

ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

Monday 23 August 1999

**PAPER 1: BASIC SCIENCES**

(2 hours)

Candidates are required to attempt **ALL TEN** questions on this paper.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

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1. What factors influence the flow of fluids through a blood vessel?
2. Define the terms: Volume of Distribution, Clearance and Time Constant in relation to the pharmacology of a drug.
3. Make brief notes on the contribution to breakdown of the ozone layer which may be caused by the discharge of volatile anaesthetic agents into the atmosphere.
4. Briefly compare rapacuronium (Org 9487), rocuronium, mivacurium and cis-atracurium.
5. Make brief notes on the anatomy of the larynx of the horse, and its innervation.
6. Briefly describe the kidney's role in blood pressure homeostasis.
7. Describe how a strain-gauge pressure transducer works.
8. Account for unstable membrane potentials at:
  - a) the post-synaptic membrane of the neuromuscular junction; and
  - b) cells of the sino-atrial node.
9. Write short notes on the distribution and role of opioid and orphan/FQ (nociceptin) receptor sites in the mammalian spinal cord.
10. What requirements are imposed by the quality control system termed Good Laboratory Practice (GLP)? Use the example of a trial in horses of the effects of a sedative agent on arterial blood pressure to illustrate these requirements.

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ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

Tuesday 24 August 1999

**PAPER 2: GENERAL MEDICINE AND SURGERY**

(3 hours)

Candidates are required to attempt **ALL** questions in Section A and **THREE** questions from Section B.

Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.

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**SECTION A** (answer **ALL** questions)

1. What are the patho-physiological changes in:
  - a) hypertrophic cardiomyopathy;
  - b) chronic bronchitis?
2. How may surgical haemorrhage be minimised during surgery on the brain and spinal cord?
3. Make brief notes on the cause and the adverse consequences of endotoxaemia in equine colic.
4. What are the desirable characteristics of a technique for the humane destruction of animals?  
What are the problems in fulfilling these criteria when destroying
  - a) a laboratory rat; and
  - b) an injured racehorse, in public view, at a sporting event?
5. Compare the effects of food deprivation in hamsters, dogs, horses and cattle.

**SECTION B** (answer **THREE** questions)

6. What physiological factors influence myocardial oxygen supply and demand?  
Discuss how anaesthesia may influence the adequacy of myocardial oxygenation.
7. Discuss the use of blood transfusions in veterinary medicine.
8. Explain how drugs used in the treatment of ophthalmic conditions may complicate the management of anaesthesia.

cont/....

9. Describe those features of a thoracic radiograph taken after blunt chest wall trauma which would influence the management of anaesthesia, and explain why these features increase risk.
10. Describe the principal features of management in a dog with full thickness burns affecting 30% of body surface area.

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ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

Tuesday 24 August 1999

**PAPER 3: ANAESTHESIA**

(3 hours)

Candidates are required to attempt **ALL** questions in Section A and **THREE** questions from Section B.

Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.

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**SECTION A** (answer **ALL** questions)

1. What problems may result from the use of CO<sub>2</sub> absorbent in rebreathing systems, and how may they be overcome?
2. Make brief notes on the problems with anaesthetising athletically fit animals.
3. What techniques would you choose to anaesthetise:
  - a) a Peregrine Falcon;
  - b) a zebra from a circus;
  - c) a pet rabbit for ovariohysterectomy?Briefly indicate the major problems you are likely to encounter in each case.
4. Which drugs should be avoided when anaesthetising a patient with known chronic renal impairment? Indicate why the agents you name are contra-indicated in such cases.
5. What is the biochemical basis of malignant hyperthermia?

**SECTION B** (answer **THREE** questions).

6. How can the degree of neuromuscular blockade be ascertained? Discuss the complications of significant residual post-operative paralysis in the domestic animals in which these agents may be used.
7. What is the Monro-Kellie hypothesis? How does it influence the management of anaesthesia?

cont/...

8. What features of:

- a) myasthenia gravis;
  - b) phaeochromocytoma; and
  - c) diabetes insipidus
- are of particular concern in anaesthesia?

