



Australian and New Zealand College of
Veterinary Scientists

Membership Examination

June 2022

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 (4)** questions, each worth 30 marks.....total 120 marks

Answer all four (4) questions

1. Answer all parts of this question:

- a) Define the term thrombosis. (1 mark)
- b) List the 4 mechanisms of thrombosis. (2 marks)
- c) List 4 common conditions that increase the risk of thrombosis. (2 marks)
- d) Antithrombotics are used to reduce the risk of thrombosis. List 5 such medications and describe their mode of action. (5 marks)
- e) Describe the pathogenesis of prostatic abscess development (including host defences) and progression to sepsis. (6 marks)
- f) List four common genera (genuses) of bacteria found in a prostatic abscess. (2 marks)
- g) List a combination of two antibiotics from different classes likely together to be effective against the organisms mentioned above. For each antibiotic describe their mode of action and a common adverse effect. (3 marks)
- h) List 4 risk factors for developing antimicrobial resistance. (2 marks)
- i) Describe the factors that should be considered in antimicrobial selection. (7 marks)

2. Answer all parts of this question:

- a) Briefly describe the sources of glucose within the body. (3 marks)
- b) Describe the 3 key mechanisms of hypoglycaemia. For each mechanism use at least two causes as examples. (12 marks)
- c) Explain why the central nervous system is particularly susceptible to hypoglycaemia. (5 marks)
- d) Outline the two proposed mechanisms of action of intralipid emulsion therapy. (6 marks)
- e) List four complications of intralipid emulsion therapy. For each provide a strategy to prevent that complication. (4 marks)

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3. Answer all parts of this question:

- a) Describe the phases of wound healing. (12 marks)
- b) With regards to wound management, define 4 methods of wound closure. For each method, give one example of a type of wound where this form of wound closure is most appropriate. (8 marks)
- c) Define anaphylaxis. (1 mark)
- d) Describe the cellular components of IgE-mediated anaphylaxis and how this results in clinical signs of anaphylaxis. (6 marks)
- e) Histamine acts through receptors H1, H2 and H3. For each receptor provide an example of how activation contributes to severe illness in anaphylaxis. (3 marks)

4. Answer all parts of this question:

- a) Describe the pathogenesis of hepatic encephalopathy. (10 marks)
- b) List 5 treatments used in the management of hepatic encephalopathy. For each treatment listed, describe the mode of action. (10 marks)
- c) In point form, explain how cortisol production is regulated in the body. Include in your answer the organs and hormones that are involved, and how they interact with one another. (6 marks)
- d) List the clinicopathological changes that may be observed in a dog in crisis from primary hypoadrenocorticism. For each change, indicate if the change is due to mineralocorticoid or glucocorticoid deficiency. (4 marks)

End of paper



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Veterinary Emergency and Critical Care Paper 2

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

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

Answer **ALL FOUR (4)** questions

Answer **FOUR (4)** questions, each worth 30 marks.....total 120 marks

Answer all four (4) questions

1. A 4-year-old male desexed Border Collie presents to the emergency room after falling from 2 stories. The patient presents in sternal recumbency.

Physical examination reveals the following:

Mentation:	Alert and responsive
Heart rate:	160 beats/minute
Pulse quality:	Poor
Mucous membranes:	Pale, cyanotic
Capillary refill time:	2 seconds
Respiratory rate:	60 breaths/minute
Lung auscultation:	Dull
Temperature:	37.0°C
Musculoskeletal:	Bilateral distal radius ulnar open fractures
Body weight:	10kg

The remainder of your clinical examination was unremarkable

Answer **all** parts of this question.

- a) Describe the clinical management of this patient during the first 30 minutes and justify your choices. (12 marks)

The dog has been stabilised in the ICU for 1 hour. You notice that the patient is increasingly tachycardic, tachypnoeic and pale. There is constant haemorrhage through the bandages from the fractures and venepuncture sites. You also notice ecchymoses over the forelimbs and ventral abdomen. The patient's blood work was repeated, and the results are as follows.

PCV	18%
TP	38g/L, serum clear
ACT	90 seconds (60-90 seconds)
Lactate	6.0mmol/L (< 2.0 mmol/L)
Platelets	210 x 10 ⁹ /L (200-900)

- b) Based on the results above, what is the most likely clinical pathological cause of haemorrhage? (1 mark)
- c) Based on the results above, describe your treatment plan for the subsequent 6 hours. Include in your answer justifications and calculations. (8 marks)

While receiving the treatment described in part c, the patient develops the following clinical signs.

Heart Rate:	140 beats/minute
Respiratory rate:	30 breaths/minute
Temperature:	40.0°C
Pulse oximetry:	98%

- d) List 3 possible causes for these changes. (3 marks)
- e) Describe how you would differentiate between the 3 causes listed in part d. Include in your answer any diagnostic tests required. (6 marks)

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2. Answer all parts of this question:

- a) Describe the cardiac and thoracic pump theories for cardiopulmonary resuscitation (CPR) and indications for use. (8 marks)
- b) Discuss intravenous fluid administration during CPR. (5 marks)
- c) Following successful CPR, you achieve return of spontaneous circulation (ROSC). Explain your treatment goals for treating a post-arrest patient. Do not include treatments in your answer. (7 marks)

A 4-year-old female desexed German Shepherd presents with pericardial effusion.

