Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2017

Small Animal Medicine

Paper 1

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

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

Answer **ALL** **FOUR (4)** questions

Answer **FOUR** questions each worth 30 marks ....total 120 marks

Paper 1: Small Animal Medicine

Answer all four (4) questions

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

   a) Describe the cough reflex, with reference to the neuroanatomical structures involved.   *(8 marks)*

   b) Discuss the pathophysiology of pyothorax in the dog **and** cat.   *(10 marks)*

   c) Briefly describe the indications, advantages **and** limitations of the following tests in the diagnosis of canine respiratory disease:

       i.   transtracheal aspiration   *(6 marks)*

       ii. bronchoalveolar lavage.   *(6 marks)*

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

   a) Briefly describe the normal anatomy of the portal circulation in dogs **and** cats. You may include a labelled diagram to complement your answer.   *(6 marks)*

   b) Briefly describe how this anatomy may be altered in animals with congenital portosystemic shunts. In your answer include the **two (2)** anatomical categories of congenital portosystemic shunts. You may include labelled diagrams to complement your answer.   *(4 marks)*

   c) Describe the pathophysiological consequences and clinical signs associated with a portosystemic shunt.   *(12 marks)*

   d) List the serum biochemical abnormalities that can be seen in animals with portosystemic shunts. For **three (3)** of these, briefly explain the mechanism by which these abnormalities occur.   *(8 marks)*

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

   a) Discuss normal regulation of calcium homeostasis. A diagram may be used to support your answer.   *(12 marks)*

   b) List conditions that can cause hypercalcaemia.   *(2 marks)*

   c) Discuss the limitations of serum total calcium measurement.   *(4 marks)*

   d) Briefly discuss **four (4)** non-specific medical treatments for hypercalcaemia **and** their mechanisms of action.   *(12 marks)*

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

   a) Discuss the pathogenesis of calcium oxalate urolith formation in dogs.
      (8 marks)

   b) Discuss the pathogenesis of struvite urolith formation in dogs.   *(8 marks)*

   c) Describe the hormonal regulation of prostatic cell function. A diagram may be used to support your answer.   *(8 marks)*

   d) Discuss the mechanism of action of the following treatments for the management of benign prostatic hypertrophy:

      i. deslorelin   *(3 marks)*

      ii. delmadinone.   *(3 marks)*

End of paper

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Paper 2

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

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

Answer **ALL** **FOUR (4)** questions

Answer **FOUR** questions each worth 30 marks ....total 120 marks

Paper 2: Small Animal Medicine

Answer all four (4) questions

1.   A two-year-old neutered male domestic shorthair cat presents with a two week history of swollen pelvic limbs. The cat has been fed a complete and balanced commercial diet, is fully vaccinated and lives in a single cat household.

   Physical examination identifies bilateral pelvic limb oedema. The remainder of the physical examination is unremarkable.

   Haematology was unremarkable.

   Biochemistry and urinalysis results are provided below:

Biochemistry

Parameter	Unit	Result	Reference range
ALP	U/L	32	14–111
ALT	U/L	15	12–130
Total bilirubin	umol/L	<2	0–15
Cholesterol	**mmol/L**	**6.36**	**1.68–5.81**
Urea	**mmol/L**	**14**	**5-7–12.9**
Creatinine	**umol/l**	**321**	**71–212**
Calcium	mmol/L	2.27	1.95–2.83
Phosphorus	mmol/L	1.89	1–2.42
Total protein	**g/L**	**54**	**57–89**
Albumin	**g/L**	**14**	**23–39**
Globulin	g/L	40	28–51
Glucose	mmol/L	4.06	3.94–8.83
Amylase	U/L	774	500–1500

Urinalysis

Collection method	Cystocentesis
USG	1.024
Colour	Pale yellow
Turbidity	Clear
pH	5.0
Glucose	Negative
Ketones	Negative
Protein	Positive (++++)
Bilirubin	Negative
RBCs	3/HPF (0-5/HPF)
WBCs	Negative
Crystals	Negative
Casts	Negative
Epithelial cells	+
Bacteria	Negative