Discuss the measures you would take to reduce these concerns.

9. What can be done to influence the quality and duration of recovery in horses after general anaesthesia? Indicate the advantages and disadvantages of the interventions mentioned.
10. What evidence is there that neonatal animals experience peri-operative pain? Discuss how you would address the needs of a 2 week-old calf undergoing surgery for the fixation of a femoral fracture.

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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN VETERINARY ANAESTHESIA

Monday 21 August 2000

**PAPER 1: BASIC SCIENCES**  
**(2 hours)**

Candidates are required to attempt **ALL TEN** questions on this paper.

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1. Write short notes on those physico-chemical properties of volatile anaesthetics that influence their behaviour in vivo.
2. With the aid of a diagram describe the neural control of breathing.
3. Briefly comment on the significance of the latent heat of vaporization in relation to the practice of anaesthesia.
4. What do you understand by the term "excitation-contraction coupling"?
5. With responsibility for anaesthesia in a modern small animal hospital, how would you devise a quality assurance system to ensure optimum patient anaesthetic care?
6. List the ideal characteristics of a peripheral nerve stimulator in the assessment of neuromuscular blockade.
7. Write short notes on arachidonic acid metabolism.
8. Briefly describe how molecules are transported across cell membranes.
9. What is Laplace's law? What is its relevance in anaesthesia?
10. Compare esmolol, propranolol and bretyllium.

THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**Tuesday 22 August 2000**

**PAPER 2: GENERAL MEDICINE AND SURGERY  
(3 hours)**

Candidates are required to attempt **ALL** questions in Section A and **THREE** questions from Section B.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.

**SECTION A** (answer **ALL** questions)

1. List those pre-operative laboratory examinations which you consider to be most important in the assessment of anaesthetic risk, giving reasons for your choice.
2. What do you understand by the term 'serum anion gap'? Comment on its usefulness as a diagnostic tool.
3. A dog with no previous history of renal disease develops anuria in the immediate post-operative period. Outline the management of such a case.
4. Briefly describe how the suspicion of coagulopathy may be investigated in animals scheduled for surgery?
5. Under what conditions may oxygen become toxic? Briefly describe the steps that may be taken to limit oxygen toxicity in animals.

**SECTION B** (answer **THREE** questions)

6. Discuss the aetiology of obesity in the dog. How does gross obesity influence the health of the animal?
7. What drugs are used to treat epilepsy? How may these drugs affect the management of anaesthesia?
8. Discuss the rational use of inotropes in veterinary medicine.

Cont/...

9. Two hours after it was first noticed to be distressed, a 6 year old Hunter was diagnosed by a veterinary surgeon as having a small intestinal obstruction. It has been referred to your veterinary hospital for surgery, and the referring veterinary surgeon has administered  $10\mu\text{g kg}^{-1}$  (micrograms per kilogram body weight) detomidine iv (intravenously), prior to its transportation by road, which is estimated to take 4 hours. Describe the circulatory and metabolic derangements you might expect to be present in this animal on its arrival, and discuss their progression in the absence of treatment.
  
10. Discuss the adverse effects of positive pressure ventilation? How might these effects be minimised?

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DIPLOMA IN VETERINARY ANAESTHESIA

**Tuesday 22 August 2000**

**PAPER 3: ANAESTHESIA  
(3 hours)**

Candidates are advised to attempt **ALL** questions in Section A and **THREE** questions from Section B.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.

**SECTION A** (answer **ALL** questions)

1. Write short notes on:
  - a) secondary hyperalgesia;
  - b) fentanyl patches; and
  - c) phantom limb pain.
2. Briefly describe how drugs used in the practice of anaesthesia affect intra-ocular pressure.
3. What factors influence the choice of anaesthetic breathing system? Briefly describe the Humphrey ADE — circle system.
4. Using a table, compare the effects of morphine in dogs, cats, pigs and horses.
5. Briefly describe the problems associated with the delivery of safe concentrations of desflurane.

