



# Australian and New Zealand College of Veterinary Scientists

## Membership Examination

June 2012

## Medicine of Dogs Paper 1

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

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

Answer your choice of any **FOUR (4)** questions from the five questions **ONLY**

All five questions are of equal value

Answer **FOUR** questions each worth 10 marks .....total 40 marks

# Paper 1: Medicine of Dogs

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Answer your choice of any **FOUR (4)** questions from the five questions **ONLY**

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

Describe:

- a) the function of the vestibular system. *(1 mark)*
- b) the neuroanatomical components making up the central and peripheral vestibular systems. *(2 marks)*
- c) the clinical signs seen with vestibular disease and how these can be used to differentiate between central and peripheral vestibular disease.

*(7 marks)*

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

Chronic hypertension causes damage to 'target' organs.

a) List 'target' organs that are typically damaged by chronic hypertension.

For **each** of these organs briefly describe the resulting:

- i. typical clinical signs
- ii. abnormal clinical pathology test findings
- iii. diagnostic imaging abnormalities. *(5 marks)*

b) Briefly describe the autoregulatory mechanism by which target organs are protected from an increase in blood pressure. *(2½ marks)*

c) Describe the pathophysiology of target organ damage when these autoregulatory mechanisms break down. *(2½ marks)*

**Continued over page**

3. Answer any **two (2)** of the following subparts: *(5 marks each)*
- a) Discuss the aetiology, epidemiology and pathophysiology of rabies in dogs.
  - b) Outline, in point form, the homeostasis of glucose. Include in your answer the major organs and hormones involved.
  - c) Explain the aetiopathogenesis of hypokalaemia in dogs.
4. List the types of fluid that can constitute abdominal effusions in dogs. For **each** fluid type, provide:
- i. a definition according to its laboratory parameters; and
  - ii. a brief description of the pathophysiological processes which generate that type of fluid. *(10 marks)*
5. Answer any **two (2)** of the following subparts: *(5 marks each)*
- a) Describe the aetiopathogenesis of regurgitation in dogs.
  - b) Describe the aetiopathogenesis of melaena.
  - c) Describe the electrocardiographic features and pathophysiology of first degree atrioventricular (AV) block.
  - d) Discuss the indications for and limitations of using parvovirus antibody titres as a substitute for timed revaccinations. Include an explanation of the principles of interpretation of parvovirus antibody titres.

**End of paper**



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## Medicine of Dogs

## Paper 2

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All five questions are of equal value

Answer **FOUR** questions each worth 10 marks .....total 40 marks

# Paper 2: Medicine of Dogs

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Answer your choice of any **FOUR (4)** questions from the five questions **ONLY**

1. A six-year-old female neutered Yorkshire terrier presents with a two month history of weight loss, vomiting, diarrhoea and a reduced appetite.

Physical examination reveals a patient in poor body condition with a fluid wave palpable in the abdomen. You collect blood for haematology and biochemistry and urine via cystocentesis for urinalysis.

The results are presented below.

## Haematology

Parameter	Value	Unit	Reference Interval
Hb	110	g/L	80-150
RBC	7.3	$\times 10^{12}/L$	5.0-10.0
PCV	0.42	L/L	0.37-0.55
WBC	10.2	$\times 10^9/L$	5.5-19.5
Neutrophils	8.2	$\times 10^9/L$	2.4-12.5
Band Neutrophils	0	$\times 10^9/L$	0-0.3
<b>Lymphocytes</b>	<b>0.8</b>	<b><math>\times 10^9/L</math></b>	<b>1.5-7.0</b>
Monocytes	0.8	$\times 10^9/L$	0.2-1.0
Eosinophils	0.4	$\times 10^9/L$	0.1-1.5
Basophils	0	$\times 10^9/L$	<0.2
Platelets	364	$\times 10^9/L$	200-500
Morphology	Normal		

