1. Briefly describe the local analgesic technique you would use to permit dehorning of an adult goat.

2. Write short notes on the following drugs:
   a. cis-atracurium
   b. dexmedetomidine
   c. levobupivacaine.

3. List the factors which may alter MAC (minimum alveolar concentration) for inhalational anaesthetic agents.

4. Briefly describe how you would anaesthetise a cat suffering from suspected asthma, which is presented for diagnostic bronchoalveolar lavage.

5. Briefly describe how the pathophysiological changes which occur as a result of hepatic disease may impact upon general anaesthesia?

6. List the advantages and problems associated with the use of nitrous oxide.

7. You are asked to advise a neighbouring practice about the handling and storage of anaesthetic gas cylinders. What advice would you give?

P.T.O. for Questions 8, 9 and 10
8. **List** the potential causes of bradycardia during general anaesthesia in the horse, and state the most appropriate treatment for **each** causative factor.

9. What acid-base / electrolyte abnormalities would be most likely to occur in a dog suffering from pyloric outflow obstruction? Which intravenous fluid would be most appropriate to correct these disturbances, and by what mechanism(s) would it exert its desired effect(s).

10. What is the significance of anaemia in an anaesthetised patient?
Candidates are required to answer **FOUR** of the following **SIX** questions.

Allow 30 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.*

1. Describe the anaesthetic management of a cat with head trauma that is to undergo fixation of a fractured mandible.

2. What substances are produced by the reaction of volatile anaesthetics with carbon dioxide absorber systems, and what is the significance of this production?

3. Discuss the use of total intravenous anaesthesia in the dog.

4. How would you manage airway obstruction during induction of anaesthesia?

5. Describe your anaesthetic management and peri-operative care of a 2 year-old German Shepherd with myasthenia gravis undergoing lateral thoracotomy for removal of the thymus.

6. What problems might be encountered in anaesthetising a rabbit for repair of a femoral fracture, and how would you manage them?
Candidates are required to answer **ALL TEN** questions.

Allow 12 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. What is meant by the term "anion gap" and what is its clinical significance?

2. Under what circumstances might you use beta-adrenergic antagonists during anaesthesia? Which agents would you use and what are the potential side-effects?

3. What is meant by the term "PaO2"? How does the information this conveys differ from that provided by "SpO2"?

4. What are the active metabolites of the following agents and what (if any) is the clinical significance of their production:
   a. Ketamine?
   b. Pethidine?
   c. Morphine?

5. **List** your anaesthetic considerations for a cat with compensated hypertrophic cardiomyopathy scheduled for extensive dentistry?

6. **Briefly** describe the role of intravenous fluids during veterinary anaesthesia.

7. **Briefly outline** a suitable anaesthetic protocol for anaesthesia of a parrot for sex determination.
8. List the contra-indications for administration of intradural analgesia (epidural) in a dog as part of a general anaesthetic protocol.

9. List the potential problems associated with general anaesthesia in the pig.

10. Define the terms allodynia and hyperalgesia. Briefly describe the processes by which they are produced.
Candidates are required to answer **FOUR** of the following **SIX** questions.

Allow 30 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.*

1. What factors influence the uptake and elimination of inhalational anaesthetic agents from the body?

2. Describe the anaesthetic management of a horse presented for repair of a ruptured cornea.

3. Why is arterial blood pressure commonly measured during anaesthesia? Describe techniques available for its clinical measurement, their advantages and limitations.

4. In what ways may arterial oxygenation be supported or improved in the anaesthetised horse?

5. Describe the mechanisms of heat loss in an anaesthetised patient and the effects of the consequent hypothermia produced.

6. “Newer non-steroidal anti-inflammatory agents are more COX-2 selective and therefore safer” – discuss this statement.
THE ROYAL COLLEGE OF VETERINARY SURGEONS
CERTIFICATE IN VETERINARY ANAESTHESIA
TUESDAY 18 JULY 2006
PAPER I
(2 hours)

Candidates are required to answer ALL TEN questions.

Allow 12 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.

1. Describe how you would perform paravertebral anaesthesia for caesarean section in a 500kg cow.

2. With the aid of a diagram, briefly illustrate the function of a ‘regulator’ (reducing valve) in the anaesthetic machine.

3. Compare the use of hypertonic saline (7.2% NaCl) and gelatine based colloid fluids for volume replacement.

4. Outline the use of alpha-2 adrenoceptor agonist drugs in sheep.

5. Briefly compare the pharmacokinetics of propofol in the dog and cat.

6. What is the role of ‘COXIBS’ in veterinary anaesthesia?

7. List the potential problems associated with general anaesthesia in birds.

8. What factors may interfere with correct function of pulse oximeters in veterinary species?

9. List the compounds that may be produced by the contact of exhaled gases with carbon dioxide absorption systems and briefly describe the clinical significance of their production.

10. Write brief notes on the use of fentanyl patches in veterinary species.
Candidates are required to answer FOUR of the following SIX questions.

Allow 30 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.

1. Discuss the therapeutic use of local anaesthetic drugs in the horse. Describe the considerations, potential complications, drugs available and provide examples of indications for their use.

2. Discuss the maintenance and management of the airway during anaesthesia in each of the following species:
   a. horse
   b. cow
   c. pig.

3. Describe in detail the considerations and precautions when anaesthetising a cat with compromised hepatic function.

4. List the classes of drug that may be used to provide analgesia in dogs and cats in the peri-operative period. Provide examples for each class and briefly describe the mechanism and purported sites of action.