**SECTION B** (answer **THREE** questions)

6. Discuss the past, present and future role of ketamine in veterinary clinical practice.
7. Write an essay on neuraxial (spinal and extradural) anaesthesia in animals.
8. What are the adverse effects of hypothermia? Describe the steps you would take to compensate for these in a case in which the preservation of normal temperature was proving impossible.

Cont/...

9. Describe the causes of post-anaesthetic airway obstruction in horses and how the problem might be avoided.
  
10. A drug company wishes to license a new product as an analgesic for perioperative use in the dog and has asked you, in your capacity as an anaesthetist in a small animal hospital, for advice. Design a suitable protocol. What are the problems associated with setting up such a clinical trial on a multicentre basis?

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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**TUESDAY 7 AUGUST 2001**

**PAPER I  
BASIC SCIENCES  
(2 hours)**

Candidates are required to attempt **ALL TEN** questions on this paper.

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If insufficient time is available to answer a question fully, it will be acceptable to complete in note form.

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1. Why is inspired gas humidification important in anaesthesia?
2. What is the Fick principle? What is its application in anaesthesia?
3. **Briefly** describe new developments that allow quantification of hypnosis under anaesthesia.
4. What do you understand by the “power” of a statistical test? How may a research worker optimise the power of an analysis?
5. **Compare** rapacuronium and suxamethonium.
6. **Summarise** Starling’s law of the heart.
7. What is the composition of soda lime and Baralyme? Describe the chemical reaction that occurs when carbon dioxide reacts with these absorbents.
8. With the aid of labelled diagrams describe the anatomical structure of the mammalian nephrons and their vasculature.

**P.T.O. for questions 9 and 10**

9. What do you understand by the term 'Good Clinical Practice'? **List** the major principles of its application to a clinical trial.
10. Write **short notes** on the mode of action and use of:
- a) tramadol
  - b) midazolam.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**WEDNESDAY 8 AUGUST 2001**

**PAPER II**  
**GENERAL MEDICINE AND SURGERY**  
(3 hours)

Candidates are required to attempt **ALL** questions in Section A and **THREE** questions from Section B.

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**Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.**

**SECTION A** (answer **ALL** questions)

1. How may the circulation be maintained during cardiac arrest in a 30 kg dog?
2. Which factors should be taken into account when choosing a site for intramuscular drug injection in
  - a) horsesand
  - b) cattle.
3. How is the embryo protected from drugs present in the maternal circulation?
4. **List** the possible causes and clinical findings of
  - a) hypomagnesaemiaand
  - b) hypochloraemia in the dog.
5. What are the main provisions of the Animals (Scientific Procedures) Act 1986 ?

**P.T.O. for Section B**

**SECTION B** (answer **THREE** questions)

6. What is the 'surgical stress response'. Describe and discuss its consequences. How may it be attenuated?
  7. Write short notes on:
    - a) myasthenia gravis
    - b) feline hyperthyroidism.
  8. How may lung function be optimised in animals after intra-thoracic surgery?
  9. Discuss the management of animals with pulmonary contusion, sustained as a result of a road traffic accident.
  10. Write an essay on the use of NSAIDs (non-steroidal anti-inflammatory drugs) in modern veterinary practice.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**WEDNESDAY 8 AUGUST 2001**

**PAPER III  
ANAESTHESIA  
(3 hours)**

Candidates are advised to attempt **ALL** questions in Section A and **THREE** questions from Section B.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

Candidates are advised that they should allocate approximately 1 hour for Section A and 2 hours for Section B.

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**SECTION A** (answer **ALL** questions)

1. **Write short notes** on those features of avian physiology that influence the management of anaesthesia in birds.
2. **Briefly** describe the adverse consequences of improper patient body position during anaesthesia and surgery.
3. What is a vaso-vagal reflex? What is its significance in veterinary anaesthesia.
4. **Briefly** describe the possible complications of central venous catheterisation
5. Write short notes on:
  - a) Nociceptin (orphanin FQ)
  - b) gabapentin
  - c) remifentanyl

**P.T.O. for Section B**

**SECTION B** (answer **THREE** questions)

6. Compare the limitations of techniques that may be used to monitor neuromuscular transmission during anaesthesia.
  7. What are the challenges facing veterinary anaesthetists involved with renal transplantation in cats?
  8. Discuss the role of anti-arrhythmic drugs in veterinary anaesthesia.
  9. What features of canine diabetes mellitus complicate the management of anaesthesia?
  10. How may your anaesthetic management and analgesic protocol optimise the immediate and long term postoperative outcome for an animal presented for limb amputation.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**TUESDAY 30 JULY 2002**

**PAPER I**  
**BASIC SCIENCES**  
(3 hours)

Candidates are required to answer **ALL 10** questions.

