



Australian College of Veterinary Scientists

## Membership Examination

June 2011

## Veterinary Anaesthesia and Critical Care

### Paper 1

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

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

Answer your choice of any **FOUR (4)** questions from the six questions **ONLY**

All six main questions are of equal value

Answer **FOUR** questions each worth 25 marks .....total 100 marks

# Paper 1: Veterinary Anaesthesia and Critical Care

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Answer your choice of any **FOUR (4)** questions from the six questions **ONLY**.

1. Answer **all** subparts of this question concerning thermoregulation in animals:
  - a) Briefly describe the **normal** control of body temperature in mammals. *(5 marks)*
  - b) Describe how thermoregulation is affected by anaesthesia and surgery. *(10 marks)*
  - c) Discuss methods for minimising peri-operative heat loss. *(10 marks)*
  
2. The construction of anaesthetic machines varies, but their safe function relies on a minimum number of fundamental components being present, and arranged in the appropriate sequence. Answer **all** subparts of this question:
  - a) Identify the main components of the anaesthetic machine, **excluding** the anaesthetic breathing system. *(5 marks)*
  - b) For **each** of the following components of the breathing system; explain the function of the component (noting the effect of patient size on the function of the component) and discuss the potential problems that can occur:
    - i. rebreathing bag *(5 marks)*
    - ii. the 'Y' piece and the inspiratory and expiratory hose of a circle system *(5 marks)*
    - iii. adjustable pressure limiting (APL or 'pop off') valve *(5 marks)*
    - iv. inspiratory unidirectional valve. *(5 marks)*
  
3. Compare the pharmacology of thiopental, propofol and alfaxalone for the induction and maintenance of anaesthesia in dogs. Consider the availability of different formulations in your response. Tables may be used to facilitate the presentation of your response. *(25 marks)*

**Examination continued on next page**

4. Most features of cardiovascular function are affected by anaesthetics, anaesthesia and surgery including mean arterial blood pressure. Answer **all** subparts of this question:
- Explain how arterial blood pressure is controlled in the healthy, conscious animal. Briefly discuss the alterations in blood pressure that can occur during anaesthesia for non-invasive procedures, e.g. radiographic examination. Cite the values for normal, excessively high and inadequate blood pressure. (10 marks)
  - Detail how you would identify and treat critical hypotension during anaesthesia in a small animal patient. (10 marks)
  - Briefly discuss the pharmacology and use of dobutamine and dopamine for the management of hypotension. (5 marks)
5. Alpha-2-receptor agonists are commonly used as sedatives and anaesthetic adjuncts in veterinary practice. Answer **all** subparts of this question:
- Detail the cardiovascular effects of  $\alpha_2$  agonist drugs and their probable causes. (10 marks)
  - Describe the main non-cardiovascular pharmacological effects of  $\alpha_2$  agonist drugs. (10 marks)
  - Discuss the indications and contraindications of  $\alpha_2$  agonists in horses, cattle, sheep and dogs. (5 marks)
6. Intermittent positive pressure ventilation (IPPV) is often used to manage the respiratory depression encountered during anaesthesia. Answer **all** subparts of this question:
- Discuss the pharmacological and non-pharmacological causes of respiratory depression in anaesthetised animals. (15 marks)
  - List the circumstances in which you would recommend the use of IPPV (referring to both manual and mechanical ventilation). Explain the adverse physiological effects of IPPV and how these may be minimized. (10 marks)

**End of paper**



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### Paper 2

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

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

Answer your choice of any **FOUR (4)** questions from the six questions **ONLY**

All six main questions are of equal value

Answer **FOUR** questions each worth 25 marks ..... total 100 marks

# Paper 2: Veterinary Anaesthesia and Critical Care

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Answer your choice of any **FOUR (4)** questions from the six questions **ONLY**.

