



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2016

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 markstotal 120 marks

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Paper 1: Veterinary Emergency and Critical Care

Answer all four (4) questions

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

- a) Describe the pathophysiology of increased intracranial pressure following traumatic brain injury. (4 marks)
- b) Define cerebral perfusion pressure with the use of an equation. (1 mark)
- c) Describe the pathophysiology behind the Cushing reflex, in relation to traumatic brain injury. (5 marks)
- d) Describe your management of a patient with severe traumatic brain injury, including in your answer the underlying physiological principals. (15 marks)
- e) Describe the modified Glasgow Coma Scoring system and how it can be utilised to manage patients with head trauma. (5 marks)

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

- a) Using a diagram outline the renin-angiotensin-aldosterone system. Include in your diagram how it is activated and the physiological effects of **each** step. (18 marks)
- b) Discuss the renin-angiotensin-aldosterone system as it relates to the physiological compensation in heart disease and the development of congestive heart failure. (6 marks)
- c) Discuss how the renin-angiotensin-aldosterone system contributes to the development of electrolyte abnormalities in patients with hypoadrenocorticism. (6 marks)

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

- a) List **eight (8)** causes of lower motor neuron paresis and paralysis. Of the eight causes at least **three (3)** must be toxicities. (4 marks)
- b) For **four (4)** of the conditions listed in 3 a), outline the mechanism of action and the method of diagnosis. (12 marks)

You collect an arterial blood sample from a patient and the following results are obtained:

- FiO_2 21%
- PaO_2 94mmHg
- PaCO_2 78mmHg

- c) Describe and interpret these results. (5 marks)
- d) Describe **two (2)** different methods of assessing pulmonary function from the results of arterial blood gas analysis. (9 marks)

4. In relation to cardiopulmonary arrest and cardiopulmonary resuscitation (CPR) in small animals, answer **all** of the following questions:

- a) List **four (4)** physical examination findings that you can use to rapidly identify if an animal is in cardiopulmonary arrest. (2 marks)
- b) For **each** of the following patients, list the pump mechanism for blood flow and site of chest compressions: (3 marks)
 - keel chested e.g. Greyhound
 - large breed dog e.g. Labrador
 - small dog e.g. Cavalier King Charles Spaniel
- c) Explain how **each** of the two pump mechanisms move blood forward in the circulatory system to restore some measure of cardiac output. (4 marks)

Question 4 continued over page

- d) Describe how you would perform chest compressions. (4 marks)
- e) After instituting chest compressions, list the other basic life support measures that you would provide to a patient. (2 marks)
- f) Describe the mode of action, beneficial effects and dosing of both adrenaline and atropine. (5 marks)
- g) Describe how capnography is a useful monitoring tool during CPR. (3 marks)
- h) Discuss the use of IV fluids in CPR. (4 marks)
- i) The following electrocardiogram is obtained. State your diagnosis. (1 mark)



- j) Briefly describe how to manage this arrhythmia. (2 marks)

End of paper



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Veterinary Emergency and Critical Care Paper 2

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Answer **ALL FOUR (4)** questions

Answer **FOUR** questions each worth 30 markstotal 120 marks

Paper 2: Veterinary Emergency and Critical Care

Answer all four (4) questions

1. A seven-year-old male neutered Poodle passed red coloured urine when he was taken for a walk. He is brought to your clinic and you collect a urine sample which appears grossly red in colour.

Answer **all** parts of this question:

- a) List the **four (4)** most common causes of pigmenturia and the differential diagnoses for **each**. (8 marks)

- b) For the causes you listed, describe your diagnostic approach for determining the aetiology and list the abnormalities you would be looking for at **each** stage. (15 marks)

- c) The patient's pigmenturia develops into a port wine colour. Discuss your concerns and how you would manage this situation. (7 marks)

