



# Australian and New Zealand College of Veterinary Scientists

## Membership Examination

June 2015

# Veterinary Anaesthesia 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 Anaesthesia and Critical Care

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Answer all four (4) questions

1. Compare the use of buprenorphine, tramadol and gabapentin for analgesia in dogs. Include in your answer the mechanisms of action, indications, contraindications, side effects and routes of administration for **each** drug. (30 marks)
  
2. With regard to a healthy (ASA 1) cat that has suffered a cardiac arrest during general anaesthesia for an elective surgical procedure:
  - a) Describe how you would perform external cardiac compressions and discuss how you would assess the efficacy of your compressions. (10 marks)
  
  - b) Discuss further life support measures you would utilise in this case. (10 marks)
  
  - c) Name **four (4)** drugs that you would choose to have in your cardiopulmonary cerebral resuscitation (CPCR) kit and justify your selection. (10 marks)
  
3. Regarding halogenated anaesthetic agents, answer **all** of the following:
  - a) Define MAC. (2 marks)
  
  - b) Briefly explain the relevance of MAC to clinical anaesthesia. (2 marks)
  
  - c) List the MAC of isoflurane, sevoflurane and desflurane in dogs **and** horses. (3 marks)
  
  - d) Discuss the factors that affect the speed of uptake of isoflurane, sevoflurane and desflurane across the alveolar membrane. (17 marks)
  
  - e) Briefly discuss the options available **and** the limitations of **each** option for removal of waste anaesthetic gas from the working environment (i.e. scavenging). (6 marks)

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4. With regard to the use of capnography for monitoring anaesthetised animals:
- a) Discuss the interpretation of the information provided by capnography and the limitations of this monitoring tool. *(15 marks)*
  - b) Draw **and** label a normal capnogram. *(5 marks)*
  - c) Draw a capnogram from an animal that is rebreathing carbon dioxide. *(2 marks)*
  - d) Discuss potential causes of rebreathing of carbon dioxide. *(8 marks)*

**End of paper**



# Australian and New Zealand College of Veterinary Scientists

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June 2015

## Veterinary Anaesthesia and Critical Care 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

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# Paper 2: Veterinary Anaesthesia and Critical Care

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Answer all four (4) questions

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

- a) Describe how you would complete these **three (3)** regional anaesthetic techniques (diagrams may be used):
  - i. Epidural in a cow. (6 marks)
  - ii. Intravenous regional anaesthesia of the forelimb in a goat. (6 marks)
  - iii. Brachial plexus in a dog. (6 marks)
- b) Briefly discuss the diagnosis and management of local anaesthetic toxicity in a conscious animal. (6 marks)
- c) Briefly discuss the prevention of local anaesthetic toxicity. (6 marks)

2. A 14-day-old female 50 kg Arabian foal is presented with acute onset lameness of the right forelimb and distension of the right front fetlock joint. The foal is reported to have been normal at birth and no other problems have been apparent until the onset of lameness sometime in the last 48 hours.

Physical exam findings are:

Mentation is dull and she is reluctant to stand.

Heart rate: 160 bpm (regular, with no audible murmurs)

Respiratory rate: 32 rpm

Rectal temperature: 35.8°C

Mucous membranes: pale pink but tacky

Peripheral pulses: regular but weak

Jugular veins fill slowly

Prolonged skin recoil/tenting

Breathing appears normal and auscultation of the respiratory tract is unremarkable

No other abnormalities are noted on physical examination.

**Question 2 continued over page**

Immediately after the initial examination a venous blood sample is obtained for haematology and biochemical analysis (results are given in Table 1 below). Arthrocentesis of the right front fetlock joint provided synovial fluid analysis which is indicative of synovial sepsis.

It is anticipated that the foal will require general anaesthesia to allow arthroscopic exploration and lavage of the fetlock joint.