1. Identify the anaesthetic monitoring equipment which you would recommend that a small animal veterinary practice should purchase. Assume that in the practice the most widely used technique involves inhalational anaesthesia after pre-anaesthetic medication with  $\alpha_2$  agonist drugs. For **each** piece of monitoring equipment; describe its basic function, the reason(s) for your recommendation, and its potential limitations/errors. (25 marks)
  
2. A six-year-old, 65 kg, female Irish wolfhound is presented to your clinic with a two-week history of exercise intolerance and lethargy. Physical examination reveals a heart rate of 168 beats per minute, barely palpable peripheral pulses and muffled heart sounds. The mucous membranes are a pale grey (almost mauve) colour. The dog is barely able to sustain normal head carriage and collapses as she enters the clinic. An ECG reveals a sinus tachycardia and all three leads show markedly dampened (low voltage) QRS complexes. Thoracic auscultation indicates the presence of a large amount of fluid in the pericardial sac. You have an ultrasound machine and diagnose a pericardial effusion. Answer **all** subparts of this question:
  - a) Briefly describe your immediate management of this dog (**prior** to you knowing the diagnosis of pericardial effusion). (10 marks)
  - b) Describe how you would sedate or anaesthetise this dog for draining the pericardial sac. Detail the anaesthetics and techniques you would use. Provide a brief description of the expected and potential complications and the monitoring equipment you would use. Indicate how you would determine the response to therapy. **Do not** detail the technique of pericardial fluid drainage. (15 marks)
  
3. 'Low flow' and 'closed circuit' anaesthesia are favoured by some anaesthetists using rebreathing systems. Answer **all** subparts of this question:
  - a) Discuss the advantages and disadvantages of **both** these techniques. (10 marks)
  - b) Describe in detail how **both** these techniques may be applied (specifying flows and vaporizer settings) in a 20 kg dog using a circle breathing system with:
    - i. a precision (out of circuit) vaporiser (10 marks)
    - ii. a non-precision (in circuit) vaporiser. (5 marks)

**Examination continued on next page**

4. Epidural anaesthesia utilising local anaesthetics is commonly used in dogs and cats in combination with general anaesthesia to reduce nociceptive stimulation during surgery. Answer **all** subparts of this question:
- Describe the technique(s) used for performing epidural anaesthesia in dogs and cats. (5 marks)
  - Describe the pharmacology, including doses, of local anaesthetics used for epidural injection in small animals. (10 marks)
  - Identify the precautions and contraindications for epidural anaesthesia. (2½ marks)
  - Identify the potential complications of epidural anaesthesia, and their management. (7½ marks)
5. General anaesthesia in horses and cattle is complicated by their size and other species-related adaptations. You are presented with a 550 kg thoroughbred mare for arthroscopy and the removal of a bone fragment from the femoro-tibial (stifle) joint. Answer **all** subparts of this question:
- Describe the anaesthetic management of this case; detailing your principal concerns and considerations, the drugs that you would use, and the physiological variables you would monitor. (20 marks)
  - Compare the management of this horse with that of a 400 kg adult pedigree Jersey cow presented for the removal of a bone sequestrum in the same joint. Emphasise the differences in your technique that result mainly from differences in species. (5 marks)
6. A five-year-old, 4.5 kg, female, domestic shorthaired-cat is presented after 'being lost' for one week. On presentation the cat is 'open mouth' breathing and her respiratory rate is 50 breaths per minute. There are reduced lung sounds on *both sides* of the thorax. There is evidence of 'old' trauma; i.e. hair loss over the thoraco-abdominal region, healed superficial lacerations, bruising of the skin, and shredded claws. You radiograph the cat's thorax as you suspect a diaphragmatic hernia. Radiographs reveal a diaphragmatic hernia with intestines, liver and stomach within the thoracic cavity. Answer **all** subparts of this question:
- Describe the measures you would have taken to stabilise the cat **before** radiography. (5 marks)
  - Describe the anaesthetic management of this case for radiographs and for the surgical repair of the hernia. (20 marks)

**End of paper**