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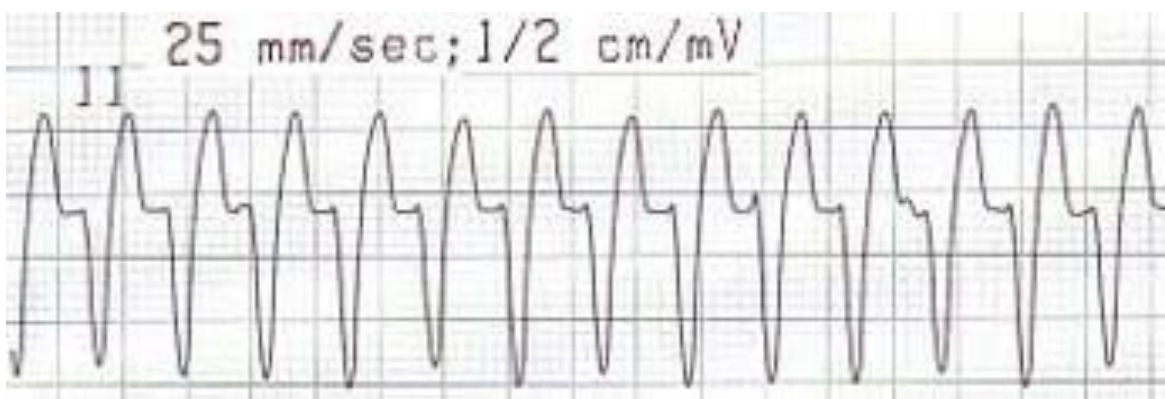
2. A 10 kg male neutered Jack Russell terrier presents to you after being observed by the owner to be acting strangely. The owner describes the animal as agitated, salivating, uncoordinated and disorientated in their bedroom after being left at home alone for the last hour.

The dog vomits and passes diarrhoea in the consultation room. Foil from an antidepressant medication package is identified in the vomit.

Examination reveals a heart rate of 180 bpm, respiratory rate of 36 bpm, temperature of 40.7°C, mean arterial pressure of 180 mmHg, mydriatic pupils and muscle tremors.

Answer **all** parts of this question:

- a) What is the most likely cause of this patient's symptoms? (2 marks)
- b) List **two (2)** drugs (**each** from a different drug class) that could be responsible for this dog's current symptoms. For **each** drug, outline its mechanism of action. (4 marks)
- c) Outline the initial diagnostic tests you will perform, with a brief explanation for **each**. (4 marks)
- d) Outline an appropriate management plan for this patient over the next 12 hours. (16 marks)
- e) In the intensive care unit (ICU), the patient develops a heart rate of 230 bpm. You perform an electrocardiogram (ECG), (see below). Interpret the ECG and describe the management required. (4 marks)



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3. A four-year-old female spayed Miniature schnauzer presents with a seven day history of lethargy and reduced appetite. She weighs seven kilograms on presentation. On physical exam she has a dull demeanour, pale/yellow gums, a heart rate of 160 bpm, a grade 2/6 murmur and an enlarged spleen.

Your initial complete blood count (CBC) and biochemistry results are below and a saline agglutination test is positive.

Parameter	Value	Normal range	Units
RBC	0.69 L	5.5–8.5	$\times 10^{12}/L$
HCT	13 L	37–55	%
RETIC	140 H	10–110	$\times 10^3/L$
WBC	22.31 H	5.5–16.9	$\times 10^9/L$
NEU	18.12 H	2–12	$\times 10^9/L$
MONO	2.17 H	0.3–2	$\times 10^9/L$
PLT	358	175–500	$\times 10^9/L$
CREA	172 H	44–159	mmol/L
TP	94 H	52–82	g/L
ALB	36	23–40	g/L
ALKP	78	23–212	U/L
TBIL	25 H	0–15	$\mu\text{mol}/L$
Lactate	>15.0 H	<2	mmol/L
HCO_3^-	11.2 H	24–26	mmol/L

Answer **all** parts of this question:

- List the abnormalities from this dog's physical examination and blood test results. (4 marks)
- What is your presumptive diagnosis? (1 mark)
- Briefly describe how to perform a saline agglutination test. (2 marks)
- Describe the changes you would expect to see on examination of a blood smear from this patient. (3 marks)
- List any further diagnostics that you would recommend and give a reason for **each** of the tests that you have listed. (6 marks)

Question 3 continued over page

- f) Would you give a blood transfusion to this patient? Justify your answer. *(4 marks)*
- g) Calculate the volume of packed red blood cells needed to raise this dog's HCT to 30%. *(2 marks)*
- h) Briefly describe transfusion related acute lung injury, as it relates to your monitoring of this patient. *(3 marks)*
- i) Discuss your medical management of this patient once it has been stabilised. In your answer discuss the reasons for your choices. *(5 marks)*

4. A two-year-old female spayed Staffordshire bull terrier presents for collapse. She collapsed following a walk and was immediately brought to the clinic. On physical examination her heart rate is 160 bpm, the capillary refill time is >2 seconds. She is panting with a marked stridor. Her body temperature is 42.3°C.

Answer **all** parts of this question:

- a) Describe your approach to the management of this patient in the first five minutes following presentation. *(9 marks)*
- b) List **five (5)** body systems that are affected in a dog with heat stress. *(2 marks)*
- c) For the five body systems listed in 4 b), describe how you would monitor for dysfunction. *(15 marks)*
- d) Describe the support and management of dysfunction in **two (2)** of the body systems mentioned in 4 c). *(4 marks)*

End of paper