



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2019

Dairy Cattle Medicine and Management Paper 1

Perusal time: **Twenty (20)** minutes

Time allowed: **Three (3)** hours after perusal

Answer **ALL SIX (6)** questions

All six questions are of equal value

Answer **SIX (6)** questions, each worth 30 markstotal 180 marks

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Paper 1: Dairy Cattle Medicine and Management

Answer all six (6) questions

1. Answer **all** parts of this question:

- a) Discuss the aetiology and pathophysiology of neonatal bovine respiratory disease. *(15 marks)*
- b) Outline the diagnostic procedures available for investigating outbreaks of pneumonia in pre-weaning calf sheds. Indicate the benefits and limitations of all nominated diagnostics. *(5 marks)*
- c) Outline the prevention strategies to prevent outbreaks of neonatal bovine respiratory disease. *(10 marks)*

2. You are presented with a valuable three-year-old dairy cow that has had melaena for 24 hours. The cow is hypothermic, has a marked tachycardia and very pale mucous membranes.

Answer **both** parts of this question:

- a) Discuss the differential diagnoses for this cow and how each differential can be ruled in or out. *(10 marks)*
- b) Formulate a treatment plan for this cow and provide a justification for your treatment choices. *(20 marks)*

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3. Copper deficiency is commonly seen in growing heifers and lactating cows in many regions of Australia and New Zealand. Provide an outline of the following:
- a) the physiological function of copper (10 marks)
 - b) the risk factors for deficiency (5 marks)
 - c) the clinical signs of deficiency (5 marks)
 - d) the process of diagnosing copper deficiency (5 marks)
 - e) supplementation options. (5 marks)
4. There is an increasing focus on prudent antimicrobial use in livestock. Discuss the principles of antimicrobial therapy for the treatment of calf scours. In your discussion, include indications and contraindications, prophylactic and therapeutic use, route of administration, drug selection, public health and food safety considerations. (30 marks)
5. Discuss the relationship between nutritional management and reproduction performance in lactating dairy cows. (30 marks)
6. Discuss the risk factors for lameness in dairy cattle and outline preventive management strategies. In your discussion, indicate the relative importance of risk factors and management interventions in different dairy production systems. (30 marks)

End of paper



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Dairy Cattle Medicine and Management Paper 2

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Paper 2: Dairy Cattle Medicine and Management

Answer all six (6) questions

1. A herd is experiencing high morbidity (80%) and mortality (30%) in calves 5 to 21 days of age. The calves are presenting with diarrhoea. The farm's treatment protocol includes oral electrolytes and oxytetracycline administered intramuscularly at 10 mg/kg SID.

Ten faecal samples submitted to the local diagnostic laboratory yielded:

Pathogen	Number of isolates from the ten samples
<i>Salmonella</i> spp.	7
<i>Cryptosporidia</i>	6
<i>Rotavirus</i>	7
Coronavirus	1

You are presented with a valuable 10-day-old calf that the farmer has described as 'failing to respond to four-days of treatment'. The calf is laterally recumbent and moribund. Its rectal temperature is 36.6°C; heart rate = 120 beats per minute; respiratory rate = 30 breaths per minute; body condition - 2.5/5; skin tent <1 second; umbilicus and joints are normal.

Blood collected from the calf yielded the following results:

Parameter	Abbreviation	Units	Result	Reference range
Calcium	CA	mmol/L	2.2	2.0–3.0
Phosphorus	PHOS	mmol/L	2.6	1.35–2.36
Total protein	TP	g/L	45	60–80
Glucose	GLU	mmol/L	2.5	3.2–4.0
Sodium	Na	mmol/L	168	135–152
Potassium	K	mmol/L	5.0	4.0–6.1
Chloride	Cl	mmol/L	115	90–103
Bicarbonate	HCO ₃	mmol/L	18	24–38
Anion gap	AG	mmol/L	40	21–34