- d) List 3 common diagnostic tests that you can run to assess for the presence of a pericardial effusion. For each test, list the findings that correlate to a pericardial effusion, and comment on the sensitivity of the test. (6 marks)
- e) Discuss why, prior to pericardiocentesis, IV fluids might be indicated as a treatment in patients with pericardial effusion. (2 marks)
- f) List 4 common causes for a haemorrhagic pericardial effusion. (2 marks)

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3. A 2-year-old female desexed Kelpie presents to the clinic on a hot summer day. The owner has witnessed the dog biting and killing a snake. The dog vomited shortly after the event and collapsed onto the ground but has since stopped vomiting. It is ambulatory on presentation.

Physical examination reveals the following:

Mentation	Quiet, alert and responsive
Heart rate	160 beats/min
Respiratory rate	80 breaths/min
Temperature	38.8°C
MM colour	Pink
CRT	1s
Pulse quality	Good
SpO2	95% on room air
Other findings	Bilateral mydriasis, absent pupillary light responses. Bilateral hindlimb ataxia

Answer **all** parts of this question.

- Describe your management of the patient in the first hour of presentation. In your answer provide a brief reason for including any treatments and/or diagnostics you wish to perform. (10 marks)
- List the 3 most likely causes for snake envenomed patients to develop hypoxaemia and 3 diagnostic tests to differentiate between these causes. (3 marks)

You obtain the following blood test results from this patient:

Venous blood gas

Parameter	Units	Result	Reference Range
pH		7.233	7.35 – 7.450
pCO ₂	mmHg	67.0	35.0 – 40.0
HCO ₃	mmol/L	20.4	20.0 – 24.0
Standard Base Excess	mmol/L	-3.8	-4 – 0

- Explain the abnormalities on the venous blood gas obtained from the patient tabled above and provide the most likely cause of these changes. (2 marks)
- Describe your management of this patient in the subsequent 6 hours. Include any medications, nursing care, equipment, and settings of any equipment you wish to use. (12 marks)
- What is venom-induced consumption coagulopathy and which common Australian snake species have venom that can cause this syndrome? (3 marks)

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4. A 1-year-old male neutered cat is presented to your hospital after a heavy container falls onto his head.

The owners report that he had a brief generalised seizure shortly after the trauma.

On presentation he is obtunded, in lateral recumbency and breathing with poor respiratory excursions.

There is a deep laceration to his ventral neck.

His initial vital signs are as follows:

Heart Rate	190 beats/min
Respiratory Rate	10 breaths/min
Mucous membranes	Pink
Capillary refill time	2 seconds
Blood pressure:	80mmHg (mean)
Temperature	35.8°C

There is no evidence of significant haemorrhage.

Answer **all** parts of this question.

- a) Outline your initial patient management in the first 1-2 hours following presentation. Provide reasoning for your choices. Your answer for this question should NOT include diagnostics, monitoring, or dose rates. (13 marks).

Two hours later, the patient is comatose with extensor rigidity of all 4 legs and dorsal flexion of the neck.

- b) What is the name of the cat's body posture when combined with this mentation? (1 mark)
- c) What does this body posture indicate in terms of lesion localisation and prognosis? (1 mark)
- d) Briefly describe how the Modified Glasgow Coma Scale (MGCS) is used in the assessment of traumatic brain injury in dogs. (2 marks)
- e) List the categories of examination used by the Modified Glasgow Coma Scale. Describe the examination findings that correspond with the least and most abnormal findings in these categories. Specific numerical values used in this system are not required in your answer. (4 marks)

You are presented with a 2-year-old female desexed Kelpie in respiratory distress 20 minutes after falling into an ocean rock pool with an estimated submersion time of 20 seconds.

The patient has a respiratory rate of 60 breaths per minute, marked inspiratory dyspnoea and an SpO₂ of 94% with flow by oxygen supplementation.

- f) List the three most important diagnostics you would use in the first hour.

For each test briefly justify your answer. (3 marks)

The patient has deteriorated despite initial treatment and is now intubated and is breathing 100% oxygen. You obtain the following arterial blood gas sample.

Parameter	Abbreviation	Units	Result	Reference Range
pH			7.22	7.35 - 7.45
Partial pressure arterial O ₂	PaO ₂	mmHg	190	85 - 100
Partial pressure arterial CO ₂	PaCO ₂	mmHg	40	36-44
Bicarbonate	HCO ₃	mmol/L	10.2	15 - 23
Base Excess	BE	mmol/L	- 9	-5 - 0

- g) Interpret these results. (5 marks)
- h) What SpO₂ would you expect from this sample? Justify your answer. (1 mark)

End of paper