



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

November 2020

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

Paper 1: Dairy Cattle Medicine and Management

Answer all six (6) questions

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

- a) Discuss the epidemiology and potential routes of transmission of *Ureaplasma diversum*. (5 marks)
- b) In addition to abortion, describe clinical syndromes associated with *Ureaplasma diversum* infection, including abnormalities recognised on physical and pathological examination of affected animals or tissues. (10 marks)
- c) List other differential diagnoses for late term abortion in dairy cattle. (5 marks)
- d) Discuss the treatment options for *Ureaplasma diversum*. (3 marks)
- e) Discuss the preventative strategies for *Ureaplasma diversum*. (7 marks)

2. Answer **both** parts of this question:

- a) Outline the pathogenesis of vagal indigestion. Describe the clinical presentation and the diagnostic procedures that may be applied to distinguish the different types of vagal indigestion. (15 marks)
- b) Describe in detail an appropriate approach to rumenotomy, including anaesthetic protocols, surgical technique, peri- and post-operative care and treatments. Include reasoning where appropriate. (15 marks)

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3. Bovine Johne's disease (BJD) is an economically important disease that affects the health and productivity of Australian dairy herds, particularly in southern Australia.

Answer **all** parts of this question:

- a) Detail the diagnostic tests that can be used to detect the disease on both a herd and individual animal basis. In your answer include the advantages and limitations for each of the tests. *(12 marks)*

Vaccination has been identified as a very valuable tool in controlling BJD in endemic areas in Australia.

- b) Provide a detailed discussion on how the vaccine can be used to control BJD, using published literature where appropriate. *(10 marks)*

Dairy farmers may be hesitant to use the commercial BJD vaccine due to the cost of the vaccine.

- c) Discuss the economic costs of BJD in the Australian context and the likely cost benefits of using the vaccine. *(8 marks)*

4. A veterinarian seeks advice regarding a request from a dairy client to supply oxytetracycline powder to medicate calf milk to manage an outbreak of calf diarrhoea.

Discuss the application of antimicrobial therapy in the management of calf diarrhoea. Outline the evidence supporting therapeutic and prophylactic antimicrobial therapy and the associated risks. Provide guidance to the veterinarian as to how to respond to the client outlining a decision-making process and risk management strategies.

(30 marks)

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5. Bovine ephemeral fever and rabies are both caused by viruses from the family *Rhabdoviridae*.

Compare and contrast the following topics for these diseases in cattle:

- a) epidemiology (5 marks)
 - b) pathogenesis (5 marks)
 - c) clinical presentation (5 marks)
 - d) diagnosis (5 marks)
 - e) treatment (5 marks)
 - f) prevention, include national and farm perspectives. (5 marks)
6. Senior veterinarians are frequently responsible for the health and safety of junior colleagues and farm staff. Conducting a risk assessment prior to conducting work is one strategy to mitigate work related injuries. Your task is to develop a risk assessment for working with cattle in cattle yards. Your risk assessment should include consideration of common veterinary activities such as pregnancy testing, examination of sick animals and obstetrics. The risk assessment should identify hazards, outline the associated possible harm, methods to assess risk, and mitigation strategies. Arrange your risk assessment in the form of a table to be utilised by colleagues and farm staff. (30 marks)

End of paper



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Dairy Cattle Medicine and Management Paper 2

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

Paper 2: Dairy Cattle Medicine and Management

Answer all six (6) questions

1. You have been contacted by a pasture based dairy farmer in southern Victoria who has had a problem with low milk fat percentage for the last six months. The farm feeds approximately four kilograms of a grain mix per cow per day.

Answer **both** parts of this question:

- a) Discuss the potential causes of low milk fat in a dairy herd including the physiological pathways which lead to low milk fat. *(15 marks)*
- b) Detail an appropriate diagnostic approach to determining the cause of low milk fat percentage in this herd and relate the diagnostic investigation to the pathophysiology of the condition. *(15 marks)*

2. A herd manager of a large corporate, seasonal calving, pasture based dairy farm has approached you for assistance in the development of a herd reproductive program. They have been advised by their semen supplier that the best way to synchronise the herd is by using a G-6-G OVSYNCH program. The herd manager has been set a goal of achieving 90+% in calf rate over a 10-week joining period.

Answer **all** parts of this question:

- a) Explain the G-6-G OVSYNCH program including when each of the hormones are given and the reason behind the administration of each of the hormones. *(5 marks)*
- b) Give the theoretical reasons why the G-6-G program improves conception rate when compared to the standard OVSYNCH program. *(5 marks)*
- c) Discuss the synchrony options that could be used by the farm manager in this herd including the advantages and limitations of each of your suggested options. *(20 marks)*

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3. A farm manager from a large corporate, split calving, dairy farm in southern Victoria contacts you to discuss a milk quality issue. The manager explains that there have been increased clinical cases of mastitis that are unresponsive to intramammary therapy.

Answer **all** parts of this question:

- a) Outline an appropriate approach to the investigation of this problem. (12 marks)

You perform a bulk tank PCR from the vat, which is positive for *Mycoplasma bovis*, *Staphylococcus aureus* and *Streptococcus uberis*, but negative for *Streptococcus agalactiae*.

- b) Describe how to control *Mycoplasma bovis* infection in the herd. (12 marks)

The first detection of *Mycoplasma bovis* in New Zealand occurred in July 2017. New Zealand elected to attempt eradication of *Mycoplasma bovis* from the national dairy and beef herds.

