



# Australian and New Zealand College of Veterinary Scientists

## Membership Examination

June 2016

# 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 and contrast intra-muscular injection and inhalational administration for the induction of general anaesthesia. Include in your answer the advantages and disadvantages, potential risks, types of drugs that may be used and equipment that may facilitate **each** delivery method. (30 marks)
  
2. Answer **all** parts of this question:
  - a) Outline the age related considerations for general anaesthesia in:  
(Your answer should include but not be limited to cardiovascular and respiratory considerations.)
    - i. The neonatal kitten (1–2 weeks). (5 marks)
    - ii. The senior/geriatric cat (last 25% of age expectancy). (5 marks)
  
  - b) Answer **all** parts of this sub-question:
    - i. What is the definition of pain? (2 marks)
    - ii. Pain assessment often relies on clinical and behavioural indicators of pain which can vary between species. List **five (5)** pain related behaviours for the dog. (5 marks)
    - iii. List **three (3)** pain related behaviours for the horse. (3 marks)
    - iv. Draw the pain pathway from noxious stimulation to the conscious pain perception. (4 marks)
    - v. On the pathway mark a location where the following drugs have an analgesic effect. (1 mark each, 6 marks total)
      - non-steroidal anti-inflammatory
      - ketamine
      - systemic opioid
      - alpha 2 adrenoreceptor agonist
      - tramadol
      - local anaesthetic

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3. With regard to the use of pulse oximetry for monitoring anaesthetised animals.

Answer **all** parts of this question:

- a) Discuss the information provided by a pulse oximeter, the mechanism by which this information is obtained and the limitations of this monitoring tool. *(10 marks)*
- b) Describe the changes you would expect to see on a pulse oximeter when an animal is suffering from hypoxaemia. Include in your answer the measurements that would indicate hypoxaemia and how these would relate to the partial pressure of oxygen in arterial blood. *(5 marks)*
- c) Discuss potential causes of hypoxia during general anaesthesia. *(10 marks)*
- d) List other monitoring **devices** which may be useful for assessing respiratory function in anaesthetised animals. *(5 marks)*

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

a) Define the following:

- i. osmolarity (3 marks)
- ii. osmotic pressure (3 marks)
- iii. tonicity (3 marks)
- iv. oncotic pressure (3 marks)
- v. hydrostatic pressure. (3 marks)

b) Compare and contrast Hartmann's and 0.9% sodium chloride (your answer may include physical characteristics and clinical applications/contraindications).  
(6 marks)

c) Synthetic and natural colloid fluids are used in veterinary medicine:

- i. List the physical characteristics of a colloid fluid. (2 marks)
- ii. Briefly describe properties of colloids that allow long acting expansion of the vascular space. (2 marks)
- iii. Fresh frozen plasma is a natural colloid. List the indications for the use of fresh frozen plasma in the dog. (2 marks)
- iv. List **three (3)** potential side effects of synthetic colloids. (3 marks)

**End of paper**



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## 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

## Paper 2: Veterinary Anaesthesia and Critical Care

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### Answer all four (4) questions

1. A 10-year-old 25 kg entire female Labrador retriever is presented for surgical repair of a fractured radius and ulna. The owner reports that prior to the injury the dog had shown no signs of ill health. The fracture occurred when the dog was kicked by a horse and there are no other physical injuries or abnormalities detected on physical examination.

As part of your preparation of this dog for anaesthesia and surgery a pre-anaesthetic blood panel is obtained (results are given in table 1 below).

It is anticipated that the dog will need to be anaesthetised for approximately two to three hours for surgery.

