



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2014

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 FOUR (4)** Questions

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

Section B: Essay Style: Answer **FOUR** questions each worth 25 markstotal 100 marks

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Paper 1: Veterinary Ophthalmology

Answer all twenty (20) questions

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

- a) Name the main sensory nerve of the face. *(1 mark)*
- b) Name the **three (3)** branches of the ophthalmic nerve. *(1 mark)*
- c) Name the first branch of the maxillary nerve. *(1 mark)*
- d) Name the specific nerve that innervates the skin and conjunctiva of the lower eyelid. *(1 mark)*

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

- a) Name the **two (2)** cell types in the inner nuclear layer of the retina that increase remarkably in cone dominant retinas. *(1 mark)*
- b) Name **two (2)** possible roles Muller cells may play in the retina. *(2 mark)*
- c) Based on morphology, state why the Muller cell is unique in the retina. *(1 mark)*

Continued over page

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

- a) Name **two (2)** functions of the parasympathetic portion of cranial nerve VII. *(1 mark)*
- b) Name the termination of the pretectal nucleus. *(1 mark)*
- c) Name the function of the pretectal nucleus. *(1 mark)*
- d) Name the nerve which provides the afferent limb of the palpebral reflex resulting from stimulation of the skin at the lateral canthus. *(1 mark)*

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

- a) Name the embryonic tissue of origin of the epidermis, cilia and conjunctival epithelium. *(1 mark)*
- b) Name **two (2)** of the deeper structures of the eyelids derived from neural crest mesenchyme. *(1 mark)*
- c) What is a somitomere? *(1 mark)*
- d) On what day of gestation in the dog do the eyelids fuse together? *(1 mark)*

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

- a) Name **two (2)** human anterior segment dysgeneses (ASD). *(1 mark)*
- b) What is the most common ASD in domestic animals? *(1 mark)*
- c) Name **two (2)** ocular tissues in domestic animals that have been confirmed to be of mesodermal origin. *(1 mark)*
- d) Name the tissues most likely to be responsible for abnormalities in lens shape (e.g., spherophakia, lens coloboma). *(1 mark)*

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

- a) Name the **four (4)** ways that the vertebrate eye can accommodate. (2 marks)
- b) Name **four (4)** possible mechanisms for presbyopia. (2 marks)

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

- a) Name the cell, other than rods or cones, believed to contribute to the regulation of a number of daily behavioural and physiological rhythms. (1 mark)
- b) State the nucleus to which the answer for 7a) projects thus enabling a pupillary light reflex. (1 mark)
- c) Name the primary nucleus in the mammalian brain responsible for the generation and maintenance of circadian rhythms. (1 mark)
- d) Name the main inhibitory transmitter in the retina. (1 mark)

8. Automated refractors are commonly used by physician ophthalmologists and optometrists.

Answer **both** parts of this question:

- a) State the advantages of a wavefront autorefractor in comparison to retinoscopy. (2 marks)
- b) Briefly explain how a wavefront autorefractor works. (2 marks)

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9. Answer **all** parts of this question:
- a) What are encapsulated sensory corpuscles? (1 mark)
 - b) What is their suggested function? (1 mark)
 - c) Name **two (2)** ocular structures in which they are found. (2 marks)
10. Briefly discuss the potential use of suberoylanilide hydroxamic acid (SAHA; Vorinostat) in veterinary ophthalmology. In your answer include the agent from which this drug is derived and its presumed mechanism of action. (4 marks)
11. Identify **four (4)** therapeutic options to provide analgesia following corneal ulceration. For **each** option, list the advantages and disadvantages of **each**. (4 marks)
12. The inherent ability of viruses to introduce genetic material into cells has been harnessed to express therapeutic genes in target cells (an approach known as gene therapy).

Answer **both** parts of this question:

- a) Viral vectors are required to have certain features to make them suitable for gene therapy. List **two (2)** features deemed to make them safe for this purpose. (2 marks)
- b) List **four (4)** purposes for the use of viral vector-mediated gene therapy in the retina. (2 marks)

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13. *Encephalitozoon cuniculi* has been reported as a cause of ophthalmic disease. List **four (4)** species that have been reported to develop ocular pathology associated with this parasite, and briefly describe the ophthalmic signs attributed to *E cuniculi* in **each** species. (4 marks)
14. With respect to ocular immunity:
- a) Provide the location on the ocular surface where the greatest concentration of organised conjunctiva associated lymphoid tissue (CALT) is found in cats. (1 mark)
 - b) List **four (4)** retinal autoantigens which have been implicated in equine recurrent uveitis (ERU). (2 marks)
 - c) Identify the immune cell type that mediates ERU. (1 mark)
15. Answer **both** parts of this question:
- a) List the **three (3)** basic lesions that can be defined using direct and retroillumination methods of slit lamp biomicroscopy. (3 marks)
 - b) Give an example of **two (2)** such lesions. (1 mark)

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16. List **four (4)** common histopathologic attributes of malignant ocular neoplasia. (4 marks)
17. Answer **both** parts of this question:
- a) Define optical coherence tomography (OCT), and state its principal use. (2 marks)
 - b) Explain how OCT images are produced. (2 marks)
18. Answer **all** parts of this question:
- a) Name the retinal layers which are functionally assessed by the flash electroretinogram (ERG). (1 mark)
 - b) In terms of the flash ERG, explain what is represented by PIII. (1 mark)
 - c) Identify the lowest frequency of flickering light required to produce a pure cone-drive response in dogs and cats during ERG. (1 mark)
 - d) Identify the age at which the ERG is first detectable in cats. (1 mark)
19. Briefly outline the clinical and histopathological differences between equine linear keratopathy **or** band opacity, and striate band keratopathy **or** 'Haab's stria'. (4 marks)
20. Briefly describe the typical light microscopic histopathological events expected of ocular melanosis in the Cairn terrier. (4 marks)

Section B over page

SECTION B

Answer all four (4) questions

1. Discuss in detail the anatomy and physiology of the optic nerve. Your answer should include the origin and end points of the optic nerve, associated cell populations and the roles of those cells, the method of information transfer along the optic nerve, and the role of myelination of the optic nerve. Your answer should also include brief comment on comparative aspects of species differences in the course of the nerve and a brief description of the lateral geniculate nucleus. *(25 marks)*
2. Discuss visual acuity in animals. Compare the visual acuity of dogs to humans. Your answer should include a definition of visual acuity, ways to measure visual acuity in animals, stimulus and ocular parameters which influence visual acuity, and factors which affect visual acuity in animals at the cellular level. *(25 marks)*
3. Discuss the use of corticosteroids in the treatment of ocular disease. Your answer should include mechanisms of action, routes of administration, types of drugs available, indications for use, ocular and systemic side effects of these medications. *(25 marks)*
4. Discuss the pathology and complications of intraocular inflammation in animals. *(25 marks)*

End of paper