- c) Explain why Australia has not attempted eradication of *Mycoplasma bovis* on a national scale. (6 marks)

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4. A dairy herd is experiencing a high incidence of pneumonia (30%) and mortality (10 %) in calves from 3–12 weeks of age. You are presented with a 4-week-old sick calf that is reported to be a representative case. Significant physical examination findings include: heart rate 130 beats per minute, respiratory rate 60 breaths per minute, rectal temperature 41°C, increased bronchovesicular sounds over the cranial ventral thorax, and petechial haemorrhages on the sclera, vaginal mucosa, and gums.

Answer **all** parts of this question:

- a) List endemic and exotic differential diagnoses that should be considered for this herd. *(5 marks)*

- b) Formulate a diagnostic plan for the herd. Your response should address all relevant diagnostic options including appropriate sample collection, diagnostic tests to be performed, the interpretation of results and any limitations of the diagnostic tests. *(10 marks)*

- c) Outline risk factors that should be investigated and discuss how they may contribute to the risk of disease. *(10 marks)*

- d) Outline and briefly justify a treatment plan for the affected calf pending the results of the diagnostic investigation. *(5 marks)*

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5. A dairy client is confused by an article about genomic testing of replacement heifers. They ask you how genomic testing works and if it is something they should be doing. Your client has not had a focus on genetics so there is no data available regarding the breeding values of cows in the herd. The herd's culling rate is typically low, and reproductive and health management is excellent.

Answer **all** parts of this question:

- a) What samples may be used for genomic testing? (3 marks)
- b) Provide an overview of the genomic testing procedure, explaining what is measured and how this is used to optimise production in comparison with other approaches to genetic selection. (12 marks)
- c) Given the herd's status, provide the farmer with an indication of the potential value that could be derived from applying genomic testing of replacement heifers. In this discussion indicate the key variables that influence the return on genomic testing and ancillary management strategies that might be applied along with genomic testing to potentially increase the return on investment. (15 marks)
6. A dairy has a pen of 300 heifers aged 12–16 weeks that are fed a total mixed ration. Yesterday all animals in the pen looked healthy. This morning three heifers were found dead and three more are recumbent. Heifer tag 2957 is presented as a representative case for diagnostic investigation. Significant findings on physical examination include rectal temperature 39°C, heart rate 150 bpm, respiratory rate 42 breaths per minute. The heifer is recumbent and stuporous. The palpebral and corneal reflex are absent, as is the menace and pupillary light response. The heifer has watery green diarrhoea, a distended splashy rumen and you estimate she is 10% dehydrated. Her body weight is approximately 250 kg.
- The farm reports there has been no change in ration ingredients.
- Diagnostic tests performed include assessment of rumen pH, a complete blood count and serum chemistry.

Question 6 continued over page

The following diagnostic test results are available. Rumen pH 5.2

Panel/test	Result	Reference range	Units
Anion gap	35		mmol/L
Sodium	147	133–143	mmol/L
Potassium	3.1	3.9–5.2	mmol/L
Chloride	106	93–103	mmol/L
CO ₂ total	8	19–34	mmol/L
Calcium	2.2	2.1–2.8	mmol/L
Phosphorus	2.8	1.2–2.5	mmol/L
Creatinine	60	85–178	μmol/L
Urea nitrogen	1.8	2.1–10.7	mmol/L
Glucose	7.77	1.8 – 3.7	mmol/L
Total protein	76	60–85	g/L
Albumin	29	30–43	g/L
Globulin	47	30–49	g/L
Aspartate aminotransferase	65	43–127	IU/L
Creatine kinase	1467	105–409	IU/L
Alkaline phosphatase	250	27–107	IU/L
Gamma glutamyl transferase	15	15–39	IU/L
Sorbitol dehydrogenase	24	12–53	IU/L
Bilirubin total	1.8	1.7–8.1	μmol/L

Question 6 continued over page

Hematology	Result	Reference range	Units
RBC	10.02	5.0–10	$\times 10^{12}/L$
Haemoglobin	111	80–150	g/L
Haematocrit	32.5	24–46	%
MCV	35.4	40–60	fL
MCH	11.1	11–17	Pg
MCHC	342	300–360	g/L
WBC	27.9	4–12	$\times 10^9/L$
Neutrophils	68	15–33	%
Lymphocytes	20	45–75	%
Monocytes	12	0–8	%
Eosinophils	0	0–20	%
Basophils	0	0–2	%
Neutrophils	19	0.7–4.9	$\times 10^9/L$
Lymphocytes	5.6	2.5–7.5	$\times 10^9/L$
Monocytes	3.3	0–0.9	$\times 10^9/L$
Eosinophils	0	0–2.40	$\times 10^9/L$
Basophils	0	0–2.0	$\times 10^9/L$
Platelets	710	220–640	$\times 10^9/L$
Plasma protein	76	60–80	g/L
Plasma fibrinogen	5	1–6	g/L

Question 6 continued over page

The herd manager would like to know what has caused the heifer morbidity and mortality, and how to manage affected animals.

Answer **all** parts of question 6:

- a) Outline differential diagnoses for this herd disease outbreak. (2 marks)
- b) Provide an explanation for each of the abnormal laboratory results and propose a tentative diagnosis based on available findings. (15 marks)
- c) Outline any further appropriate diagnostic investigation that is indicated. (1 mark)
- d) Formulate a comprehensive treatment plan for the affected heifer and advice for management of the pen of heifers. (12 marks)

End of paper