Answer **all** parts of question 1:

a) State the **most** likely reason for hypoproteinaemia in this patient. Justify your answer with reference to differential diagnoses.   *(6 marks)*

b) Outline an appropriate diagnostic approach to this patient, **and** discuss the indications for **each** diagnostic test selected.   *(12 marks)*

c) Outline your initial treatment and management plan for this patient. Briefly justify for your treatment choices.   *(12 marks)*

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2. An 11-month-old male neutered Birman cat is presented with a four week history of progressive inappetence, lethargy and polydipsia, and a one week history of seizures. On physical examination he was underweight (body condition score 3/9) and pyrexic (temperature 39.6⁰C). Neurological examination demonstrated obtundation and facial twitching. Ocular examination demonstrated uveitis and chorioretinitis. All other clinical examination findings were within normal limits. Blood is collected for haematology and biochemistry, with results below:

Haematology

Parameter	Unit	Result	Reference range
Haematocrit	**L/L**	**0.23**	**0.25–0.45**
Red blood cells	**x 10^{12}/L**	**4.6**	**5.0-10.0**
Reticulocytes ABs	x 10^9/L	10	3-50
White blood cells	**x 10^9/L**	**24.9**	**5.5–19.5**
Neutrophils	**x 10^9/L**	**17.1**	**2.5–12.5**
Lymphocytes	x 10^9/L	6.9	1.5–7
Monocytes	x 10^9/L	0.7	0–0.9
Eosinophils	x 10^9/L	0.2	0–1.5
Basophils	x 10^9/L	0.1	0–0.2
Platelets	x 10^9/L	460	200–500

Biochemistry

Parameter	Unit	Result	Reference range
Calcium	mmol/L	2.2	2.0–3.0
Phosphate	mmol/L	1.4	1.3–2.3
Urea	mmol/L	5.9	5.4–10.7
Creatinine	μmol/L	117	70–160
Glucose	**mmol/L**	**8.0**	**3.9–7.5**
Cholesterol	mmol/L	2.9	1.9–3.9
ALT	U/L	75	5–80
ALP	U/L	72	10–120
CK	**U/L**	**650**	**50–400**
Albumin g/L	g/L	33	22–35
Globulin	**g/L**	**60**	**28–54**
Total Protein	**g/L**	**93**	**66–88**

Answer **all** parts of question 2:

a) Indicate the neuroanatomical localisation based on the physical examination findings.   *(1 mark)*

b) Create a **ranked** list of differential diagnoses for this case. Justify your rankings.
   (7 marks)

c) Discuss the additional diagnostic tests that could be performed to confirm a diagnosis in this cat.   *(15 marks)*

d) List the **most** likely diagnosis and indicate the associated prognosis in this case.
   (2 marks)

e) Outline an appropriate plan for the initial management of this cat.   *(5 marks)*

3.   An 11-year-old female neutered Labrador dog presents for investigation of an episode of collapse. The owners reported the episode occurred while the dog was chasing a ball and that she did not lose consciousness, urinate or defecate during the episode, which lasted for a few minutes. She seemed normal immediately before the collapse episode and returned to normal shortly afterwards. Physical and neurological examinations are unremarkable.

Answer **all** parts of question 3:

a) Create a differential diagnoses list for episodic collapse in any dog, and discuss these diagnoses in relation to this case.   *(12 marks)*

Blood is collected for haematology and serum biochemistry. The results are presented below:

Haematology

Parameter	Unit	Result	Reference range
Red cell count	x 10^{12}/L	6.3	5.5–8.5
Haematocrit	L/L	0.41	0.37–0.55
White cell count	x 10^9/L	15.2	6.0–17.0
Neutrophils	**x 10^9/L**	**12.9**	**3.0–11.5**
Lymphocytes	**x 10^9/L**	**0.3**	**1.0–4.8**
Monocytes	x 10^9/L	1.2	0.2–1.4
Eosinophils	x 10^9/L	0.3	0.1–1.3
Platelets	x 10^9/L	350	200–500

