



Page 1 of 3

UNIVERSITY OF SWAZILAND

2nd SEM. 2013/2014

FINAL EXAMINATION PAPER

PROGRAMME: B.Sc. ANIMAL SCIENCE (DAIRY OPTION) YEAR 4

COURSE CODE: ASD 401

TITLE OF PAPER: DAIRY ANIMAL FEEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE
CHIEF INVIGILATOR

QUESTION 1

Fatty liver and ketosis are metabolic disorders that tend to afflict dairy cattle.

Discuss these two disorders in detail, explaining their cause, symptoms and how best they can be prevented in a dairy farm.

(25 Marks)

QUESTION 2

Discuss the importance of the balance between neutral detergent fibre (NDF) and non-structural carbohydrates (NSC) in the diet of the ruminant animal, its impact on rumen digestion as well as the proportions of volatile fatty acids (VFA's) produced and their implication on rumen health, the dietary energy supply to the cow as well as milk yield and quality.

(25 Marks)

QUESTION 3

A dairy nutrition simulation report (appended) shows the performance of a lactating Holstein cow based on the Total Mixed Ration design shown.

- a) Discuss the dietary energy supply and its influence and contribution to the milk produced by the cow. **(7 Marks)**
- b) Comment on the mineral supply of the diet in relation to the animal requirements as well as the Ca:P ratio of the feed. **(3 Marks)**
- c) Discuss the rumen degradable protein (RDP) fraction of the diet in comparison to the required RDP in relation to the animal's performance as well as the formulation of the diet. **(7 Marks)**
- d) Discuss the rumen undegradable protein (RUP) fraction of the diet in comparison to the required RUP by the animal and what the difference implies in relation to the diet quality and animal performance. **(8 Marks)**

QUESTION 4

(a) Discuss the metabolic disorder, parturient paresis; its causes, corrective interventions and how it can best be prevented in cattle. **(13 Marks)**

(b) Discuss the metabolic disorder, hypomagnesaemia; its causes, corrective interventions and how it can best be prevented in cattle. **(12 Marks)**

QUESTION 5

In animal nutrition, fishmeal and soybean meal are two of the most potent protein sources in animal rations. Discuss in detail their suitability for inclusion and inclusion rates in dairy cattle feed as well as the underlying implications on the economics of their inclusion in the diets of ruminant animals. **(25 Marks)**

NRC Dairy Nutrition Simulation Model Summary Report

Animal Inputs

Animal Type: Lactating Cow
Age: 52 months
Body Weight: 650 kg
Milk Fat: 3.00%
Days In Milk: 250

Milk Production: 35.0 (kg/day)
Days Pregnant: 180
Breed: Holstein
Milk True Protein: 3.00%

Diet Nutrient Balances

Animal Requirements	NEI (Mcal/day)	MP (g/day)	Ca (g/day)	P (g/day)	K (g/day)
Maintenance	10.30	882	21	26	177
Pregnancy	0.00	0	0	0	0
Lactation	22.50	1,567	43	32	53
Growth	0.00	0	0	0	0
Total Required	32.80	2,449	63	58	229
Total Supplied	37.00	2,476	64*	70*	284*
Balance	4.20	27	1	13	55

Animal Performance

DMI - Actual: 24.9 (kg/day)
 DMI - Predicted: 23.2 (kg/day)

NEI Allowable Milk: 41.5 (kg/day)
 MP Allowable Milk: 35.6 (kg/day)

Milk Production: 35.0 (kg/day)

Days to gain one condition score: 119 daily

Weight Change due to Reserves: 0.8 (kg/day)

Protein Values

RDP Required: 2350 (g/d)
 RDP Supplied: 4017 (g/d)
 RDP Balance: 1667 (g/d)

RUP Required: 1301 (g/d)
 RUP Supplied: 1334 (g/d)
 RUP Balance: 33 (g/d)

MP - Bacterial: 1278 (g/d)
 MP - RUP: 1080 (g/d)
 MP - Endogenous: 118 (g/d)

CP - Diet: 21.5 (%DM)
 CP - RDP: 16.1 (%DM)
 CP - RUP: 5.4 (%DM)

Diet Concentrations

NDF: 37.4 (%DM)

Forage NDF: 32.5 (%DM)

ADF: 22.1 (%DM)

NFC: 35.0 (%DM)

Undiscounted TDN: 66 (%DM)

ME: 2.36 (Mcal/kg DM)

NEI: 1.49 (Mcal/kg DM)

NEg: 0.98 (Mcal/kg DM)

Ca: 0.4 (%DM)

P: 0.4 (%DM)

Ether-Extract: 2.8 (%DM)

DCAD: 169 (mEQ/kg)

Target Diet Concentration

NEI: 1.41 (Mcal/kg)

MP: 105 (g/kg)

Ca: 3 (g/kg)

P: 2 (g/kg)

Diet Summary

Feed Ingredients	Kg/day (Dry Matter)	Kg/day (As-Fed)	% (Dry Matter)
Maize Silage, normal	11.58	33.00	46.51
Soybean, Meal, solv. 48% CP	2.50	2.79	10.04
Grass Hay, C-3, mature	4.17	4.94	16.75
Maize Grain, cracked, dry	3.47	3.94	13.95
Calcium Carbonate	0.11	0.11	0.44
Mono-Sodium Phosphate (1 H ₂ O)	0.05	0.05	0.20
Salt	0.13	0.13	0.51
Vitamin premix 1	0.69	0.69	2.79
Urea	0.69	0.69	2.79
Wheat Bran	1.50	1.68	6.02