Table 1. Pre-anaesthetic blood panel (canine):

	Value	Reference Range	Unit
PCV	0.50	0.37–0.55	L/L
ALT	28	0–58	U/L
ALP	71	0–185	U/L
Creatinine	245	75–138	µmol/L
Urea	24.2	2.5–8.4	mmol/L
Glucose	4.8	3.2–6.5	mmol/L
Serum Protein	80	52–80	g/L
Albumin	38	24–40	g/L
Globulins	42	28–42	g/L

Answer **all** parts of this question:

- a) Based on the history, signalment, physical exam and laboratory findings make an assessment of the dog's anaesthetic risk, including assigning an American Society of Anaesthesiologists (ASA) rating. (2 marks)
- b) List complications that are likely to be encountered if this dog is anaesthetised in its current condition. (8 marks)
- c) Outline and briefly justify an appropriate plan for further evaluation, pre-operative stabilisation and anaesthesia of this patient. (20 marks)

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2. A three-day-old male Thoroughbred foal presents at your practice recumbent and unable to stand. It has a distended abdomen and has not been seen to urinate.

On physical examination the foal is tachycardic with a heart rate of 160, and tachypnoeic with a respiratory rate of 60. Mucous membranes are injected and tacky with a CRT of two seconds. Results from blood work are shown below.

Abdominocentesis reveals a straw coloured fluid that smells like urine.

	<b>Patient result</b>	<b>Reference range</b>	<b>Units</b>
HCT	40%	0.28–0.46	
HGB	105	107–168	g/L
WBC	12.5	5.2–12.0	x 10 <sup>9</sup> /L
Neutrophils	9.4	3.2–10.6	x 10 <sup>9</sup> /L
Lymphocytes	1.7	0.7–3.1	x 10 <sup>9</sup> /L
Monocytes	1.4	<0.7	x 10 <sup>9</sup> /L
Eosinophils	0	<0.2	x 10 <sup>9</sup> /L
Basophils	0	<0.2	x 10 <sup>9</sup> /L
Platelets	233	100–500	x 10 <sup>9</sup> /L
Alb	20	25–34	g/l
ALP	1755	<2301–foals	U/L
AST	887	<215	U/L
Glucose	4.5	4.5–6.5	mmol/L
Urea	15	2.5–9.3	mmol/L
Creat	300	70–200	µmol/L
Ca	2.25	0.28–0.46	mmol/L
GGT	51	<74	U/L
Glob	15	25–36	g/l
Phos	1.61	1.47–3.00	mmol/L
Bili	116	46–72	µmol/L
TP	52	49–70	g/l
Na <sup>+</sup>	112	131–140	mmol/L
K <sup>+</sup>	5.8	3.3–4.4	mmol/L
Cl <sup>-</sup>	88	86–101	mmol/L

Based on the findings above, answer **both** parts of this question:

- List the abnormalities and most likely differential diagnosis. (5 marks)
- Describe and justify the appropriate management of this case (include pre-operative, intra-operative and post-operative management). (25 marks)

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3. Describe your considerations for anaesthesia for dehorning **each** of the animals listed below. Include in your answer an appropriate plan for providing restraint, anaesthesia (regional or general) and post-operative analgesia:

a) Two-year-old Brahman bull which has had very little handling. (10 marks)

b) Six-month-old Merino ram that is kept as a pet. (10 marks)

c) A two-week-old goat kid which has never been handled. (10 marks)

4. Answer **both** parts of this question:

a) A five-year-old female lop rabbit presents for ovariohysterectomy. Outline the potential anaesthetic complications and anaesthetic management of this case. (10 marks)

b) You are working in a rural small animal practice. On a quiet day the practice owner asks if you could 'tidy up' the emergency drug box and make it a bit more 'user friendly'. He also asks you to put together a flow chart that can be used by both vets and nurses during CPR.

Answer **both** parts of this sub-question:

i. List the drugs that you would like in your emergency drug box, for **each** drug state when you would use it, and what effect you would expect the drug to have. (10 marks)

ii. Create a flow diagram to be used during CPR in small animal practice. Include in your answer guidelines for both basic and advanced life support that are able to be followed by both vets and nurses. (10 marks)

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