Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2019

Veterinary Practice (Small Animal)

Paper 1

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

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

Answer **ALL <u>EIGHT (8)</u>** questions

Answer **<u>EIGHT</u>** questions, each worth 15 marks ..... Total: 120 marks

Paper 1: Veterinary Practice (Small Animal)

Answer all eight (8) questions

1. Explain the mechanisms of action of prednisolone and relate these to this drug's clinical and adverse effects in dogs and cats. *(15 marks)*

2. Compare and contrast the clinical features of conjunctivitis, anterior uveitis and glaucoma. *(15 marks)*

3. Briefly discuss **five (5)** causes of non-traumatic cranial cruciate ligament rupture in the dog. *(3 marks each; total 15 marks)*

4. List and describe the stages of open skin wound healing following haemostasis. Include in your answer the processes occurring within the wound, the main cells/tissues involved and the approximate time an uncomplicated wound will spend in each stage. *(15 marks)*

5. Animal welfare science has moved beyond a focus on purely minimising negative experiences, to an increasing emphasis on promoting positive mental states.

   Answer **both** parts of this question:

   a) Explain how the five freedoms and five domains models may be used to assess potential welfare compromise in sentient animals. *(8 marks)*

   b) Discuss the ways in which positive welfare states can be achieved for animals, using examples of animals you work with in practice. *(7 marks)*

Continued over page

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

a) Briefly discuss the pathophysiology of hyperkalaemia for each of the following **three (3)** scenarios: *(4 marks each; total 12 marks)*

i. hyperkalaemia associated with adrenal gland disease in dogs

ii. hyperkalaemia associated with urinary tract disease in cats

iii. hyperkalaemia associated with metabolic acidosis in dogs.

b) Briefly discuss the effects of hyperkalaemia on cardiac function. Include in your answer the electrocardiogram (ECG) changes associated with hyperkalaemia. *(3 marks)*

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

a) Explain the difference between central and peripheral vestibular disease and list **three (3)** neurological signs that would be consistent with central, rather than peripheral, vestibular disease. *(5 marks)*

b) Explain what is meant by the terms upper motor neuron (UMN) and lower motor neuron (LMN). Compare and contrast the neurological signs associated with upper motor neuron damage and lower motor neuron damage. *(5 marks)*

c) Describe the neurological signs which are consistent with a compressive spinal cord lesion between T3 and L3, in a dog. *(5 marks)*

8. Discuss the life cycle and pathophysiology of heartworm disease (*Dirofilaria immitis*) in the dog. Your discussion should include the significance of *Wolbachia* for the disease process. *(15 marks)*

End of paper

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Paper 2

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

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

Answer **ALL <u>FOUR (4)</u>** questions

Answer **<u>FOUR</u>** questions, each worth 30 marks ..... Total: 120 marks

Paper 2: Veterinary Practice (Small Animal)

Answer all four (4) questions

1. You are presented with a seven-week-old Staffordshire terrier-cross puppy that the owner has just acquired from a neighbour. The puppy is eating well and has been wormed. The puppy will be an indoor-outdoor dog and lives in a region where leptospirosis is **not** a concern.

   Answer **all** parts of this question:

   a) Outline an appropriate vaccination protocol for this puppy for the first 12 months of life. Provide a brief explanation of your reasoning, with respect to current guidelines. *(6 marks)*

   One week after the vaccination visit, the puppy presents acutely collapsed, dehydrated and vomiting. Liquid, bloody diarrhoea is present and you suspect that the puppy has parvoviral enteritis.

   b) The owner is concerned that the vaccination has either failed or has caused the disease. Write a short response to address these concerns. *(4 marks)*

   c) You perform an in-house parvovirus enzyme-linked immunosorbent assay (ELISA) antigen test on the puppy's faeces and the result is negative. State, with reasons, whether or not this result rules out parvoviral infection. Suggest any further test(s) that could be valuable in confirming or ruling out this diagnosis. *(4 marks)*

Question 1 continued over page

Supportive therapy for the puppy, including intravenous lactated Ringer's (Hartmann's) infusion, methadone analgesia and maropitant, is commenced. After some clinical improvement in the first 24 hours, the puppy rapidly deteriorates. It is now obtunded, has a heart rate of 240 beats per minute (bpm), rapid, shallow respiration, a rectal temperature of 40.2°C and copious haemorrhagic diarrhoea.

A complete blood count and blood smear is performed.

