



# Australian and New Zealand College of Veterinary Scientists

## Membership Examination

June 2014

# Veterinary Emergency and Critical Care 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

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# Paper 1: Veterinary Emergency and Critical Care

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Answer all four (4) questions

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

- a) List the various forms of shock, and provide an example of a condition that causes **each** form of shock you list. (5 marks)
- b) Compare and contrast the pathophysiology of cardiogenic shock with anaphylaxis. (12 marks)
- c) Describe how to obtain a measurement of central venous pressure in a patient using a manometer. You may use a diagram to illustrate your answer. (5 marks)
- d) Using examples, describe how central venous pressure can be used to assess cardiovascular status and function in the critically ill patient. (8 marks)

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

- a) Describe in detail the aetiopathogenesis of acute respiratory distress syndrome (ARDS). (10 marks)
- b) List **four (4)** criteria for the diagnosis of acute respiratory distress syndrome (ARDS). (4 marks)
- c) Patients with acute respiratory distress syndrome (ARDS) are frequently placed on oxygen supplementation. Outline how oxygen therapy can result in toxicity to the respiratory tract and include options available to reduce this risk. (6 marks)
- d) List the major determinants of tissue oxygen delivery, and discuss how **each** of these determinants may be manipulated to improve oxygen delivery in a patient with septic shock. (10 marks)

**Continued over page**

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

- a) List the **six (6)** major toxin types found in Australian elapid snakes. *(3 marks)*
- b) Describe the mechanism of action and expected clinical findings for **each** of the toxins listed in part 3 a). *(15 marks)*
- c) A dog presents with generalised tonic-clonic seizure activity. You suspect toxicity as the cause. List **six (6)** toxins that can result in these symptoms, and for **each** toxin listed, provide the specific mechanism of action of the toxin. *(12 marks)*

4. A dog presents to you having fallen off the back of a ute. He has several large, full-thickness wounds to his distal forelimbs, and you suspect he may have a fractured pelvis. The dog is in shock.

Answer **all** parts of this question:

- a) Outline the nociceptive pathway. *(3 marks)*
- b) List **three (3)** drugs (each from a different drug class) that would be appropriate initial analgesic choices for this dog in its current state. For **each** drug, outline its mechanism of action. *(9 marks)*
- c) Briefly describe the phases of wound healing following cutaneous tissue injury. *(6 marks)*
- d) The wounds have been thoroughly irrigated and there is a large open contaminated wound on the distal forelimb. Describe the **three (3)** bandaging layers, their purpose and the materials used for **each** layer, during the first 7–10 days of wound management. *(12 marks)*

**End of paper**



# Australian and New Zealand College of Veterinary Scientists

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June 2014

## Veterinary Emergency and Critical Care Paper 2

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

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Answer **ALL FOUR (4)** questions

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

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# Paper 2: Veterinary Emergency and Critical Care

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Answer all four (4) questions

1. A 12-week-old puppy weighing 10 kg presents to you late one night. Early that morning the puppy was seen eating seeds from a palm tree. One hour after this, the puppy started to vomit and has continued to vomit throughout the day. This afternoon, the puppy developed haemorrhagic diarrhoea and has been passing large volumes of diarrhoea intermittently ever since. Your initial physical examination is shown below.

**Clinical exam findings:**

Mentation	obtunded
Mucous membranes	tacky and pale
Capillary refill time	3 seconds
Heart rate	190 beats/minute
Respiratory rate	30 breaths/minute
Pulse quality	poor
Rectal temperature	37.1°C
Integument	skin tenting

Answer **all** parts of question one:

- a) What is your assessment of the cardiovascular and hydration status of this dog?  
(1 mark)
- b) Describe in detail an intravenous fluid plan for this puppy for the next 24 hours. Provide details of fluid types, volumes and rates. Include in your answer any calculations made. (12 marks)
- c) Two hours after admission, the puppy develops intermittent grand mal seizures and other neurological signs, including head pressing and ataxia. List the **two (2)** most likely causes of this patient's neurological signs given the history.  
(1 mark)