**Question 1 continued over page**

## Biochemistry

Parameter	Value	Unit	Reference Interval
ALT	35	U/L	0-100
ALP	66	U/L	0-85
Bilirubin	2	µmol/L	0-5
<b>Cholesterol</b>	<b>1.7</b>	<b>mmol/L</b>	<b>1.9-3.9</b>
Urea	8.8	mmol/L	6.0-11.8
Creatinine	103	µmol/L	80-178
<b>Calcium</b>	<b>1.68</b>	<b>mmol/L</b>	<b>1.81-2.70</b>
Phosphorus	1.41	mmol/L	1.3-2.8
<b>Total Protein</b>	<b>36</b>	<b>g/L</b>	<b>54-78</b>
<b>Albumin</b>	<b>14</b>	<b>g/L</b>	<b>21-38</b>
<b>Globulin</b>	<b>22</b>	<b>g/L</b>	<b>26-51</b>
Glucose	5.8	mmol/L	3.9-6.1
Sodium	151	mmol/L	147-156
Potassium	4.1	mmol/L	3.5-5.0
Chloride	120	mmol/L	109-122

## Urinalysis

USG	1.044
pH	6.5
Glucose	Negative.
Ketones	Negative.
Bilirubin	Negative.
Blood	Negative.
Protein	Positive +
RBCs	Negative.
WBCs	Negative.
Casts	Negative.
Bacteria	Negative.

**Question 1 continued over page**

Answer **all** subparts of this question:

- a) Provide a problem list for this patient based on the history, physical examination and laboratory data. (1 mark)
- b) State the most likely hypothesis to account for hypoproteinaemia in this patient. Justify your answer with reference to differential diagnoses. (4 marks)
- c) Outline your continued diagnostic approach to **this** patient (i.e. additional to the diagnostic tests already performed). Justify any procedures you will perform with reference to likely aetiologies. (5 marks)

2. A three-year-old, 30 kg mixed breed female spayed dog has been treated for idiopathic epilepsy following a comprehensive diagnostic workup. She is currently on 60mg of phenobarbitone twice daily. She has been on this medication for six months.

After starting therapy with phenobarbitone her seizure frequency initially reduced to an acceptable level, but over the past month she has been having refractory seizures, typically one generalised seizure every two days.

Answer **all** subparts of this question:

- a) Describe the approach to improving the management of this epileptic dog with phenobarbitone alone. Include in your answer possible side effects of phenobarbitone use and ongoing monitoring. (4 marks)

Despite optimising phenobarbitone medication the generalised seizures continue.

- b) You decide to add a second antiepileptic drug to the phenobarbitone protocol.
  - i. Describe the therapeutic plan for the next antiepileptic you will use with particular reference to the pharmacokinetics of the drug. (3 marks)
  - ii. Describe possible side effects associated with this medication. (1 mark)

Unfortunately the generalised seizures continue despite optimal management with two antiepileptic medications.

- c) Briefly discuss options for a third drug to add to the treatment plan. (2 marks)

**Continued over page**

3. An eight-year-old, 8 kg male neutered Jack Russell terrier presents due to a three day history of anorexia and vomiting. Over the last three months increased thirst was noted. The dog lost weight (1 kg) over the last three months but was eating well during this time.

Physical examination findings:

- Depressed but responsive
- Resting respiratory rate 24 breaths per minute
- Body condition score 3 out of 9
- Mucus membranes are pink, dry with a capillary refill time of 1 second
- Skin tenting is noted
- Severe periodontal disease and tartar
- Resting heart and pulse rate are 120 beats per minute
- Lung sounds are normal
- No cardiac murmur or arrhythmia is detected
- Peripheral lymph nodes are not palpable
- Rectal temperature is 37.9°C.

