

Australian College of Veterinary Scientists
Fellowship Examination

June 2011

Veterinary Anaesthesia and Critical Care
Paper 1

Perusal time: **Twenty (20)** minutes

Time allowed: **Three (3)** hours after perusal

Answer **ALL TEN (10)** questions

In some questions you must choose which subparts to answer. All choices are of equal value.

Ten questions each worth 10 marks.....total 100 marks

Paper 1: Veterinary Anaesthesia and Critical Care

Answer **ALL** TEN (10) questions.

1. Define and briefly describe the application in anaesthesia of **each** of the following:
(2½ marks each)
 - a) the Fick principle
 - b) the Beer-Lambert law
 - c) the Hagen-Poiseuille equation
 - d) Charles', Boyle's and Henry's gas laws.

2. List **ten (10)** features of an anaesthetic machine that prevent the delivery of a hypoxic gas mix to the patient. *(10 marks)*

3. Choose **four (4)** of the following drugs and list the class of drug, its mode of action and an indication for use: *(2½ marks each)*
 - a) sugammadex
 - b) dexmedetomidine
 - c) amantadine
 - d) pimobendan
 - e) ephedrine.

4. List the factors that contribute to the risk of explosion in an anaesthesia preparation room or theatre environment. For **each** risk factor explain how to minimise or prevent this danger. *(10 marks)*

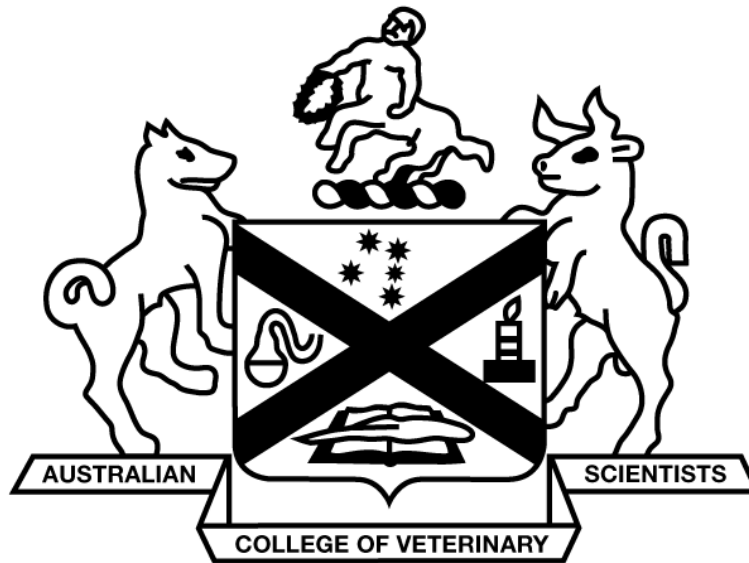
Examination continued on next page

5. Define **four (4)** of the following statistical concepts and briefly explain how they are used: *(2½ marks each)*
- confidence interval
 - p-value
 - normally distributed/parametric data
 - statistical power
 - the 3 R's of scientific research.
6. Answer **all** subparts of this question:
- List **four (4)** metabolic abnormalities that occur in dogs with liver insufficiency. Discuss how these changes affect the anaesthetic management of the animal. *(4 marks)*
 - Describe the hormonal and metabolic changes associated with the stress response. *(6 marks)*
7. Answer **all** subparts of this question:
- Briefly outline the mechanisms that regulate cerebral blood flow. Discuss how abnormalities in each of these mechanisms alter blood flow in the normal and abnormal brain. *(4 marks)*
 - Define 'coronary steal' and 'ischaemic preconditioning'. *(2 marks)*
 - Outline the direct and indirect hormone response mediated by the kidney in response to hypotension. Describe how each of the hormones released act to restore blood pressure. *(4 marks)*
8. Answer **all** subparts of this question: *(2½ marks each)*
- Describe the anatomy of the epidural space. You may produce a labelled drawing if you wish.
 - Outline species differences in epidural administration.
 - List **five (5)** drugs that can be administered into the epidural space and describe the site of action of **each** drug in the epidural space.
 - Describe the factors that affect cranial spread of drugs in the epidural space.

Examination continued on next page

9. Answer **two (2)** of the following subparts of this question: *(5 marks each)*
- a) Describe the considerations for anaesthetising animals for magnetic resonance imaging (MRI).
 - b) Outline the causes of hypernatraemia. Discuss the management of acute and chronic hypernatraemia.
 - c) List **five (5)** drugs used to medically manage heart disease. Describe the mechanism of action of **each** drug. Discuss how **each** drug interacts with the cardiovascular effects of anaesthetic agents. Discuss recommendations that have been made for administration of **each** agent in the peri-operative period.
10. Answer **all** subparts of this question:
- a) Describe the mechanisms of action of vasopressin and discuss its use in cardiopulmonary cerebral resuscitation. *(1 mark)*
 - b) Describe the mechanism of action, indications for use and side-effects of dopamine administration in the dog. *(3 marks)*
 - c) Outline the characteristics of oxyglobin. Explain the indications for its administration. Describe the disadvantages/adverse effects associated with its administration. *(3 marks)*
 - d) List **five (5)** drugs used to control hypertension. Briefly describe the mechanism of action of each and provide **one (1)** example of disease where these drugs may be required in the peri-operative period. *(3 marks)*

End of paper



Australian College of Veterinary Scientists
Fellowship Examination

June 2011

Veterinary Anaesthesia and Critical Care
Paper 2

Perusal time: **Twenty (20)** minutes

Time allowed: **Three (3)** hours after perusal

Answer your choice of any **FIVE (5)** questions from the six questions **ONLY**

All six main questions are of equal value

Answer **FIVE** questions each worth 20 marks total 100 marks

Paper 2: Veterinary Anaesthesia and Critical Care

Answer your choice of any **FIVE** (5) questions from the six questions **ONLY**

1. During general anaesthesia of a four kg five-year-old domestic short-haired cat undergoing a pelvic fracture repair there seems to be significant haemorrhage. Discuss how you would assess and quantify the degree of blood loss given the species. This discussion should include reference to the rheological changes expected following acute haemorrhage and how these factors are altered by anaesthesia. Describe how you would manage varying degrees of blood loss, indicating specific differences to management in the cat compared to other species. *(20 marks)*

2. Describe the methods available in both a clinical and research environment to assess the depth of anaesthesia. Discuss species differences and the impact that different drugs may have on these methods. *(20 marks)*

3. A 30 kg labrador is scheduled for a left caudal lung lobectomy by thoracoscopy. It is possible that the surgeons may need to convert to a thoracotomy but they are confident they will be able to perform this procedure as planned. Discuss your approach to this case, the pre-operative considerations, anaesthetic and analgesic regimes which would be appropriate, airway management and the monitoring equipment you would like to use and why. *(20 marks)*

4. Answer **all** subparts of this question:
 - a) Describe techniques that have been used to measure cardiac output in anaesthetised horses. Discuss the advantages and disadvantages of each technique particularly those specific to their use in the horse. *(10 marks)*
 - b) Discuss the reported effects of anaesthetic drugs and techniques on cardiac output in horses. *(10 marks)*

Examination continued on next page

5. Describe the pharmacokinetics, pharmacodynamics, and side effects of alpha 2 agonists. Compare and contrast these topics in different ruminant species. *(20 marks)*

6. Describe the mechanism of pain. Describe the changes that occur in the receptors and pain pathways that occur in peripheral and central hypersensitisation and neuropathic pain. Briefly discuss the mechanism of actions of common drugs in management of pain, hypersensitisation and neuropathic pain. *(20 marks)*

End of paper