



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2016

Veterinary Ophthalmology Paper 1

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

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

Section A: Answer **ALL TWENTY (20)** Questions

Section B: Answer **ALL TEN (10)** Questions

Section A: Short Answer: Answer **TWENTY** questions each worth 4 marks. total 80 marks

Section B: Long Answer: Answer **TEN** questions each worth 10 marks..... total 100 marks

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Paper 1: Veterinary Ophthalmology

SECTION A

Answer all twenty (20) questions

1. With reference to genetics:
 - a) Name the canine ophthalmic disease caused by a mutation in the gene ADAMS17. *(1 mark)*
 - b) Name **one (1)** human ophthalmic disorder known to be acquired by mitochondrial inheritance. *(1 mark)*
 - c) Progressive retinal atrophy in Abyssinian cats can be inherited in an autosomal recessive manner. Briefly outline the specific genetic mechanism by which this occurs. *(2 marks)*

2. Briefly describe uveoscleral aqueous outflow in the horse. *(4 marks)*

3. In canine ocular development:
 - a) State the day on which the eyelids fuse. *(1 mark)*
 - b) At what day does the lens vesicle separate from the surface ectoderm? *(1 mark)*
 - c) At what day is there the first indication of ciliary processes and iris formation? *(1 mark)*
 - d) By which day is the tapetum present? *(1 mark)*

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4. In relation to topical ophthalmic preparations, list **four (4)** characteristics of bioadhesive polymers that facilitate adherence to mucin-epithelial surfaces. *(4 marks)*
5. Compare and contrast the **two (2)** main optical systems used in magnifying loupes, with with brief considerations of advantages, disadvantages and image quality from available systems. *(4 marks)*
6. When performing ocular histopathology identify the most appropriate stain for **each** of the following structures: *(4 marks total - 0.5 marks each)*
- i. calcium
 - ii. chlamydia species
 - iii. basement membranes
 - iv. collagen
 - v. melanin
 - vi. fungi
 - vii. mast cell granules
 - viii. iron.
7. Answer **both** parts of this question:
- a) List **four (4)** factors which influence depth of field in ophthalmic photography. *(2 marks)*
 - b) Name **two (2)** disadvantages of ring flashes in ophthalmic photography. *(2 marks)*

Continued over page

8. Answer **all** parts of this question:
- a) List **two (2)** antibiotics from the penicillin group which are active against *Pseudomonas aeruginosa*. (1 mark)
 - b) Briefly describe the mechanism of action of the fluoroquinolones. (2 mark)
 - c) Name the fluoroquinolone which has consistently demonstrated superior intraocular penetration following repeated topical administration in the rabbit research model. (1 mark)
9. Identify and briefly explain factors that contribute to the transparency of the ocular lens. (4 marks)
10. With respect to phototransduction, define the 'dark current' and briefly explain how exposure to light alters this process. (4 marks)
11. Briefly compare and contrast the spectrum of colour vision found in dogs, horses and chickens. (4 marks)
12. Briefly describe the phenol red thread test and state the normal values for the dog, cat and horse. (4 marks)
13. Answer **both** parts of this question:
- a) Briefly describe or draw the life cycle of *Encephalitozoon cuniculi*. (2 marks)
 - b) List **four (4)** mammalian species in which *E. cuniculi* has been reported to cause ocular disease. (2 marks)

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14. With reference to the ocular anatomy of camelids:
- a) Name the absent eyelid structure that sets them apart from other domestic mammals. *(1 mark)*
 - b) Identify the retinal adaptation of some camelids which is suggested to help with to high altitude living. *(1 mark)*
 - c) State the finding in corneal anatomy suggested to predispose llamas and alpacas to corneal oedema. *(1 mark)*
 - d) Briefly explain the pupillary rough in camelids and state its proposed function. *(1 mark)*
15. Briefly describe tear dispersal from the canine conjunctival sac. *(4 marks)*
16. Name the aging changes take place in the vitreous and what are the clinical implications of these changes? *(4 marks)*
17. State the advantages and disadvantages of the following tissue fixatives used for ocular pathology: *(4 marks)*
- i. formalin
 - ii. glutaraldehyde
 - iii. Davidson's
 - iv. Bouin's.