Allow 18 minutes per question.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey

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1. With the aid of diagrams, describe the appearance of (and events responsible for) a normal central venous pressure waveform over one cardiac cycle.
2. Write **brief** notes on:
  - (a) The Bernoulli effect
  - (b) Poiseuille's Law.
3. Describe the anatomy of the canine spinal canal and its contents at the level of the lumbosacral junction. How does that of the cat differ?
4. Write **short** notes on the pharmacology of pimobendan.
5. Write **short** notes on the following:
  - a) The Null hypothesis
  - b) Confidence intervals
  - c) Statistical significance
  - d) Standard deviations.

**P.T.O. for questions 6, 7, 8, 9 and 10**

6. **Briefly** discuss the principles by which the following anaesthetic breathing systems work:

- a) Mapleson A breathing system.
- b) Mapleson F breathing system.
- c) A closed circuit breathing system.

7. Write **short** notes on the principles underlying the following :

- a) A pulse oximeter
- b) A capnograph (end tidal carbon dioxide meter)
- c) A mass spectrometer.

Indicate how these pieces of apparatus can give false readings.

8. **Briefly** describe how the effects of muscle relaxing drugs are terminated by the body.

9. Write **short** notes on the buffering systems available in the body to prevent a drop in pH.

10. **Briefly** describe those anatomical and physiological differences between reptiles and mammals which are of importance to the veterinary anaesthetist.

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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**TUESDAY 30 JULY 2002**

**PAPER II**

**GENERAL MEDICINE, GENERAL SURGERY AND ANAESTHESIA**

(3 hours)

**This paper is in two Sections (A and B) and instructions relating to the number of questions to be answered are given at the head of each Section.**

**SECTION A**

Candidates are required to answer **THREE** of the following **four** questions.

Allow 30 minutes per question. (1½ hours)

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If insufficient time is available to answer a question fully, it will be acceptable to complete in note form.

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1. Describe the pathophysiology, diagnosis and management of air embolism in anaesthetised patients.
  2. Discuss the management of anaesthesia and intensive care of a 5 month-old Jack Russell dog presented for investigation and possible ligation of a port~~as~~systemic shunt.
  3. What are the pathophysiological effects and clinical signs of paracetamol intoxication in the cat? How does the dog differ?
  4. What features of Magnetic Resonance Imaging (MRI) complicate the management of anaesthesia and patient monitoring?

**P.T.O. for Section B**

THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**JULY 2002**

**PAPER II**

**GENERAL MEDICINE, GENERAL SURGERY AND ANAESTHESIA**

**SECTION B**

Candidates are required to answer **THREE** of the following FOUR questions.

Allow 30 minutes per question. (1½ hours)

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5. Discuss the therapeutic roles of magnesium in anaesthesia and intensive care.
  6. "There is nothing holy about the blood pressure, it is the blood flow that counts"  
Discuss.
  7. Describe the cause, presenting features and treatment of malignant hyperthermia.
  8. Discuss the use of Oxyglobin in small animals.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

**WEDNESDAY 13 JULY 2005**

**PAPER I  
BASIC SCIENCES  
(3 hours)**

Candidates are required to answer **ALL 10** questions.

Allow 18 minutes per question.

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1. What methods can be used to monitor and/or measure cardiac output? **Briefly** describe those that are practical to use in clinical and/or experimental practice, **outlining** the advantages and the limitations of **each** method.
  