Parameter	**Result**	**Reference interval (adult dog)**
RBC	**4.8**	5.5–8.5 x 10^{12}/L
Haemoglobin	**101**	120–180 g/L
Haematocrit	**0.2**	0.37–0.55
WCC	14.6	6.0–17.0 x 10^{9}/L
Neutrophils	**12.9**	3.0–11.5 x 10^{9}/L
Lymphocytes	**0.2**	1.0–4.8 x 10^{9}/L
Monocytes	0.3	0.1–1.3 x 10^{9}/L
Eosinophils	**0.0**	0.1–1.3 x 10^{9}/L
Platelets	**90**	200–500 x 10^{9}/L
Total protein (refractometer)	**45**	50–70 g/L

Smear:
RBCs uniform, normal morphology with no polychromasia or anisocytosis.
Frequent band neutrophils, 2+ toxic change, other WBC morphology normal.
Platelets average 4 per high power field, no clumps.

d) List and explain the abnormalities in the haematology and suggest a reason for the puppy's deterioration. *(8 marks)*

e) What antimicrobial(s), if any, are appropriate to use in this puppy? Justify your reasoning. *(4 marks)*

f) Outline, with justification, **two (2)** additional therapeutic strategies (other than those already listed) that may be helpful in the management of this puppy. *(4 marks)*

Continued over page

2. A twelve-year-old male, neutered, domestic shorthair cat with chronic renal insufficiency has developed feline odontoclastic resorptive lesions on two upper canine teeth, which are causing discomfort. The photograph of one tooth appears below:

Prior to anaesthesia, full pre-operative blood tests were performed. The abnormal results are listed below:

		Reference range
SDMA	19	0–14 ug/dl
BUN	26	5–15 mmol/L
Creatinine	280	80–200 µmol/L
Potassium	3.2	3.5–5.0 mmol/L
HCT	22	25–45 L/L
USG	1.022	

Answer **all** parts of this question:

a) Assess this cat's stage of renal disease, with reference to the International Renal Interest Society (IRIS) guidelines. *(1 mark)*

b) Nominate, with brief justification, any other diagnostic test(s) that is/are indicated. *(4 marks)*

c) Outline a suitable anaesthetic protocol for this cat, justifying your reasoning. Include recommendations for monitoring the anaesthetic. *(15 marks)*

Question 2 continued over page

d) Explain, in detail, the most appropriate dental procedure for this cat. *(6 marks)*

e) Outline an appropriate post-operative analgesic plan for this cat. *(4 marks)*

3. An eight-year-old female, speyed Golden Retriever is presented to you with a two-week history of lethargy and weight loss. The dog is reportedly drinking more than previously and, in the last week, has vomited occasionally.

Physical examination reveals a patient with a body condition score of 3/9, tacky mucous membranes and enlarged popliteal and prescapular lymph nodes. The nodes are discrete, firm and painless.

Answer **all** parts of this question:

a) You are concerned that this dog may have multicentric lymphoma. Describe the initial investigation of this case, including reference to staging and grading. Justify any diagnostic interventions. *(12 marks)*

You obtain the following results from a complete blood count, serum biochemistry and urinalysis.

Parameter	**Unit**	**Result**	**Reference interval**
Haemoglobin	g/dL	**18.9**	12.0–18.0
PCV	L/L	**0.59**	0.37–0.55
Red blood cells	x 10^{12}/L	**8.8**	5.5–8.5
MCV	fL	67	60–77
MCH	pg	22	19–30
MCHC	g/dL	32	30–38
White cell count	x 10^{9}/L	15.7	5.5–16.9
Bands	x 10^{9}/L	0	0–0.3
Neutrophils	x 10^{9}/L	**12.5**	3.0–11.5
Lymphocytes	x 10^{9}/L	1.6	1.0–4.8
Monocytes	x 10^{9}/L	**1.5**	0.2–1.4
Eosinophils	x 10^{9}/L	0.1	0.1–1.3
Basophils	x 10^{9}/L	0	Rare
Platelets	x 10^{9}/L	250	175–500
Smear: normal RBC and WBC morphology, platelets adequate.			