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18. With respect to latanoprost:
- a) List the potential complications that may arise when using this drug more than twice a day in dogs. *(2 marks)*
 - b) Briefly comment on the theoretical use of this drug in the treatment of equine and feline glaucoma. *(2 marks)*
19. With reference to corneal suturing:
- a) List **six (6)** disadvantages of the simple interrupted suture pattern. *(3 marks)*
 - b) List **two (2)** advantages of the simple interrupted suture pattern. *(1 mark)*
20. Outline the anatomy of the precorneal tear film. *(4 marks)*

Section B over page

SECTION B

Answer all ten (10) questions

1. Answer **all** parts of this question:

- a) Describe the innervation and muscular physiology of the nictitating membrane in cats. (6 marks)
- b) State the nature of the nictitans gland secretions in: (2 marks)
 - i. cats
 - ii. horses
 - iii. cattle
 - iv. pigs.
- c) Name the muscles that are responsible for the movement of the nictitating membrane in birds and state their innervation. (2 marks)

2. Describe choroidal blood flow in dogs. Your answer should reference the anatomy of the choroidal vessels and mechanisms employed to control this flow. (10 marks)

3. Describe the mechanics of opening and closing the canine eyelids. Your answer should include reference to the anatomy of the muscles involved in **each** phase, their innervation, and how they work with other anatomical structures to achieve a normal blink. (10 marks)

4. Persistent or recurrent uveitis has been postulated to be caused by an immune response to autoantigens.

Answer **both** parts of this question:

- a) By what mechanisms can these autoantigens arise? (6 marks)
- b) List **four (4)** antigens or autoantigens that have been implicated in equine recurrent uveitis. (4 marks)

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5. Outline the function of glycosaminoglycans (GAGs) in the canine cornea. Include in your answer the types, their origins, their relative frequency and their distribution in the cornea. *(10 marks)*
6. With respect to the inner nuclear layer of the retina, compare and contrast the metabolism and function of Mullers cells and amacrine cells. *(10 marks)*
7. Answer **all** parts of this question:
- a) Briefly describe the presenting signs and ocular lesions caused by the following herpes viruses: *(7 marks total - 1 mark each)*
- i. Marek's disease in poultry
 - ii. pseudorabies (Aujeszky's disease) in pigs
 - iii. equine herpesvirus-1 in horses
 - iv. equine herpesvirus-2 in horses
 - v. malignant catarrhal fever in cattle
 - vi. infectious bovine rhinotracheitis
 - vii. canine herpesvirus.
- b) List **four (4)** types of herpesviruses that can cause ocular disease in man. *(2 marks)*
- c) State the percentage of cats reported to become infected by feline herpesvirus. *(1 mark)*

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8. Compare and contrast computed tomography (CT) and magnetic resonance imaging (MRI) in the evaluation of orbital diseases. *(10 marks)*

9. Compare and contrast methods of accommodation in the primate, cat and chicken. *(10 marks)*

10. Discuss diagnostic tools used to visualise and evaluate the retina, including the advantages and disadvantages of **each**. *(10 marks)*

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Veterinary Ophthalmology Paper 2

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Paper 2: Veterinary Ophthalmology

SECTION A

Answer all twenty (20) questions

1. List **four (4)** published causes of keratoconjunctivitis sicca in horses. *(4 marks)*

2. Perfluorocarbon liquids (PFCLs) are useful as vitreal substitutes to facilitate complex vitreoretinal surgery. List **four (4)** properties of PFCLs which make them suitable for this purpose. *(4 marks)*

3. Answer **both** parts of this question:
 - a) List **three (3)** advantages of the ab externo method of intraocular sulcus fixation of intraocular lens implants following intracapsular lens extraction. *(3 marks)*

 - b) State the main drawback to this method of intraocular sulcus fixation. *(1 mark)*

4. Answer **both** parts of this question:
 - a) List **four (4)** causes of retained spectacles in snakes. *(2 marks)*

 - b) Identify **four (4)** strategies that can be employed to **conservatively** manage this condition. *(2 marks)*

5. Outline **two (2)** surgical techniques that can be employed to treat pseudopterygium (conjunctival overgrowth) in rabbits. *(4 marks)*

