



# UNIVERSITY OF SWAZILAND

2<sup>ND</sup> SEM. 2010/2011

## FINAL EXAMINATION PAPER

**PROGRAMME:** B.Sc. ANIMAL SCIENCE III  
B. Sc. ANIMAL SCIENCE-DAIRY III  
B. Sc. AGRICULTURAL EDUCATION III

**COURSE CODE:** AS 304

**TITLE OF PAPER:** NUTRITION, FEEDS AND FEEDING

**TIME ALLOWED:** TWO (2) HOURS

**INSTRUCTIONS:** ANSWER ANY FOUR (4) QUESTIONS

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

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### QUESTION 1

(a) Using the Daily Nutrient Requirements of Lactating Dairy Cattle tables, tabulate the nutrient requirements in terms of dry matter, digestible protein, metabolisable energy, total digestible nutrients, Ca and P of the following animals:

(i) A lactating Jersey cow of 400 kg liveweight producing 15 kg/d of milk with a butterfat content of 4.5%. [10]

(b) A farmer has available on the farm maize grain with 87 % DM, 8 % CP, 11 MJ/kg ME and 80 % TDN, and sunflower meal with 89 % DM, 34 % CP, 9.5 MJ/kg ME and 69 % TDN.

(i) Using the Pearson Square method, calculate the composition of the required mixture of the two ingredients to formulate a 16 % CP broiler meal. [6]

(ii) Calculate the DM, ME and TDN content of the broiler meal. [9]

### QUESTION 2

Discuss the feed resources available to livestock farmers in Swaziland. [25]

### QUESTION 3

Explain the macro minerals calcium and phosphorous under the following headings:

(a) Source [5]

(b) Function [10]

(c) Deficiency symptoms [10]

### QUESTION 4

(a) Compare and contrast the digestion of carbohydrates in monogastrics and ruminants. [10]

(b) Explain the partitioning of feed energy in an animal. All energy losses must be indicated. [15]

### **QUESTION 5**

The determination of chemical composition in animal feeds is not an absolute measure of nutritive value of feeds. Give a detailed account of one way of further evaluating livestock feeds through feeding of animal. [25]

TABLE 2 Daily Nutrient Requirements of Lactating Dairy Cattle

Body Weight (kg)	Dry Feed (kg)	Protein		Energy				Ca (g)	P (g)	Carotene (mg)	Vitamin A* (1000 ru)
		Total (g)	Digestible (g)	NE lactating cows (Mcal) <sup>a</sup>	DE (Mcal)	ME (Mcal)	TDN (kg)				
<b>Maintenance of Mature Lactating Cows<sup>b</sup></b>											
350	5.0	468	220	5.9	12.3	10.1	2.8	14	11	37	15
400	5.5	521	245	7.6	13.6	11.2	3.1	17	13	42	17
450	6.0	585	275	8.3	15.0	12.3	3.4	18	14	48	19
500	6.5	638	300	9.0	16.3	13.4	3.7	20	15	53	21
550	7.0	691	325	9.7	17.6	14.4	4.0	21	16	58	23
600	7.5	734	345	10.3	18.9	15.5	4.2	22	17	64	25
650	8.0	776	365	10.9	19.8	16.2	4.5	23	18	69	28
700	8.5	830	390	11.6	21.1	17.3	4.8	25	19	74	30
750	9.0	872	410	12.2	22.0	18.0	5.0	26	20	79	32
800	9.5	915	430	12.8	23.3	19.1	5.3	27	21	85	34
<b>Maintenance and Pregnancy (Last 2 Months of Gestation)</b>											
350	5.4	570	315	8.7	15.8	13.0	3.6	21	16	67	27
400	5.9	630	355	9.7	17.2	14.1	4.0	23	18	76	30
450	6.4	690	400	10.7	19.4	15.9	4.4	25	20	86	34
500	6.9	750	430	11.6	21.1	17.3	4.8	29	22	95	38
550	7.4	810	465	12.6	22.9	18.8	5.2	31	24	105	42
600	7.9	870	500	13.5	24.6	20.2	5.6	34	26	114	46
650	8.4	930	530	14.4	26.4	21.6	6.0	36	28	124	50
700	8.9	990	555	15.3	27.7	22.7	6.3	39	30	133	53
750	9.4	1050	585	16.2	29.5	24.2	6.7	42	32	143	57
800	9.9	1110	630	17.0	31.2	25.6	7.1	44	34	152	61
<b>Milk Production (Nutrients Required per kg of Milk)<sup>c</sup></b>											
<b>% Fat</b>											
2.5		66	42	0.59	1.12	0.91	0.255	2.4	1.7		
3.0		70	45	0.64	1.23	0.99	0.280	2.5	1.8		
3.5		74	48	0.69	1.34	1.06	0.305	2.6	1.9		
4.0		78	51	0.74	1.46	1.13	0.330	2.7	2.0		
4.5		82	54	0.78	1.57	1.21	0.355	2.8	2.1		
5.0		86	56	0.83	1.68	1.28	0.380	2.9	2.2		
5.5		90	58	0.88	1.79	1.36	0.405	3.0	2.3		
6.0		94	60	0.93	1.90	1.43	0.430	3.1	2.4		

<sup>a</sup> The energy requirements for maintenance, reproduction, and milk production of lactating cows are expressed in terms of NE<sub>lactating cows</sub>.  
<sup>b</sup> Maintenance of lactating cows = 0.085 Mcal NE<sub>lactating cows</sub>/kg<sup>0.75</sup>. To allow for growth, add 20 percent to the maintenance allowance during the first lactation and 10 percent during the second lactation.

<sup>c</sup> The energy requirement is presented as the actual amount required with no adjustment to compensate for any reduction in food value at high levels of feed intake. To account for depressions in digestibility, which occur at high planes of nutrition with certain types of rations, such as corn silage, coarse textured grains or forages with high cell-wall content (e.g., Bermuda grass, sorghum, etc.), an increase of 3 percent feed should be allowed for each 10 kg of milk produced above 20 kg/day.