Haematology, biochemistry and urinalysis are performed. The results are as follows:

Haematology	Results	Reference interval
<b>Haemoglobin</b> g/dL	<b>8.7</b>	<b>12.0 – 18.0</b>
<b>PCV</b> L/L	<b>0.24</b>	<b>0.37 – 0.55</b>
<b>Red cell count</b> x 10 <sup>12</sup> /L	<b>3.8</b>	<b>5.5 – 8.5</b>
MCV (PCV/RCC)        fL	65	60-75
MCH (Hb/RCC)        pg	22	19 - 24
MCHC (Hb/PCV)        g/dL	36	32 - 38
Reticulocyte %	0	< 2
White cell count        x 10 <sup>9</sup> /L	12.8	6.0 – 17.0
Neutrophils            x 10 <sup>9</sup> /L	8.7	3.0 – 11.5
<b>Lymphocytes</b> x 10 <sup>9</sup> /L	<b>0.5</b>	<b>1.0 – 4.8</b>
Monocytes            x 10 <sup>9</sup> /L	1.0	0.2-1.4
Eosinophils            x 10 <sup>9</sup> /L	0.2	0.1 – 1.3
Basophils              x 10 <sup>9</sup> /L	0	Rare
Platelets                x 10 <sup>9</sup> /L	325	300 - 700
<b>Total solids</b> g/L	<b>88</b>	<b>60- 80</b>
Comments: None.		

**Question 3 continued over page**



Red cell morphology: Normal

White cell morphology: Normal

<b>Biochemistry</b>	<b>Results</b>	<b>Reference interval</b>
Sodium            mmol/L	154	144 - 160
<b>Potassium        mmol/L</b>	<b>2.8</b>	<b>3.5 – 5.8</b>
Chloride           mmol/L	114	109 - 122
Calcium            mmol/L	2.4	2.10 – 2.80
<b>Phosphate        mmol/L</b>	<b>2.9</b>	<b>0.9 – 2.1</b>
<b>Urea                mmol/L</b>	<b>42.2</b>	<b>3.6 – 8.9</b>
<b>Creatinine        μmol/L</b>	<b>430</b>	<b>60 – 170</b>
<b>Glucose            mmol/L</b>	<b>12.2</b>	<b>3.3 – 6.7</b>
Cholesterol        mmol/L	6.1	3.9 – 7.8
Total Bilirubin    μmol/L	2	0 – 10
ALT                U/L	76	5 – 80
ALP                U/L	110	10 – 120
<b>Total protein     g/L</b>	<b>89</b>	<b>54 – 78</b>
<b>Albumin            g/L</b>	<b>39</b>	<b>24 – 38</b>
Globulin            g/L	50	35 - 55

Urine Analysis: Free catch

Gross appearance: Pale Yellow

Specific gravity: 1.019

**Question 3 continued over page**

Dipstick results		Sediment exam	
Protein	3+	Casts/LPF	None
pH	6.5	RBC/HPF	None
Blood	None	WBC/HPF	None
Ketones	None	Epithelial cells	None
Bilirubin	None	Crystals	None
Glucose	None	Bacteria	Few
SSA Protein	3+	Other	None

Answer **both** subparts of this question:

- a) Provide a diagnostic hypothesis which would account for this patient's clinical signs and clinicopathological abnormalities. Justify your answer with reference to differential diagnoses for the specific problems present. (4 marks)
  
  - a) Describe your management of this patient for the first three days of hospitalisation. Explain the reasons for your treatment decisions. (6 marks)
4. Lucy is a five-year-old female spayed Shih tzu who presents for assessment of increasing lethargy over the past week, and a two-day history of haematochezia and melaena. There was no history of travel outside of Australia, recent vaccination or other drug administration.

Physical examination findings:

- Body condition score 7/9
- Heart rate 100 beats per minute with synchronous pulses
- Systolic grade 1/6 left basal murmur (newly diagnosed)
- Pale pink mucous membranes, CRT less than 2 secs
- Panting
- Rectal temperature 38.5°C.