Table 1:

	<b>Value</b>	<b>Reference Range</b>	<b>Unit</b>
<b>RBC</b>	14.0	6.5–12.5	x 10 <sup>12</sup> /L
<b>Hb</b>	190	110–170	g/L
<b>HCT</b>	0.52	0.28–0.46	L/L
MCV	38	35–44	fL
MCH	14	12–16	pg
MCHC	360	320–400	g/L
Platelets	200	100–500	x 10 <sup>9</sup> /L
<b>WBC</b>	18.7	5.2–12.0	x 10 <sup>9</sup> /L
Neutrophils	12.4	3.2–8.0	x 10 <sup>9</sup> /L
Band Neutrophils	3.6	0–0.4	x 10 <sup>9</sup> /L
Lymphocytes	2.5	0.7–3.1	x 10 <sup>9</sup> /L
Monocytes	0.2	0.0–0.6	x 10 <sup>9</sup> /L
Eosinophils	0.0	0.0–0.8	x 10 <sup>9</sup> /L
Basophils	0.0	0.0–0.3	x 10 <sup>9</sup> /L
Fibrinogen	6.5	1.0–4.0	g/L
<i>Red blood cell and platelet morphology appear normal; Neutrophils show moderate toxic changes</i>			
AST	180	150–220	U/L
GGT	45	<73	U/L
Bilirubin	48	46–72	µmol/L
CK	420	50–450	U/L
Creatinine	150	80–160	µmol/L
Urea	8.0	2.5–9.3	mmol/L
Glucose	2.8	3.5–6.5	mmol/L
Serum Protein	78	50–70	g/L
Albumin	40	28–35	g/L
Globulins	38	26–40	g/L
Calcium	3.0	2.50–3.60	mmol/L
Phosphate	1.80	1.47–1.83	mmol/L
Sodium	135	131–140	mmol/L
Potassium	3.0	2.8–4.7	mmol/L
Na:K Ratio	45	>29	
Chloride	100	95–102	mmol/L
Bicarbonate	21	23–32	mmol/L

**Question 2 continued over page**

Answer **all** parts of question 2:

- a) Answer **both** of the following sub-questions: *(10 marks)*
- i. Based on the clinical examination and blood results, describe the foal's hydration and hemodynamic status.
  - ii. Describe a fluid therapy plan to achieve hemodynamic stabilisation prior to surgery. Include in your answer quantification of fluid deficits; the fluid or fluids you would use; the rates and volumes of fluid to be administered.
- b) Describe how you would assess the effectiveness of your therapy described in part 2 a). *(5 marks)*
- c) Assuming there are no equipment or cost constraints, list monitoring techniques or tests that could be used to assess the foal's response to the therapy you have instituted in part 2 a). *(5 marks)*
- d) Based on the clinical examination and blood results, list any other clinical problems **not** given in 2 a) that will require treatment prior to anaesthesia. Describe your treatment of these problems and the extent to which the abnormalities should be corrected so as to stabilise the foal prior to surgery.  
*(10 marks)*

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3. A two-year-old 30 kg male mixed breed dog has been anaesthetised for elective surgery. It has no prior health problems. No abnormalities were found on physical examination and preoperative packed cell volume, total plasma protein and blood urea nitrogen were within the normal ranges. The dog was premedicated with acepromazine (0.6 mg) and methadone (10 mg) by intra-muscular injection. General anaesthesia was induced with intravenous propofol (75 mg) and is being maintained with isoflurane in oxygen via a circle breathing system. An intravenous cannula is in place and used to infuse Hartmann's solution at 10 mL/kg/h. Monitoring equipment includes an oscillometric blood pressure monitor with the cuff attached to the left forelimb, ECG, oesophageal temperature, pulse oximetry and capnography.
- Approximately 20 minutes after induction of anaesthesia and prior to the start of surgery, hypotension has developed (mean arterial blood pressure 45 mmHg; systolic/diastolic arterial blood pressures 75/30 mmHg).

Answer **both** parts of this question:

- a) List the potential causes of the low blood pressure measurement in this case. *(12 marks)*
- b) Explain your approach to management of hypotension in this case. *(18 marks)*
4. Injuries such as fractures and lacerations may occur during recovery from general anaesthesia in horses.
- Discuss the ways in which the risk of these injuries may be minimised. *(30 marks)*

**End of paper**