Question 3 continued over page

Biochemistry

Parameter	Unit	Result	Reference range
Sodium	mmol/L	147	144–160
Potassium	mmol/L	3.9	3.5–5.8
Chloride	mmol/L	115	109–122
Calcium	mmol/L	2.6	2.3–3.0
Glucose (fl ox)	**mmol/L**	**1.6**	**3.4–7.4**
Cholesterol	mmol/L	4.2	3.9–7.8
Urea	mmol/L	6.7	3.6–8.9
Creatinine	μmol/L	95	43–129
Bilirubin	μmol/L	2	0–20
ALT	U/L	42	3–83
ALP	U/L	66	0–170
CK	U/L	390	50–400
Total protein	g/L	56	55–76
Albumin	g/L	31	25–40
Globulin	g/L	25	19–39

b) List the conditions that can be associated with hypoglycaemia and discuss which
    of these conditions are **most** likely in this case, with reference to the history,
    physical examination and clinical pathology findings.   *(8 marks)*

Further testing generates the following information:

Parameter	Unit	Result	Reference range
Insulin	mU/L	17	5–20
Glucose	**mmol/L**	**1.6**	**3.4–7.4**

c) Briefly interpret these results.   *(1 mark)*

d) Based on these results, state the **most** likely diagnosis.   *(1 mark)*

e) Outline the treatment and management options for this case.   *(8 marks)*

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4. A two-year-old female spayed Rough Collie dog presents with a three month history of weight loss, diarrhoea and occasional vomiting. She is bright and active with a voracious appetite. She is fed a complete and balanced commercial dry dog food and is up-to-date with routine vaccinations and intestinal worming.

On physical examination the dog is underweight (body weight 22 kg; body condition score 3/9). The remainder of the examination is unremarkable.

Answer **all** parts of question 4:

a) Create a **ranked** list of differential diagnoses for this dog. *(5 marks)*

b) Outline an appropriate diagnostic approach for this case. *(4 marks)*

The results of additional tests are below:

Haematology

Parameter	Unit	Result	Reference range
Red cell count	x 10¹²/L	6.89	5.50–8.50
Haemoglobin	g/L	152	120–180
Haematocrit	L/L	0.48	0.37–0.55
MCV	fL	70	60–77
MCH	Pg	21	19–24
MCHC	g/L	348	320–360
White cell count	x 10⁹/L	7.2	6.0–17.0
Neutrophils	x 10⁹/L	4.9	3.0–11.5
Lymphocytes	x 10⁹/L	1.5	1.0–4.8
Monocytes	x 10⁹/L	0.5	0.1–1.3
Eosinophils	x 10⁹/L	0.3	0.1–1.3
Platelets	x 10⁹/L	358	200–500

Question 4 continued over page

Biochemistry

Parameter	Unit	Result	Reference range
Sodium	mmol/L	157	138–158
Potassium	mmol/L	5.5	3.8–5.8
Chloride	mmol/L	109	100–115
Bicarbonate	mmol/L	22	18–24
Urea	**mmol/L**	**9.3**	**3.6–8.9**
Creatinine	μmol/L	125	43–129
Protein	g/L	54	54–78
Albumin	g/L	26	24–38
Globulin	g/L	28	24–42
Total bilirubin	μmol/L	1	<15
GGT	U/L	5	<10
ALP	**U/L**	**126**	**10–120**
ALT	**U/L**	**289**	**5–80**
AST	**U/L**	**108**	**10–80**
Cholesterol	**mmol/L**	**1.8**	**3.9–7.8**
Calcium	mmol/L	2.30	2.10–2.80
Phosphorus	mmol/L	1.40	0.87–2.10
Creatine kinase (CK)	**U/L**	**518**	**50–400**

Trypsin like immunoassay

Parameter	Unit	Result	Reference range
Trypsin-like immunoassay (TLI)	**μg/L**	**2.4**	**5.2–30.0**

c) List the **most** likely diagnosis in this case. *(1 mark)*

d) Create an appropriate management plan for this dog. *(8 marks)*

The dog presents three months later for ongoing diarrhoea, weight loss and vomiting, which has become more frequent. On physical examination she has lost more weight (body weight 19 kg; body condition score 2/9). The remainder of examination is unremarkable.

e) Discuss the possible reasons for the poor response to treatment in this case, and outline a revised management plan. *(12 marks)*

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