Question 1 continued over page

Parameter	Abbreviation	Units	Result	Reference range
Haematocrit	HCT	L/L	0.26	0.24–0.46
White blood cells	WBC	$\times 10^9/L$	8.9	4.0–12.0
Neutrophils		$\times 10^9/L$	6.6	0.6–4.0
Bands		$\times 10^9/L$	0.8	
Lymphocytes		$\times 10^9/L$	1.2	2.5–7.5
Monocytes		$\times 10^9/L$	0.3	0–0.8
Eosinophils		$\times 10^9/L$	0	0–2.5
Basophils		$\times 10^9/L$	0	0–0.3
Platelet count	PLT	$\times 10^9/L$	255	100–800

Answer **both** parts of this question:

- a) Formulate a therapeutic plan for the calf, discuss the pros and cons of your approach and describe how the response to treatment should be evaluated.
(15 marks)
- b) Describe and justify a plan to reduce the herd's calf morbidity and case fatality.
(15 marks)

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2. The owner of a seasonal-calving Holstein herd requires assistance with reproductive management. Last season's calving pattern is presented in the table below. The mating start date for cows and heifers was the 15th of November. The cows started calving on the 15th of August.

Month	# Cows calving
August	50
September	300
October	300
November	250
December	100

Historically, the herd has utilised artificial insemination for six weeks, followed by the introduction of eight Jersey bulls for approximately ten weeks. The herd's owner is concerned about the spread of the calving pattern and the lack of Holstein replacement heifers generated.

Discuss the process for analysing reproductive records and outline the benchmarks for high-performing herds. In your discussion, include reference to the reproductive performance of this herd and the different management options that could be implemented to address the owner's concerns. (30 marks)

3. You are presented with a recumbent, six-year-old Holstein cow. The cow is 250 days in milk and is not pregnant. Over the last six weeks, the owner has noticed changes in the cow's gait. Yesterday, the cow was noticed to have depressed mentation. On physical examination, the cow has a heart rate of 60 beats per minute, a respiratory rate of 24 breaths per minute and a rectal temperature of 38.7°C. Abnormal clinical findings include the lack of a menace response, depressed mentation and bruxism. None of the remaining 300 milking cows in the herd are affected and there is no history of recent dietary change.

Discuss the differential diagnoses for this case. In your discussion, indicate how each of the differential diagnoses can be ruled in or out. Indicate what diagnostic samples should be collected, how they should be submitted and what tests should be requested. If a post-mortem were to be conducted, indicate the gross pathology and histopathological lesions that would be associated with each of the differential diagnoses. (30 marks)

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4. The owner of a seasonal calving dairy herd has called you to assist with an ongoing mastitis problem. The herd has had a bulk milk cell count average of 350,000 cells/ml for the last two seasons.

Answer **all** parts of this question:

- a) Outline the approach to investigating this problem. (10 marks)

The farm collects a total of 20 milk samples from the clinical and high cell count cows. The culture results are below:

Isolate	Number of samples
<i>Staphylococcus aureus</i>	10
<i>Streptococcus uberis</i>	4
<i>Eschericia coli</i>	1
<i>Streptococcus dysgalactiae</i>	1
No growth	4

- b) Discuss the potential reasons for obtaining a result of 'no growth' from milk cultures. (5 marks)
- c) Given the culture results, provide detailed advice to the farm manager to improve their milk quality. (15 marks)
5. A large corporate dairy operation has approached you to develop an optimal herd-health program for their heifer-rearing unit. The heifer unit takes in approximately 3,000 weaned heifers, at approximately three months of age, from the corporation's 10 spring-calving dairy herds. On the heifer-rearing unit, the heifers are raised on pasture and returned to their properties of origin four weeks prior to calving.
- Outline the recommendations for the heifer herd health plan. Your recommendations should address all of the important areas of animal health, including timing and methods of any proposed treatments. (30 marks)

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6. A dairy herd has problems with abomasal displacement and retained placentas. The herd milks 2,000 cows in a free-stall facility, calving cows year-round. The problems have been occurring in fresh heifers over the last two months. The treatment records indicate that 15% of the heifers calving each month were diagnosed with abomasal displacement and 30% were diagnosed with retained placenta.

Discuss the investigation into the potential causes of the problems and provide recommendations on how to reduce the rate of abomasal displacement and retained placenta in the herd. (30 marks)

End of paper