5. Anaesthetic mortality in companion animal species has reduced by more than half in the past 20 years. Critically discuss the factors that have contributed to this reduction.
6. ‘Anticholinergic agents do not play a role in pre-medication in modern veterinary anaesthesia’ – **discuss** this statement.
1. What is meant by the term context sensitive half time (or context sensitive half life)?

2. What are the problems associated with long term assisted ventilation in animals?

3. What are the indications and contraindications for caudal epidural (extradural) anaesthesia in the cat?

4. List potential problems with general anaesthesia in a pet tortoise.

5. With the aid of a diagram, briefly describe the function of a flowmeter (rotameter) in the anaesthetic machine.

6. Describe how you would perform intravenous regional anaesthesia in a cow (to facilitate digit amputation from the hind leg).

7. Write brief notes on Alphaxalone as an anaesthetic agent in veterinary anaesthesia.

8. Briefly outline the anaesthetic considerations for obese dogs.

9. List the potential complications associated with tracheal intubation in cats and how these may be minimised.

10. Outline your considerations for anaesthetising a fractious colt for routine castration in the field and suggest a suitable anaesthetic technique.
1. Describe the physiological response to a major bleed in an anaesthetised patient.

2. Discuss your anaesthetic considerations for a depressed goat presented with urethral obstruction.

3. Explain the principles that govern your choice of fluids, route and rate of administration in the perioperative period for the following cases:
   a. A 12 year old cat with chronic non-regenerative anaemia undergoing bone marrow biopsy.
   b. A Doberman with type I vonWillebrands disease undergoing ovariohysterectomy.
   c. A dog with chronic diarrhoea undergoing exploratory laparotomy for biopsies of the gastrointestinal tract.

4. Compare the advantages and disadvantages of using intravenous or inhalation techniques for maintenance of anaesthesia in the horse.
5. Capnography is becoming more affordable for general veterinary practice. Discuss the benefits and limitations of this monitoring technique, including practical considerations for its use.

6. Discuss the role of the bicarbonate buffer system in the physiological response to acute lactic acidosis during anaesthesia.
 Candidates are required to answer **ALL TEN** questions.

Allow 12 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.*

1. **List** the features of an anaesthetic machine designed to improve patient safety. For each indicate how the feature works and how this improves patient safety.

2. **Write short notes** on buprenorphine as an opioid analgesic agent in cats.

3. **Outline** the considerations for anaesthetising a dog with a penetrating corneal foreign body.

4. **List** the factors affecting PaO₂ in an anaesthetised horse.

5. **Briefly list** the considerations when anaesthetising a llama.

6. **Write brief notes** on malignant hyperthermia.

7. **With the aid of a diagram**, describe how you would perform a caudal epidural (extradural) block in a cow. Give **TWO** indications for this technique.

8. **List** the mechanisms by which drug action is terminated in the body. For each mechanism, give an example of a drug used in veterinary anaesthesia.

9. **Write brief notes** on dexmedetomidine as a sedative agent in veterinary anaesthesia.

10. **Briefly** compare and contrast the use of sevoflurane and isoflurane in the dog.
1. Rabbits are anaesthetised commonly in general practice. A recent study showed that they are more likely to die in the peri-anaesthetic period compared with dogs and cats. Discuss the possible reasons for this and what steps could be taken to avoid them.

2. Discuss patient monitoring during anaesthesia for magnetic resonance imaging.

3. What are the indications for blood product transfusion in the peri-operative period? Discuss the problems encountered with whole blood transfusion and how they can be minimised in ONE of the following species:
   a) dog
   b) cat
   c) horse.

4. Discuss the causes, consequences and prevention of peri-operative hypothermia in anaesthetised small animals.

5. Discuss the routes of administration by which analgesic drugs may be provided in the post-operative period.

6. What is meant by ‘partial intravenous anaesthesia’ (PIVA)?
   Discuss the different techniques/drugs that may be used for PIVA in the horse.
1. Write short notes on the physiological effects of pregnancy that impact on anaesthesia.

2. List the potential problems associated with anaesthesia in birds.

3. Compare and contrast alpha-2 adrenoreceptor agonists and acepromazine in veterinary anaesthesia.

4. Outline your approach to managing the analgesic requirements of a cat undergoing an exploratory laparotomy.

5. Write short notes explaining the following terms:
   a. Affinity.
   b. Potency.
   c. Efficacy.

6. Briefly describe the anaesthetic considerations and your approach to anaesthetise a pet Vietnamese pot-bellied pig presented for routine castration.

7. What are the limitations of pulse oximetry?

8. Describe your approach to a 12 year-old Warmblood gelding for standing oral extraction of the left third maxillary cheek tooth. The clinician estimates the extraction may take 3 hours.

P.T.O. for Questions 9 and 10
9. Write short notes on how you can determine when a carbon dioxide absorbent (e.g. soda lime) is no longer absorbing enough carbon dioxide to prevent re-breathing. List the advantages and disadvantages to each approach.

10. What is meant by the term ‘Base Excess’? How might you utilise the information it imparts during the peri-anaesthetic period?
Candidates are required to answer **FOUR** of the following **SIX** questions.

Allow 30 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.*

1. “Nitrous oxide is an outdated drug and has no place in modern veterinary practice.”

   **Discuss** this statement in relation to veterinary anaesthesia.

2. **Discuss** the use of pain assessment, with application to different veterinary species.

3. **Compare and contrast** ‘in-circuit’ and ‘out-of-circuit’ vaporisers.

4. **Discuss** the use of neuromuscular blocking agents in horses.

5. **Write an essay** on the management of hyperkalaemia in the peri-anaesthetic period.

6. **Describe in detail** the anaesthetic considerations for a dog presenting with an oesophageal foreign body.