



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2016

Veterinary Anaesthesia and Critical Care Paper 1

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

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

Answer **ALL SIX (6)** questions

All six questions are of equal value.

Answer **SIX** questions each worth 30 markstotal 180 marks

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Veterinary Anaesthesia and Critical Care Paper 1

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Paper 1: Veterinary Anaesthesia and Critical Care

Answer all six (6) questions

1. The measure of cardiac output has been shown to help assess whole body perfusion and oxygen delivery. For **each** of the methods of measurement of cardiac output given below, briefly describe how the method works, and list the advantages and disadvantages of **each** method:
 - a) Fick method (10 marks)
 - b) lithium dilution (10 marks)
 - c) pulse contour analysis. (10 marks)

2. The administration of a blood transfusion has become more commonplace in the veterinary field. Adverse reactions can occur in association with blood transfusions.

Answer **all** parts of this question:

- a) List the blood types most commonly involved in transfusion reactions in **each** of the following species:
 - i. dogs (2 marks)
 - ii. cats (2 marks)
 - iii. horses (2 marks)
 - iv. cattle. (2 marks)
- b) Identify the types of immune-mediated transfusion reactions that can occur when whole blood is administered to an animal. For **each** type of reaction, briefly describe the immunological mechanism(s) underpinning the response, and the clinical signs that are commonly observed. (22 marks)

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3. There are a wide variety of intravenous fluids for supportive therapy in veterinary medicine.

Answer **all** parts of this question:

- a) The composition of different crystalloid solutions varies and is a key factor in the selection of appropriate fluids for intravenous administration. Discuss the pathophysiologic principles underpinning the selection of a crystalloid fluid with reference to the following fluids: 0.9% sodium chloride, Plasma-Lyte 148, and 5% dextrose. (15 marks)
- b) Hydroxyethyl starches are often characterised by a series of numbers, for example: 6% hydroxyethyl starch 130/0.4/ 9:1. Briefly define what a hydroxyethyl starch is and briefly explain what **each** of the descriptive numbers refer to. (5 marks)
- c) The use of hydroxyethyl starches in critically ill animals has become a controversial issue with debate surrounding its safety and efficacy. Briefly describe the indications for the use of hydroxyethyl starches and the adverse effects that may occur with the use of these agents. (10 marks)

4. Birds and reptiles have unique anatomical features that need to be recognised prior to anaesthesia.

Answer **both** parts of this question:

- a) Describe the anatomy of the avian respiratory tract and the physiology of gas exchange in birds. (15 marks)
- b) Compare and contrast the anatomy and physiology of the respiratory and cardiovascular systems of mammals and non-crocodilian reptiles, with relevance to the practice of anaesthesia. (15 marks)

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5. Answer **both** parts of this question:
- a) Using the pharmacokinetic properties of remifentanyl as an example, define and describe the concept of ‘context-sensitive’ half-time, and explain how this is related to terminal elimination half-life. *(15 marks)*
 - b) Explain the principles of target-controlled infusion for total or partial intravenous anaesthesia, including examples of agents for which this technique has been described in animals. *(15 marks)*
6. With regards to intermittent positive pressure ventilation (IPPV) in animals during general anaesthesia, discuss the indications, side effects and modes of ventilation (including initial ventilator settings for a healthy dog and a healthy horse during anaesthesia). Also describe how the physiological state of the animal should be monitored during IPPV. *(30 marks)*

End of paper



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Veterinary Anaesthesia and Critical Care Paper 2

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

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

Answer **ALL SIX (6)** questions

All six questions are of equal value.

Answer **SIX** questions each worth 30 markstotal 180 marks

Paper 2: Veterinary Anaesthesia and Critical Care

Answer all six (6) questions

1. A four-year-old pregnant French bull dog presents to the veterinary hospital 10 hours after the onset of labour. An emergency caesarean is performed in an attempt to save the puppies.

Answer **both** parts of this question:

- a) List the physiological changes associated with pregnancy and the anaesthetic considerations for this bitch. *(10 marks)*
- b) Outline your perioperative anaesthetic plan for this animal and justify your choices. *(20 marks)*

2. A two-year-old male neutered domestic short hair cat has presented with a simple femoral fracture and no other injuries. The cat is undergoing an orthopaedic procedure and an epidural is performed. Inadvertently, some bupivacaine was administered intravenously (IV).

Answer **all** parts of this question:

- a) Describe the anatomical approach when performing an epidural in this cat, and the techniques available to ascertain whether the needle is in the epidural space. *(8 marks)*
- b) Discuss the contraindications to performing an epidural in small animals. *(7 marks)*
- c) List the clinical signs of bupivacaine toxicity and explain why bupivacaine appears to be more toxic than the other local anaesthetic agents. *(15 marks)*

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3. A healthy three-year-old, 600 kg bull, presents to the large animal department for removal of a large mass on its prepuce. General anaesthesia is not an option.
- Describe in detail **two (2)** local anaesthetic techniques (**excluding** a ring block) that could be used to facilitate surgical removal of the mass. Include in your answer the anatomical landmarks relevant to the local anaesthetic block, drugs and doses you would use, and the advantages and disadvantages of these techniques.
- (15 marks for each block / 30 marks total)*
4. Describe in detail the risks associated with tracheal intubation, and how they can be avoided, with a focus on cats, pigs and horses. Include in your answer a list of the indications for endotracheal intubation and the different approaches to placement of a tube in the trachea. *(30 marks)*
5. Describe in detail the techniques that can be used to monitor the depth of anaesthesia in animals. Include in your answer a definition of anaesthesia and a brief discussion on the purpose of monitoring during anaesthesia. *(30 marks)*
6. There has been recent debate about the risks associated with human use and/or abuse of the drug ketamine. As a consequence there has been a campaign to reschedule this drug as it is considered by some to be of 'no medical use'.
- Create an argument both for **and** against the rescheduling of ketamine whereby the result, if it was rescheduled, would be that ketamine was no longer available for veterinary use. Include in your answer, comments on the potential misuse of the drug and some examples of situations where it would be difficult to substitute other drugs for ketamine in the practice of veterinary anaesthesia. *(30 marks)*

End of paper