



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2019

Small Animal Medicine

Paper 1

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL FOUR (4)** questions

Answer **FOUR (4)** questions, each worth 30 marks..... total: 120 marks

© 2019 Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208 This publication is copyright. Other than for the purposes of and subject to the conditions prescribed under the Copyright Act, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the Australian and New Zealand College of Veterinary Scientists.

Paper 1: Small Animal Medicine

Answer all four (4) questions

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

- a) Describe the underlying physiological changes in the heart that lead to changes on an electrocardiogram tracing, indicating where they occur on the trace. *(6 marks)*

- b) Describe the murmur typically associated with: *(6 marks)*
 - i. mitral valve insufficiency

 - ii. aortic stenosis

 - iii. patent ductus arteriosus.

- c) Discuss the pathophysiology of heart failure secondary to mitral valve regurgitation in dogs. *(18 marks)*

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

- a) Describe the physiology of gastrointestinal absorption of dietary cobalamin. *(6 marks)*

- b) Briefly discuss the clinical significance of the following laboratory tests for chronic enteropathies in dogs:
 - i. serum cobalamin concentration *(3 marks)*

 - ii. serum trypsin-like immunoreactivity. *(3 marks)*

- c) Briefly discuss the physiology of gastric acid secretion. *(8 marks)*

Question 2 continued over page

- d) Indicate the mechanism of action of **each** of the following gastric protectants:
(3 marks)
- i. omeprazole
 - ii. misoprostol
 - iii. famotidine.
- e) Discuss the indications, clinical significance and limitations of the evaluation of serum bile acids in dogs and cats. (7 marks)

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

- a) Outline the physiology of iron homeostasis including absorption, utilisation, storage, recycling and excretion or loss. (8 marks)
- b) Discuss the pathophysiological consequences of iron deficiency. (7 marks)
- c) Describe and explain the changes that may be seen on a haemogram in iron deficiency anaemia, including changes to red blood cell indices. (10 marks)
- d) State and briefly discuss the clinical utility and limitations of **two (2)** additional tests that can be used to evaluate serum iron status. (5 marks)

Continued over page

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

- a) Discuss the aetiopathogenesis of canine sinonasal aspergillosis. (*15 marks*)
- b) Comment briefly on the sensitivity and specificity of serum antibody titres for the detection of canine sinonasal aspergillosis. (*3 marks*)
- c) For **each** of the following drugs, state the mechanism of action and list **two (2)** adverse effects: (*12 marks*)
 - i. amphotericin B
 - ii. itraconazole
 - iii. terbinafine.

End of paper



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2019

Small Animal Medicine

Paper 2

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL FOUR (4)** questions

Answer **FOUR (4)** questions, each worth 30 marks..... total: 120 marks

© 2019 Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208 This publication is copyright. Other than for the purposes of and subject to the conditions prescribed under the Copyright Act, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the Australian and New Zealand College of Veterinary Scientists.

Paper 2: Small Animal Medicine

Answer all four (4) questions

1. A six-year-old female, neutered, domestic shorthair cat presents with a two-week history of decreased appetite and lethargy, and a more recent three-day history of anorexia, vomiting and noticeable weight loss. The cat is up to date with preventive health care, has not been receiving any medication, and there is no known access to toxins.

On physical examination, the cat weighs 7.8 kg, has a body condition score of 8/9, abdominal distention and is jaundiced. No other abnormalities are detected. Blood is drawn for haematology and biochemistry and urine is collected for urinalysis. The results are provided below and on the following pages:

Haematology

Parameter	Abbreviation	Unit	Result	Reference range
Haematocrit	HCT	L/L	0.24	0.30–0.52
Red blood cells	RBC	x 10¹²/L	6.09	6.54–12.2
Reticulocytes	Retic	x 10 ⁹ /L	5	3–50
Red blood cell distribution width	RDW	%	12.1	10.6–14.3
Haemoglobin	Hb	g/L	90	98–162
Mean corpuscular volume	MCV	fL	72	64–76
Mean corpuscular haemoglobin	MCH	pg	25	21–26
Mean corpuscular haemoglobin concentration	MCHC	g/L	350	310–360
White blood cells	WBC	x 10⁹/L	19.7	2.8–17
Neutrophils		x 10⁹/L	16.8	1.48–10.3
Bands		x 10 ⁹ /L	0	0
Lymphocytes		x 10 ⁹ /L	1.2	0.9–3.5
Monocytes		x 10⁹/L	1.4	0.0–1.1
Eosinophils		x 10 ⁹ /L	0.3	0–1.4
Basophils		x 10 ⁹ /L	0.0	0.0–0.10
Platelet count	PLT	x 10 ⁹ /L	400	200–500
Comments: Automated blood count				