2. Modern inhalation anaesthetics have been found to react with classical carbon-dioxide absorbents in ways that may be dangerous to the patient. What are these dangers? **Briefly discuss** how the newest carbon dioxide absorbents have evolved to reduce the risk.
  
3. **Define** the following physical laws and phenomena and **briefly** explain their relevance to anaesthesia:
  - (a) Daltons law of partial pressures.
  - (b) Laplace's Law.
  - (c) Venturi effect.
  
4. **Describe** the components of a normal time capnogram (i.e. the capnograph trace throughout each breath as seen) and explain the physiology which results in the trace as seen.

**Draw diagrams** of the capnograms which would occur in the following circumstances, explaining why the trace differs as it does from normal:

- (a) oesophageal intubation
- (b) airway obstruction
- (c) cardiac arrest
- (d) expiratory valve (circle system) malfunction
- (e) pulmonary embolus
- (f) malignant hyperthermia.

**P.T.O. for Questions 5 - 10**

5. What are the main causes of atrial fibrillation? Explain how the diagnosis may be confirmed and write a **short** account of the possible methods of treatment.
  
  6. **Draw** the oxygen dissociation curve and write **short notes** on the following:
    - (a) p50.
    - (b) Bohr effect.
    - (c) The value of preoxygenation.
    - (d) Oxygen therapy in severe chronic bronchitis.
    - (e) Hyperbaric oxygen.
  
  7. Write **short notes** on the pharmacology and use (within anaesthesia) of:
    - (a) Rocuronium.
    - (b) Dantrolene.
    - (c) Gabapentin.
  
  8. **Discuss briefly**, with examples:
    - (a) the use and abuse of correlation in anaesthetic research
    - (b) the terms sensitivity and specificity when describing a diagnostic test.
  
  9. Give an account of the structural pharmacology of opioid receptors.
  
  10. Discuss the causes, pathophysiology and treatment of hyperkalaemia and hypokalaemia.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

**DIPLOMA IN VETERINARY ANAESTHESIA**

WEDNESDAY 13 JULY 2005

**PAPER II**

**GENERAL MEDICINE, GENERAL SURGERY AND ANAESTHESIA**  
(3 hours)

**This paper is in two Sections (A and B) and instructions relating to the number of questions to be answered are given at the head of each Section.**

**SECTION A**

Candidates are required to answer **THREE** of the following **four** questions.

Allow 30 minutes per question. (1½ hours)

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2. **Discuss, giving specific examples** the advantages and disadvantages of:
  - (a) the use of anti-cholinergic agents in equine anaesthesia
  - (b) the use of pressor agents during anaesthesia in the horse.
  
3. *"TIVA (total intravenous anaesthesia) should replace inhalation agents in veterinary anaesthesia"*. **Discuss** this statement.
  
3. The new 'cox-sparing' non steroidal anti-inflammatory agents seem set to displace the older agents such as phenylbutazone and flunixin meglumate from the veterinary market-place. **Discuss** the merits and disadvantages of this change.
  
4. **Write an essay** on the pharmacology of local anaesthetic agents and their role in veterinary anaesthesia and analgesia.

**P.T.O. for Section B**

THE ROYAL COLLEGE OF VETERINARY SURGEONS  
DIPLOMA IN VETERINARY ANAESTHESIA

WEDNESDAY 13 JULY 2005

PAPER II

GENERAL MEDICINE, GENERAL SURGERY AND ANAESTHESIA

SECTION B

Candidates are required to answer **THREE** of the following FOUR questions.

Allow 30 minutes per question. (1½ hours)

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5. **Discuss** the pathophysiology and treatment of:

- (a) hyperthyroidism in the cat
- (b) insulinoma in the dog.

How would you anaesthetise animals suffering from these conditions?

6. **Discuss** the patho-physiological response to a 50% loss of circulating blood volume in a dog.

7. **Discuss** the major factors associated with anaesthesia which contribute to (or ameliorate) the risk of peri-operative mortality in the dog and the horse.

8. **Give an account** of the potential problems of anaesthesia in:

- (a) a rabbit
- (b) an alpaca.

In **each** case indicate how you would attempt to overcome these problems.

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