = 0.019M/D + 0.503;$$

$$k_f = 0.78q_m + 0.006 \quad \text{Or} \quad k_f = 0.042M/D + 0.006;$$

$$k_l = 0.35q_m + 0.420 \quad \text{Or} \quad k_l = 0.019M/D + 0.420;$$

$$\text{Net energy for maintenance} = 0.396 \text{ MJ/kg } W^{0.73}.$$

Net energy value of live weight: 26 MJ/kg;

Efficiency of use of body tissue for milk synthesis: 0.84;

Energy value of milk (MJ/kg)=1.509 + 0.0406F (F=butter fat (g/kg));

$$APL = (NE_m + NE_p) / NE_m;$$

$$k_{mp} = APL / (1/k_m + (APL-1)/k_p);$$

$$\text{Maximum DM intake} = 0.025 W + 0.1Y \text{ (where } Y \text{ is milk yield)}$$

QUESTION FOUR [28]

- a) Discuss problems associated with over-consumption of grain (or concentrates) in ruminants. [16]
- b) Write short notes on the following:
 - i. Phenolic compounds [3];
 - ii. Prolamine protein [3];
 - iii. Nitrate poisoning [3]; and
 - iv. Grass tetany [3].

***** Good luck!*****