Question 1 continued over page

Biochemistry

Parameter	Abbreviation	Unit	Result	Reference range
Alkaline phosphatase	ALP	U/L	612	14–111
Alanine transaminase	ALT	U/L	286	12–130
Gamma-glutamyltransferase	GGT	U/L	9	0–4
Aspartate aminotransferase	AST	U/L	42	18–90
Total bilirubin	TBIL	µmol/L	56	0–15
Cholesterol	CHOL	mmol/L	6.3	3.5–9.0
Urea	UREA	mmol/L	7.4	2.5–10
Creatinine	CREA	µmol/L	128	50–140
Calcium	CA	mmol/L	2.5	1.9–2.9
Phosphorus	PHOS	mmol/L	0.89	1.0–2.4
Total protein	TP	g/L	64	52–80
Albumin	ALB	g/L	31	23–40
Globulin	GLOB	g/L	33	25–45
Glucose	GLU	mmol/L	11.2	4.11–8.84
Amylase	AMYL	U/L	586	333–1500
Lipase	LIPA	U/L	164	77–750
Creatine kinase	CK	U/L	232	73–510
Sodium	Na	mmol/L	154	139–153
Potassium	K	mmol/L	3.2	3.5–5.8
Chloride	Cl	mmol/L	120	101–118
Bicarbonate	HCO ₃	mmol/L	24	12–26
Anion gap	AG	mmol/L	22	14–25
Symmetric dimethylarginine	SDMA	µg/dL µmol/L	13 0.65	0 – 14 0–0.7
Total T4	TT4	nmol/L	20	15 - 60

Question 1 continued over page

Urinalysis

Parameter	Result	Reference interval
Collection method	free catch	
USG	1.044	
Colour	clear	
Clarity or turbidity	slightly turbid	
pH	7.0	
Glucose	negative	
Ketones	negative	
Protein	negative	
Bilirubin	++	
RBCs	0	<5/HPF
WBCs	0	<5/HPF
Crystals	nil seen	
Casts	nil seen	
Epithelial cells	nil seen	
Bacteria	nil seen	

Answer **all** parts of question 1:

- Considering the history, clinical examination, and clinicopathological abnormalities, list the **four (4)** most likely differential diagnoses. Identify your primary differential diagnosis, giving justification for your choice. (5 marks)
- Discuss which further diagnostic test(s) are appropriate to perform in this case. Justify your choices based on the differential diagnoses provided in part 1 a) of this question. (10 marks)

Question 1 continued over page

An abdominal ultrasound is performed in this case and the results are provided below:

Abdominal Ultrasound

There is subjective hepatomegaly.

The liver parenchyma is diffusely hyperechoic, isoechoic to the spleen and hyperechoic to the right renal cortex and falciform fat.

- c) State the most likely diagnosis, with reference to the abdominal ultrasound results. (2 marks)
 - d) List **four (4)** components considered important in the management of this cat based on the most likely diagnosis **and** identify, with brief justification, which you would consider the most important. (5 marks)
 - e) Outline an appropriate nutritional plan for this cat and discuss the nutritional management and monitoring that should take place over the next seven days. (8 marks)
2. A 12-year-old male, neutered, Burmese cat presents with a two-week history of low head carriage and an inability to jump onto the bed. The cat lives indoors only and is fed a complete and balanced commercial wet-and-dry food diet. The cat's owner reports an increase in thirst. Preventive health care is up to date and there is no known toxin access.
- On physical examination, vital parameters are within reference limits. The cat has profound cervical ventroflexion, a plantigrade stance and generalised weakness. The remaining clinical examination is unremarkable.
- Blood is collected for haematology and biochemistry, including total T4 and urine. The results are provided below:
- Haematology is unremarkable.

Question 2 continued over page

Biochemistry

Parameter	Abbreviation	Unit	Result	Reference
Alkaline phosphatase	ALP	U/L	40	5–50
Alanine aminotransaminase	ALT	U/L	72	19–100
Gamma-glutamyltransferase	GGT	U/L	4	0–9
Aspartate aminotransferase	AST	U/L	48	18–90
Total bilirubin	TBIL	μmol/L	2.0	0–7
Cholesterol	CHOL	mmol/L	4.2	2.2–5.5
Urea	UREA	mmol/L	10.2	5.0–10.8
Creatinine	CREA	μmol/L	145	80–200
Calcium	CA	mmol/L	2.3	2.1–2.8
Phosphorus	PHOS	mmol/L	1.4	1.0–2.3
Total protein	TP	g/L	78	60–84
Albumin	ALB	g/L	35	25–38
Globulin	GLOB	g/L	46	31–52
Glucose	GLU	mmol/L	6.0	3.2–7.5
Amylase	AMYL	U/L	382	333–1500
Lipase	LIPA	U/L	431	77–750
Creatine kinase	CK	U/L	453	73–510
Sodium	Na	mmol/L	151	147–156
Potassium	K	mmol/L	2.2	4.0–4.5
Chloride	Cl	mmol/L	118	115–130
Bicarbonate	HCO ₃	mmol/L	18	12–26
Anion gap	AG	mmol/L	21	14–25
Symmetric dimethylarginine	SDMA	μg/dL μmol/L	14 0.7	0–14 0–0.7
Total T4	TT4	nmol/L	32	15–60

