



UNIVERSITY OF SWAZILAND

2nd SEM. 2012/2013

FINAL EXAMINATION PAPER

PROGRAMME: B.Sc. ANIMAL SCIENCE IV (DAIRY OPTION)

COURSE CODE: ASD 401

TITLE OF PAPER: DAIRY ANIMAL FEEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION 1 AND ANY THREE (3) OTHER QUESTIONS

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QUESTION 1 [COMPULSORY]

(a) Using the NRC Nutrient Requirements of Dairy Cattle tables, tabulate the nutrient requirements in terms of dry matter, total protein, metabolisable energy, net energy for lactation and total digestible nutrients of the following animals:

- (i) A lactating Friesian cow of 550 kg liveweight producing 25 kg/d of milk with 3 % butterfat content. **[10 Marks]**
- (ii) A pregnant Nguni-Jersey cow of 350 kg liveweight during the last two months of pregnancy. **[5 Marks]**

(b) A farmer has available on the farm maize grain with 90 % DM, 8 % CP, 10 MJ/kg ME and 86 % TDN, and full fat soyabean meal with 92 % DM, 42 % CP, 12 MJ/kg ME and 85% TDN.

- (i) Using the Pearson Square method, calculate the composition of the required mixture of the two ingredients to formulate a 16 % CP heifer meal. **[4 Marks]**
- (ii) Calculate the DM, ME and TDN content of the heifer meal. **[6 Marks]**

QUESTION 2

Write short notes on the following:

- (a) Milk fever **[10 Marks]**
- (b) Laminitis **[10 Marks]**
- (c) Bloat **[5 Marks]**

QUESTION 3

Give an account of the feeding management recommended for a dairy cow during the lactation period. **[25 Marks]**

QUESTION 4

Discuss the essentials that are needed to ensure survival of the dairy calf to weaning age.

[25 Marks]

QUESTION 5

Explain the principal dietary factors affecting milk fat concentration in lactating cows. **[25 marks]**

Table 1: NRC Daily Nutrient Requirements of Lactating Dairy Cattle

| Body Weight (kg) | Dry Feed (kg) | Protein | | Energy | | | | Ca (g) | P (g) | Carotene (mg) | Vitamin A (1000 IU) |
|--|---------------|-----------|----------------|---------------------------|-----------|-----------|----------|--------|-------|---------------|---------------------|
| | | Total (g) | Digestible (g) | NE lactating cows (Mcal)* | DE (Mcal) | ME (Mcal) | TDN (kg) | | | | |
| Maintenance of Mature Lactating Cows¹ | | | | | | | | | | | |
| 350 | 5.0 | 468 | 220 | 6.9 | 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 | 9.6 | 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 | 26 |
| 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 |
| Maintenance and Pregnancy (Last 2 Months of Gestation) | | | | | | | | | | | |
| 350 | 6.4 | 570 | 315 | 8.7 | 15.8 | 13.0 | 3.6 | 21 | 16 | 67 | 27 |
| 400 | 7.2 | 650 | 355 | 9.7 | 17.2 | 14.1 | 4.0 | 23 | 18 | 76 | 30 |
| 450 | 7.9 | 730 | 400 | 10.7 | 19.4 | 15.9 | 4.4 | 26 | 20 | 86 | 34 |
| 500 | 8.6 | 780 | 430 | 11.6 | 21.1 | 17.3 | 4.8 | 29 | 22 | 95 | 38 |
| 550 | 9.3 | 850 | 465 | 12.6 | 22.9 | 18.8 | 5.2 | 31 | 24 | 105 | 42 |
| 600 | 10.0 | 910 | 500 | 13.5 | 24.6 | 20.2 | 5.6 | 34 | 26 | 114 | 46 |
| 650 | 10.6 | 960 | 530 | 14.4 | 26.4 | 21.6 | 6.0 | 36 | 28 | 124 | 50 |
| 700 | 11.3 | 1000 | 555 | 15.3 | 27.7 | 22.7 | 6.3 | 39 | 30 | 133 | 53 |
| 750 | 12.0 | 1080 | 595 | 16.2 | 29.5 | 24.2 | 6.7 | 42 | 32 | 143 | 57 |
| 800 | 12.6 | 1150 | 630 | 17.0 | 31.2 | 25.6 | 7.1 | 44 | 34 | 152 | 61 |
| Milk Production (Nutrients Required per kg of Milk)² | | | | | | | | | | | |
| % Fat | | | | | | | | | | | |
| 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 | | |