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6. List **eight (8)** infectious agents that can cause conjunctivitis in poultry species. *(4 marks)*
7. A seven-year-old Rottweiler presents with a large sebaceous adenoma occupying one third of the upper central eyelid. You remove the mass and choose to perform a Z-plasty to repair the defect. Use a diagram to illustrate this technique. *(4 marks)*
8. With respect to early retinal degeneration (erd) in the Norwegian elkhound:
- a) Briefly outline the electroretinographic findings typical of this condition. *(1 mark)*
 - b) Explain what the observed waveform suggests about electrical transmission within the retina. *(1 mark)*
 - c) Outline how the electroretinogram alters with time. *(1 mark)*
 - d) What changes are noticed in the rod and cone flicker responses? *(1 mark)*
9. List **eight (8)** factors that have been identified that are important in the prevention of posterior capsular opacification after cataract surgery. *(4 marks)*
10. List **eight (8)** congenital eye anomalies seen in the Rocky mountain horse. *(4 marks)*
11. List **four (4)** materials from which intraocular lenses (IOLs) are made. *(4 marks)*
12. With respect to laser surgery in veterinary ophthalmology:
- a) List **two (2)** clinical applications for endolaser in veterinary ophthalmology. *(2 marks)*
 - b) List **two (2)** clinical applications for the Nd:YAG laser in veterinary ophthalmology. *(2 marks)*

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13. Define the condition chromodacryorrhoea and briefly discuss the development of the condition in rat. *(4 marks)*
14. State the prognosis for **each** of the following neoplasms: *(4 marks)*
- i. conjunctival haemangiosarcoma of the third eyelid in a dog
 - ii. conjunctival melanoma in a dog
 - iii. cutaneous mast cell tumours in the eyelid of a cat
 - iv. lobular adenoma of the lacrimal gland in a dog.
15. List **four (4)** exogenous factors that contribute to corneal disease in captive pinnipeds. *(4 marks)*
16. Outline the pharmacological tests that can help localise the lesion in Horner's syndrome. *(4 marks)*
17. Answer **both** parts of this question:
- a) List **three (3)** parasites that have been reported to cause keratitis in dogs. *(3 marks)*
 - b) Name a cause of parasitic keratoconjunctivitis in cattle. *(1 mark)*

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18. Answer **both** parts of this question:
- a) List **four (4)** causes of pre-iridal fibrovascular membranes in the eye. *(2 marks)*
 - b) List **four (4)** ocular sequelae of pre-iridal fibrovascular membrane formation. *(2 marks)*
19. Answer **both** parts of this question:
- a) List **four (4)** pathogenic viruses in cattle that cause ocular signs. *(2 marks)*
 - b) List **four (4)** reported causes of cataracts in pigs. *(2 marks)*
20. List **eight (8)** possible sequelae following proptosis of the globe in a dog. *(4 marks)*

Section B over page

SECTION B

Answer all ten (10) questions

1. Describe the clinical findings reported in cases of canine distemper virus. *(10 marks)*

2. Vitamin A is essential for ocular health. Relate the pathophysiology of vitamin A deficiency in cattle to the clinical signs associated with the condition. *(10 marks)*

3. Answer **all** parts of this question:
 - a) Discuss the proposed pathogenesis of aqueous misdirection syndrome (malignant glaucoma). *(2 marks)*

 - b) Discuss the clinical manifestations of this form of glaucoma. *(3 marks)*

 - c) Briefly state ultrasonographic and histopathology findings associated with the condition. *(2 marks)*

 - d) Briefly discuss treatment options for this disease. *(3 marks)*

4. Discuss pathophysiological changes that occur within the lens during cataract formation. *(10 marks)*

5. Compare and contrast the clinical signs, pathophysiology and treatment of medial canthal ulcerative blepharitis and uveodermatological syndrome in dogs. *(10 marks)*

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6. Several types of Immune-Mediated Keratitis (IMMK) have been reported in horses. Compare and contrast the clinical signs and the treatment options available for endothelial keratitis and eosinophilic keratitis. *(10 marks)*
7. Answer **all** parts of this question:
- a) List mechanisms of cellular destruction that occur following cryotherapy. *(4 marks)*
 - b) List the different cryogens commonly used in veterinary ophthalmology and their boiling points. *(2 marks)*
 - c) List the uses for cryotherapy in veterinary ophthalmology. *(4 marks)*
8. Discuss the diagnosis of uveitis in camelids, including in your answer the different aetiologies of uveitis in these species and treatment options for this condition. *(10 marks)*
9. With respect to canine optic neuritis:
- a) List the causes of optic neuritis in dogs. *(4 marks)*
 - b) Briefly describe the clinical manifestations of optic neuritis in dogs. *(2 marks)*
 - c) How would you investigate a case of optic neuritis in a dog? *(2 marks)*
 - d) Outline the treatment and prognosis for the various types of canine optic neuritis. *(2 marks)*
10. Describe the pathophysiological changes that occur in **each** of the components of the globe with glaucoma. *(10 marks)*

End of paper