



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2012

Veterinary Ophthalmology Paper 1

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

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

Section A: Answer **ALL twenty (20)** questions

Allow **one (1)** hour for Section A

Section B: Answer **ALL four (4)** questions

Allow **two (2)** hours for Section B

All questions are of equal value

Answer **ALL twenty** questions in Section A each worth 4 marks.....total 80 marks

Answer **ALL four** questions in Section B each worth 25 markstotal 100 marks

Paper 1: Veterinary Ophthalmology

Section A

Answer ALL twenty (20) questions

1. Myocillin is an important protein implicated in the development of human and canine glaucoma.
 - a) Briefly discuss the proposed role of myocillin in the normal canine eye. *(1 mark)*
 - b) Define the location of myocillin in the normal canine eye. *(1 mark)*
 - c) Briefly discuss the proposed role of the myocillin protein in canine glaucoma. *(2 marks)*

2. With reference to toxic anterior segment syndrome:
 - a) Define this syndrome. *(1 mark)*
 - b) Briefly discuss the proposed aetiology. *(2 marks)*
 - c) List the strategies that can be implemented to reduce its incidence. *(1 mark)*

3. Scanning laser polimetry is an increasingly-used technique in ophthalmology.
 - a) List the main clinical ophthalmic condition it is used to assess in humans. *(1 mark)*
 - b) Briefly describe how this technique may be useful in investigating canine ocular disease. *(2 marks)*
 - c) Briefly comment on the outcome of the use of scanning laser polimetry in the published veterinary literature. *(1 mark)*

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4. List **four (4)** different techniques (other than digital tonometry) used for the measurement of intraocular pressure. (2 marks) For **two (2)** of these techniques, outline in detail how intraocular pressure is measured. (2 marks)
5. Briefly describe the role of Vitamin A/retinal and retinol in the process of phototransduction. (4 marks)
6. With the aid of a diagram, demonstrate the various foramen in the bovine orbit and identify the nerves and arteries that pass through each of these foramen. (4 marks)
7. List **four (4)** glycosaminoglycans located in the cornea. (2 marks) Briefly outline the role of glycosaminoglycans in the maintenance of normal corneal function. (2 marks)
8. Briefly discuss the different roles of the retinal pigment epithelium in the canine eye. (4 marks)
9. Describe in detail the innervation of the dog iris. (4 marks)
10. Briefly discuss the benefits of the use of magnetic resonance imaging (MRI) compared with computer assisted tonometry (CT), as a diagnostic modality in veterinary ophthalmology. (4 marks)
11. List **four (4)** classes of systemic antifungal antimicrobial drugs. (2 marks) Briefly describe the mode of action for **two (2)** of these antimicrobial agents. (2 marks)

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12. Various lipoproteins have been linked to ocular pathology. With respect to lipoproteins:
- a) Name the predominant lipoprotein in dogs and cats. *(1 mark)*
 - b) Name the lipoprotein and the lipid associated with the clinical presentation of lipid aqueous in Burmese kittens. *(1 mark)*
 - c) List **four (4)** systemic diseases which should be investigated as underlying aetiologic factors contributing to lipid keratopathy cornea in the dog. *(2 marks)*
13. List **four (4)** features of the raptor eye that distinguish it from the canine eye. *(4 marks)*
14. Slit lamp examination is an integral part of most ophthalmic examinations. List **two (2)** different slit lamp techniques and their uses in veterinary ophthalmology. *(4 marks)*
15. A number of different tissue stains are used in veterinary ophthalmology. List **four (4)** stains used in ocular cytological or histopathological evaluation, and the structures or tissues to which they bind and identify. *(4 marks)*
16. Gonioscopy is an important ancillary diagnostic aid in veterinary ophthalmology. List the structures that can be observed during gonioscopy and outline what is being assessed when using this technique. *(4 marks)*