Question 3 continued over page

Parameter	Unit	Result	Reference interval
Calcium	mmol/L	**3.4**	2.10–2.80
Phosphate	mmol/L	**0.8**	0.9–2.1
Urea	mmol/L	**10.3**	3.6–8.9
Creatinine	mmol/L	**0.17**	0.06–0.16
Glucose	mmol/L	5.0	3.3–6.7
Cholesterol	mmol/L	5.3	3.9–7.8
Total bilirubin	µmol/L	4	0–10
ALT	U/L	63	5–80
ALP	U/L	101	10–120
Amylase	U/L	1900	<2000
Total protein	g/L	**80**	54–78
Albumin	g/L	37	24–38
Sodium	mmol/L	140	136–154
Potassium	mmol/L	**3.3**	3.4–5.3

Urinalysis (cystocentesis): USG 1.019, pH 6, protein 1+ blood negative, glucose negative, ketones negative, bilirubin negative. Sediment: unremarkable

b) Interpret the laboratory results in the context of the case. *(6 marks)*

c) As a result of your investigations, you conclude that this dog has high-grade, stage III, substage b multicentric lymphoma. Briefly explain what this grading and staging means and explain its prognostic implications. *(4 marks)*

d) Outline the options for managing this case and the prognostic implications for alternative strategies. Your answer must address the immediate concerns, as understood from the laboratory results, as well as the potential benefits of referral to a specialist. *(8 marks)*

Continued over page

4. Answer **both** parts of this question (Part A and Part B)

Part A:

A 12-year-old female, neutered, Burmese cat has presented with a history of several months of weight loss. The cat has lost 15% of its previous body weight; however, her appetite remains good. The cat's water intake has noticeably increased and she has been drinking out of the shower base. There has also been more urine in her litter tray.

On examination, the cat is alert and responsive and adequately hydrated. Her heart rate is 210 bpm, with normal pulse amplitude. Her respiratory rate is 45 bpm with normal effort. The cat is thin, with a body condition score of 3/9 and there is muscle wastage evident. Her hair coat is dull and dry. The remainder of the physical examination is unremarkable.

Answer **all** parts of question 4, part A:

Part A - Question 1:

a) List the problems identified in the history and on physical examination. *(2 marks)*

b) Construct a list of differential diagnoses for this cat, indicating which are most likely. *(4 marks)*

Question 4 Part A: question 1 continued over page

The cat has been admitted for in-house haematology, serum biochemistry and urine analysis. The results are as follows:

Parameter	Result	Reference interval
Glucose	**11.2**	4.3–7.0 mmol/L
BUN	10.5	7.0–13.0 mmol/L
Creatinine	**18**	30–190 umol/L
Total protein	75	60–85 g/L
Albumin	32	26–36 g/L
Globulin	43	27–45 g/L
Total bilirubin	1.7	1–10 umol/L
ALT	**126**	10–100 IU/L
AST	**75**	12–30 IU/L
ALP	72	10–100 IU/L
Cholesterol	3.23	1.8–5.2 mmol/L
Calcium	2.3	1.6–2.5 mmol/L
Phosphate	1.4	1.29–2.84 mmol/L
Sodium	157	145–160 mmol/L
Potassium	3.5	3.4–5.2 mmol/L
Chloride	112	94–113 mmol/L

Parameter	Result	Reference interval
RBC	9.6	4.9–10.0 x 10^{12}/L
Haemoglobin	149	77–156 g/L
Haematocrit	0.40	0.25–0.46
Reticulocytes	30	10–50 x 10^{9}/L
WCC	14.1	4.0–14.5 x 10^{9}/L
Neutrophils (seg)	**11.3**	3.0–9.2 x 10^{9}/L
Neutrophils (band)	0.05	0–0.1 x 10^{9}/L
Lymphocytes	1.2	0.9–3.9 x 10^{9}/L
Monocytes	0.3	0–0.5 x 10^{9}/L
Eosinophils	0.2	0–1.2 x 10^{9}/L
Platelets	250	100–420 x 10^{9}/L
SMEAR: RBC and WBC morphology normal, platelets adequate.		

Question 4 Part A: continued over page

Urinalysis	
Appearance	pale yellow, clear
Specific gravity	1.022
pH	7.5
Protein	2+
Glucose	negative
Ketones	negative
Bilirubin	negative
Sediment: unremarkable	

Part A - Question 2:

Interpret the findings on the complete blood count (CBC), blood biochemistry and urinalysis, indicating which differentials become more or less likely.

(6 marks)

Part A - Question 3:

Outline an appropriate diagnostic approach to the case from this point forward. Justify your decisions. *(8 marks)*

Part B:

Discuss the available treatment options for feline hyperthyroidism, including their mechanism of action. Justify your recommended option for the management of an uncomplicated hyperthyroid cat. *(10 marks)*

End of paper