**Question 1 continued over page**

- d) List **three (3)** diagnostic steps that you would consider next. Give reasons for **each** step or test listed. *(3 marks)*
  
- e) State the most likely differential diagnosis for this patient's signs and clinical findings. *(1 mark)*
  
- f) Outline an appropriate management plan for this patient over the next 12 hours. Assume the patient is receiving an appropriate fluid plan. *(12 marks)*

**Question 2 begins on next page**

2. A three-year-old female desexed cross-breed dog, presents with a three day history of vomiting, inappetence and lethargy. She has become progressively lethargic over the past three days and she is now very weak. She has a small amount of diarrhoea today.

**Haematology:**

Parameter	Value	Normal range, units
WBC	16.52	6–17 x 10 <sup>9</sup> /L
LYM	4.7	1–4.8 x 10 <sup>9</sup> /L
MON	0.58	0.2–1.5 x 10 <sup>9</sup> /L
NEU	8.93	3–12 x 10 <sup>9</sup> /L
EOS	0.8	0–0.8 x 10 <sup>9</sup> /L
BAS	0.11	0–0.4 x 10 <sup>9</sup> /L
<b>RBC</b>	<b>8.92</b>	5.5–8.5 x 10 <sup>9</sup> /L
<b>HGB</b>	<b>20.7</b>	12–18 g/dL
<b>HCT</b>	<b>59.1</b>	37–55%
<b>PLT</b>	<b>170</b>	200–500 x 10 <sup>9</sup>
<b>Blood smear</b>	Platelet clumping present	

**Biochemistry:**

Parameter	Value	Normal range, units
ALB	29	25–44 g/L
ALP	31	20–150 U/L
ALT	115	10–118 U/L
AMY	1190	200–1200 U/L
tBIL	5	2–10 µmol/L
<b>BUN</b>	<b>&gt;53</b>	2–9 mmol/L
<b>Ca<sup>2+</sup></b>	<b>2.98</b>	2.15–2.95 mmol/L
<b>PHOS</b>	<b>4.44</b>	0.93–2.13 mmol/L
<b>CRE</b>	<b>354</b>	27–124 µmol/L
GLU	3.5	3.3–6.1 mmol/L
<b>Na<sup>+</sup></b>	<b>130</b>	138–160 mmol
<b>K<sup>+</sup></b>	<b>6.1</b>	3.7–5.8 mmol/L
TP	59	54–82 g/L
GLOB	30	23–52 g/L

**Urinalysis:**

Parameter	Value
USG	1.014

**Question 2 continued over page**

Answer **all** parts of question two:

- a) For the clinicopathological results on the previous page, list the abnormal values and provide possible causes for each abnormality. *(8 marks)*
- b) List the main differential diagnoses based on all the patient information presented (i.e. signalment, history and clinicopathological findings). *(2 marks)*
- c) With respect to your list of differential diagnoses part 2 b) above, outline a rational investigative approach to this patient. Give reasons for your choices of any diagnostic tests or procedures. *(5 marks)*
- d) Twenty-four hours following admission the patient has not produced any urine. Provide a detailed approach to the management of this problem over the subsequent 24 hours (assume the clients have no financial constraints). *(15 marks)*

**Question 3 begins on next page**



3. An 11-year-old desexed domestic short-haired cat that presents with a five day history of intermittent vomiting, and a 14 day history of reduced appetite and lethargy. She has not eaten for eight days, but is still drinking. The cat has a body condition score of 2/9. Blood tests are performed, the results of which are presented below.