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17. Several recent published studies have reported the bacterial and fungal population retrieved from the conjunctiva of the healthy horse. A recent report from the United Kingdom (UK) revealed some interesting data. With reference to this manuscript:
- List the most common Gram-negative and Gram-positive bacterial species isolated from the conjunctiva in healthy horses in the UK. *(2 marks)*
 - Briefly outline how the population of bacteria isolated from the conjunctiva changes with age in the healthy horse. *(1 mark)*
 - List **two (2)** fungal organisms which have been isolated from the conjunctiva of healthy horses. *(1 mark)*
18. Using a table, compare the features of Merle Ocular Dysgenesis and Collie Eye Anomaly with respect to the frequency and/or severity of microphthalmia, choroidal hypoplasia, optic nerve coloboma, and iris coloboma. *(4 marks)*
19. Name the blood vessels of the canine eye that directly perform the following functions:
- supply the major arterial circle of the iris *(1 mark)*
 - supply the ciliary body *(1 mark)*
 - supply the choroid *(1 mark)*
 - drain the anterior uvea and choroid. *(1 mark)*
20. Ophthalmic drugs with autonomic activity are useful in the diagnosis of several ocular conditions. List **four (4)** actions of autonomic drugs within the eye. *(2 marks)*
List **two (2)** direct acting sympathomimetic drugs and **two (2)** indirect acting sympathomimetic drugs. *(2 marks)*

End of Section A

Section B

Answer ALL four (4) questions

1. The cornea interfaces with the external environment, and is subject to continuous challenge from this environment. Over the last twenty years considerable progress has been made in understanding the immunobiology of the mammalian ocular surface and cornea. In light of this progress, review the mechanisms of immunoregulation and protection of the ocular surface. In your answer, discuss the mechanisms for protection against foreign antigens, and also how immunoregulation can fail in the event of immune mediated corneal disease. *(25 marks)*
2. Discuss the similarities and differences between the retinal nutritive systems in selachians (non-bony fish), teleostians (bony fish), amphibians, reptilians, and avians. *(25 marks)*
3. Discuss the tunica vasculosa lentis in ocular development with reference to the timing of its appearance and regression. In your answer, discuss the clinical manifestations of failure of this tissue to regress. *(25 marks)*
4. There are **three (3)** basic tapetal morphologic types in vertebrates. Discuss each of these with reference to the species in which they occur and their location, composition, and function. *(25 marks)*

End of paper



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Veterinary Ophthalmology Paper 2

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Section A: Answer **ALL twenty (20)** questions
Allow **one (1)** hour for Section A

Section B: Answer **ALL four (4)** questions
Allow **two (2)** hours for Section B

All questions are of equal value.

Answer **ALL twenty** questions in Section A each worth 4 marks.....total 80 marks
Answer **ALL four** questions in Section B each worth 25 markstotal 100 marks

Paper 2: Veterinary Ophthalmology

Section A

Answer **ALL** twenty (20) questions

1. List **four (4)** types of surgical needles available for use in ophthalmic surgery. (2 marks). For each type describe the benefits of the design for its intended application. (2 marks)

2. Answer **both** subparts of this question.
 - a) Define 'amaurosis'. (1 mark)

 - b) Discuss the differential diagnoses of acute amaurosis in dogs and briefly outline the diagnostic tests that may assist in differentiating these diseases. (3 marks)

3. List the **four (4)** reported ocular clinical signs associated with canine herpesvirus infection in adult dogs, in order from the most common clinical sign to the least common. (4 marks)

4. Define the pathogenesis, clinical presentation and location of heterotopic bone formation in the guinea pig eye and briefly discuss the clinical implications of heterotopic bone formation for the eye; include in your answer a brief discussion of the diagnosis, management and prognosis. (4 marks)

5. Answer **both** subparts of this question.
 - a) Define the origin and briefly discuss the role of matrix metalloproteases in corneal ulceration. (2 marks)

 - b) With reference to the published relevant literature, list the documented benefits of using systemic doxycycline in the treatment of ocular surface disease in veterinary ophthalmology. (2 marks)

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6. Pre-iridal fibrovascular membranes are an important pathological entity in the canine eye.
- a) Briefly describe the histopathological characteristics of pre-iridal fibrovascular membranes in dogs. *(2 marks)*
 - b) List **two (2)** ocular signs that can be clinically detected in affected dogs. *(2 marks)*
7. The diode laser is often used as a surgical treatment of glaucoma in equine ophthalmology.
- a) State the wavelength of the diode laser as used in veterinary ophthalmology. *(1 mark)*
 - b) Briefly outline the basis of laser treatment for equine glaucoma. *(1 mark)*
 - c) Briefly discuss the proposed benefit of diode laser compared to Nd:YAG laser in the treatment of equine glaucoma. *(1 mark)*
 - d) State the distance behind the limbus that the laser should be applied in a horse with equine glaucoma and outline how long after treatment the intraocular pressure would stabilise based on the published veterinary literature. *(1 mark)*
8. Canine corneal squamous cell carcinomas are uncommon but can be difficult to manage.
- a) Name **two (2)** histopathological features that distinguish squamous cell carcinomas from carcinoma in situ. *(1 mark)*
 - b) List **four (4)** adjuvant therapies which could be considered in addition to local resection of a squamous cell carcinoma. *(2 marks)*
 - c) List **two (2)** factors proposed to influence the development of squamous cell carcinomas. *(1 mark)*