Question 2 continued over page

Urinalysis

Parameter	Result	Reference interval
Collection method	cystocentesis	
USG	1.023	
Colour	yellow	
Clarity or turbidity	clear	
pH	6.5	
Glucose	negative	
Ketones	negative	
Protein	negative	
Bilirubin	0	
RBCs	2	<5/HPF
WBCs	0	<5/HPF
Crystals	nil seen	
Casts	nil seen	
Epithelial cells	nil seen	
Bacteria	nil seen	

Answer **all** parts of question 2:

- a) Formulate a problem list for this cat. (2.5 marks)

- b) List the differential diagnoses for hypokalaemia in the cat. Identify and briefly justify which of these would be considered most likely in this patient. (3.5 marks)

Question 2 continued over page

- c) As part of your investigations, you perform indirect blood pressure measurement using Doppler sphygmomanometry.

Answer **all** parts of this sub-question:

- i. Describe how to perform this diagnostic test. (6 marks)
- ii. Define the risk categories of hypertension based on **one (1)** recognised classification system. (2 marks)
- iii. List the target organs at risk for hypertensive damage and the associated physical examination findings that may indicate target organ damage. (6 marks)

An abdominal ultrasound is performed in this case and the results are provided below:

Abdominal Ultrasound

A 15.0 x 21.0 mm nodule on the cranial pole of the right adrenal gland was identified. There is no evidence of vascular invasion from the nodule.

There are no other abnormalities detected.

- d) Construct a prioritised list of differential diagnoses for a solitary adrenal mass in this cat. (2 marks)
- e) Discuss any further diagnostics you could perform to confirm the most likely diagnosis **and** briefly discuss the management options for this condition. (8 marks)

Continued over page

3. A 10-year-old, male, neutered, West Highland white terrier presents for a second opinion with haematuria and occasional stranguria over the previous three weeks, that is non-responsive to an initial seven-day treatment course with amoxicillin-clavulanic acid.

Answer **all** parts of this question:

- a) List the **four (4)** most likely differential diagnoses for this dog. *(4 marks)*
 - b) Discuss an appropriate diagnostic approach for this case, justifying each diagnostic test selected. *(14 marks)*
 - c) List **three (3)** non-surgical treatment options for canine transitional cell carcinoma/urothelial carcinoma. For **each** treatment, list **one (1)** advantage and **one (1)** disadvantage. *(9 marks)*
 - d) Briefly discuss the appropriate monitoring of any **one (1)** of these treatments. *(3 marks)*
4. A four-year-old, male, neutered, Whippet presents with a five-day history of lethargy, reduced appetite and reluctance to walk. The dog has no prior significant medical history and is up to date with preventive health care.

On physical examination, the dog is quiet and responsive, has a hunched stance and exhibits reluctance to walk. There is discomfort on palpation of the carpi, bilaterally, and on spinal palpation. The dog has a rectal temperature of 40.1°C.

Answer **all** parts of this question:

- a) Based on the history and physical examination findings, create a **prioritised** list of **three (3)** differential diagnoses. Justify your rankings. *(4 marks)*
- b) Outline an appropriate diagnostic plan for this dog. Justify your decision for each diagnostic test. *(7 marks)*

Question 4 continued over page

Radiographs of the dog's spine and carpi are unremarkable. Synovial fluid is collected from both carpi and stifle joints and the results are presented below:

Cytology

Parameter	Abbreviation	Unit	Result	Reference range
Right carpus				
Cellularity		Cells x 10⁹/L	34	<3
Neutrophils	Neut	%	74	<10
Lymphocytes	Lym	%	16	<20
Mononuclear	Mono	%	7	>70
Eosinophils	Eos	%	3	0
Blood			1+	0

Left carpus				
Cellularity		Cells x 10⁹/L	13	<3
Neutrophils	Neut	%	78	<10
Lymphocytes	Lym	%	8	<20
Mononuclear	Mono	%	12	>70
Eosinophils	Eos	%	2	0
Blood			1+	0

Right stifle				
Cellularity		Cells x 10⁹/L	28	<3
Neutrophils	Neut	%	80	<10
Lymphocytes	Lym	%	4	<20
Mononuclear	Mono	%	16	>70
Eosinophils	Eos	%	0	0
Blood			Rare	0

Comments: Non-degenerate neutrophils are present in all sites. No haemophagocytosis was noted. Decreased viscosity was noted in all sites. Synovial fluid culture is negative.

Question 4 continued over page

- c) Based on these results, state the most likely diagnosis. (*1 mark*)
- d) Outline an appropriate treatment and monitoring plan for this dog. Include a brief justification for your treatment choices. (*12 marks*)
- e) Outline the mechanism of action and list **two (2)** adverse effects of each of the following. (*6 marks*)
- i. cyclosporine A
 - ii. leflunomide.

End of paper