**Haematology:**

Parameter	Value	Normal range, units
<b>WBC</b>	<b>39.5</b>	5.5–19.5 x 10 <sup>9</sup> /L
LYM	3.26	1.7–7 x 10 <sup>9</sup> /L
MON	0.58	0–1.5 x 10 <sup>9</sup> /L
<b>NEU</b>	<b>31.9</b>	2.5–14 x 10 <sup>9</sup> /L
EOS	0.74	0–1 x 10 <sup>9</sup> /L
BAS	0.05	0–0.2 x 10 <sup>9</sup> /L
RBC	9	5–10 x 10 <sup>9</sup> /L
HGB	14	8–15 g/dL
HCT	42.2	24–45%
PLT	334	300–800 x 10 <sup>9</sup> /L
<b>Serum colour</b>	<b>Icteric</b>	

**Biochemistry:**

Parameter	Value	Normal range, units
<b>ALB</b>	<b>19</b>	25–44 g/L
<b>ALP</b>	<b>110</b>	10–90 U/L
<b>ALT</b>	<b>&gt;2000</b>	20–100 U/L
AMY	806	300–1100 U/L
<b>tBIL</b>	<b>30</b>	2–10 µmol/L
BUN	11	4–11 mmol/L
Ca <sup>2+</sup>	2.5	2–2.95 mmol/L
PHOS	1.47	1.09–2.74 mmol/L
CRE	180	27–186 µmol/L
<b>GLU</b>	<b>3.3</b>	3.8–8.3 mmol/L
Na <sup>+</sup>	153	142–164 mmol
<b>K<sup>+</sup></b>	<b>3.0</b>	3.7–5.8 mmol/L
TP	75	54–82 g/L
GLOB	56	15–57g/L
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Urine specific gravity		1.050

**Question 3 continued over page**

Answer **all** parts of question three:

- a) For the clinical pathology results on previous page, list the abnormal findings. For **each** abnormality, provide a list of possible causes. (8 marks)
- b) List **three (3)** diagnostic steps that you would consider next. Give reasons for **each** of your choices. (3 marks)
- c) Briefly outline your plan for monitoring this patient over the next 48 hours. (5 marks)
- d) Describe the procedure for oesophagostomy tube placement in this patient. (4 marks)
- e) Provide a detailed nutrition plan for this cat for the next five days. The cat's rehydrated bodyweight is 2.1 kg. (5 marks)
- f) Discuss the potential complications that could arise with reinstating feeding in this patient and how these may be avoided. (5 marks)

**Question 4 begins on next page**

4. You have just removed a spleen and performed prophylactic gastropexy in a clinically unwell, four-year-old female speyed Neapolitan mastiff with a splenic torsion. One hour post operatively you notice that there is blood dripping from the surgical wound.

**Physical Examination Findings:**

Mentation	quiet and lethargic
Mucous membranes	moist and pale
Capillary refill time	1 second
Heart rate	170 beats/minute
Respiratory rate	50 breaths/minute
Femoral pulse quality	poor
Rectal temperature	38.8°C

Answer **all** parts of question four:

- a) List the possible causes for the blood dripping from the wound. (4 marks)

A coagulation analysis is performed in this dog. The results of the coagulation panel are as follows:

Parameter	Value	Normal range
Platelet count	4 platelets/HPF	10–20/HPF
Activated clotting time	267 seconds	80–120 seconds
Cytology	schistocytes ++ spherocytes +	

- b) State the most likely diagnosis for the bleeding based on the results of this coagulation analysis. (1 mark)
- c) Based on your diagnosis in part 4 b) above, describe the pathophysiological mechanism(s) behind every abnormality in this coagulation analysis. (8 marks)
- d) Six hours later you notice that the patient's mucous membranes are becoming increasingly pale. His PCV is 22% and TP is 46 g/L. A whole blood transfusion is being considered as a treatment option. List the factors to consider when making a decision whether to transfuse or not. (8 marks)
- e) Not long after beginning the blood transfusion the patient becomes pale, tachycardic and vomits:
- i. What is the most likely cause of this change and what is the underlying pathological mechanism? (2 marks)
  - ii. Outline the management of this patient's condition. (7 marks)

**End of paper**