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9. Exophthalmos is a common presentation in orbital disease in the dog. Outline your clinical approach to investigation of this condition if you did not have access to advanced imaging modalities. (4 marks)
10. List **four (4)** viruses that can cause ocular disease in chickens. (2 marks) Briefly outline the ocular clinical signs of one of these viral diseases. (2 marks)
11. Neuronal ceroid lipofuscinosis (CNL) is reported in Border collies:
- a) List **two (2)** clinical signs which may be associated with CNL in this breed. (1 mark)
 - b) Briefly outline the cause of CNL in Border collies. (1 mark)
 - c) State the typical age at which affected dogs present and the typical age at which vision problems become apparent. (2 marks)
12. Cataracts have been identified in farmed fish. List the proposed causes for the development of cataracts in farmed Atlantic salmon. (4 marks)
13. Briefly discuss the formation of the retina. In your answer include the proposed mechanism for the formation of a rosette encountered in retinal dysplasia. (4 marks)

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14. Feline infectious peritonitis (FIP) can be a challenging viral disease to diagnose and manage. The aetiologic agent is a feline coronavirus, although not all cats infected with the virus develop clinical symptoms of FIP.
- a) List **two (2)** clinical abnormalities affecting the fundus that may be present with FIP viral infection. (1 mark)
 - b) List the **two (2)** haematological and biochemical abnormalities associated with this disease which may assist with the clinical diagnosis. (1 mark)
 - c) Name the cell type in which the virus is located in affected animals. (1 mark)
 - d) State the reported incidence of FIP in cats seropositive for feline *coronavirus spp.* (1 mark)
15. List and briefly discuss the important factors that have been reported to be implicated in the development of corneal sequestrum in cats. (4 marks)
16. Keratoconjunctivitis sicca is a common ocular disease in dogs and treatment with topical cyclosporin is beneficial in the management of the disease. Briefly outline how cyclosporin improves tear quality and quantity. (4 marks)
17. Ocular manifestations of both experimental and spontaneous canine diabetes mellitus have been used as a model for complications associated with human diabetes. List **eight (8)** ocular abnormalities associated with canine diabetes mellitus. (4 marks)
18. Equine glaucoma is a poorly understood disease. List **two (2)** risk factors for the development of glaucoma in horses. (2 marks) List **two (2)** reasons why horses may be more tolerant of elevations in intraocular pressure, which in other species would typically result in blindness. (2 marks)

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19. There are many causes of vision failure in young cattle. Give **two (2)** examples of clinical syndromes or diseases in **each** of the following categories that may result in vision failure in young cattle.
- a) infectious (*1 mark*)
 - b) nutritional (*1 mark*)
 - c) toxic (*1 mark*)
 - d) hereditary. (*1 mark*)
20. A dog presents with an eyelid mass and surgical resection is performed. Histopathological diagnosis confirms an incompletely resected conjunctival mast cell tumour. With reference to the literature what would your management recommendations be for further surgical intervention; include a brief discussion regarding the risk of recurrence and the long term prognosis. (*4 marks*)

End of Section A

Section B

Answer ALL four (4) questions

1. Discuss the medical and surgical options available for the treatment of primary glaucoma in cats. Include in your answer a review of the various pharmacological agents available and discuss their use in cats. In addition, you should also discuss the advantages and disadvantages of various surgical options for the management of glaucoma in this species. *(25 marks)*
2. Review the different melanomas that can affect the canine and feline eye. Compare and contrast the biological behaviour of melanomas in these species. Include in your answer a discussion about some recent developments in ancillary medical treatment modalities that may be beneficial in the management of these tumours. *(25 marks)*
3. Discuss the potential causes and management of post-operative ocular hypertension following canine phacoemulsification surgery. Include in your answer a discussion of lens pathology, breed and ocular anatomy as well as intra-operative considerations and pre- and post-operative medical management. *(25 marks)*
4. Refraction of light is vital for vision. Discuss refraction with reference to ocular anatomy in the various layers of the eye as light enters. Discuss some of the species differences in refraction, especially between terrestrial and non terrestrial species. Name the different mechanisms by which vertebrates may accommodate. Finally discuss the visual implications of aphakia and how intraocular lenses can bring a dog or cat to emmetropia. *(25 marks)*

End of paper