**Question 4 continued over page**

**Laboratory data:****Haematology**

<b>Parameter</b>	<b>Patient value</b>	<b>Laboratory reference interval</b>
<b>Red blood cells (x 10<sup>12</sup>/L)</b>	<b>3.87</b>	<b>5.7-8.8</b>
<b>Haemoglobin</b>	<b>89</b>	<b>129-184</b>
<b>Haematocrit</b>	<b>0.27</b>	<b>0.37-0.6</b>
Mean corpuscular volume (fL)	70.1	58.8-71
<b>Reticulocytes, absolute (x 10<sup>9</sup>/L)</b>	<b>113</b>	<b>0-60</b>
Mean corpuscular haemoglobin (pg)	23	20.5-24
Mean corpuscular haemoglobin concentration (g/L)	328	310-362
<b>Platelets (x 10<sup>9</sup>/L)</b>	<b>5</b>	<b>143-400</b>
White blood cells (x 10 <sup>9</sup> /L)	12.5	5.2-14
<b>Neutrophils (x 10<sup>9</sup>/L)</b>	<b>12.0</b>	<b>3.9-8</b>
Lymphocytes (x 10 <sup>9</sup> /L)	2.33	1.3-4.1
Monocytes (x 10 <sup>9</sup> /L)	0.74	0.2-1.1
Eosinophils (x 10 <sup>9</sup> /L)	0	0-0.6
Moderate polychromasia and anisocytosis. No platelet clumps. No spherocytes. Saline agglutination negative.		

**Question 4 continued over page**

**Serum chemistries**

Parameter	Patient value	Laboratory reference range
Sodium (mmol/L)	149	139-153
Potassium (mmol/L)	4.8	3.9-5.9
Chloride (mmol/L)	114	101-116
Bicarbonate (mmol/L)	18	12-26
Glucose (mmol/L)	6.2	3.6-6.8
<b>Urea (mmol/L)</b>	<b>18.2</b>	<b>3.6-10</b>
Creatinine (umol/L)	59	44-132
Calcium total (mmol/L)	2.3	2.25-2.82
Phosphate (mmol/L)	0.9	0.8-2.2
<b>Total protein (g/L)</b>	<b>52.9</b>	<b>56-80</b>
Albumin (g/L)	26.5	24-38
Globulin (g/L)	26.4	25-45
Bilirubin (umol/L)	1	0-8
Alkaline phosphatase (U/L)	32	20-184
Aspartate aminotransferase (U/L)	29	10-60
Alanine aminotransferase (U/L)	35	21-142
Cholesterol (mmol/L)	5	3.3-6.9
Creatinine kinase (U/L)	95	47-228

**Urinalysis:**

Collection method	Voided
Colour	clear, yellow
USG	1.035
pH	6.5
Protein	Trace
Glucose	Negative
Ketones	Negative
Bilirubin	Negative
Blood	Negative
Leucocytes	<1 per high power field

**Question 4 continued over page**

Answer **all** subparts of this question:

- a) List the problems from the history, physical examination and laboratory results for this patient. (2 marks)
- b) Provide a diagnostic hypothesis which would account for this patient's clinical signs and clinicopathological abnormalities. Justify your answer with reference to differential diagnoses for the specific problems present. (4 marks)
- c) Diagnostic testing fails to identify any further abnormality. Discuss your initial therapeutic plan including monitoring, for your most likely differential diagnosis. (4 marks)

5. Answer any **two (2)** of the following subparts: (5 marks each)

- a) Discuss the management of bronchopneumonia in a three-year-old male rottweiler, with predominantly degenerative neutrophils in the bronchoalveolar lavage fluid.
- b) Discuss the treatment of heartworm infection (dirofilariasis) with right-sided congestive heart failure in a two-year-old male kelpie.
- c) Discuss the management and prevention of leptospirosis in a four-year-old female labrador dog.

**End of paper**