

Australian College of Veterinary Scientists
Membership Examination

June/July 2010

Veterinary Radiology

Paper 1

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **four (4)** from the six questions **only**.

All questions are of equal value.

Subsections of questions are of equal value unless stated otherwise.

Paper 1: Veterinary Radiology

Answer four (4) from the six questions only.

1. High-end, sophisticated X-ray machines are capable of making exposures with shorter times compared to small, portable machines. Compare and contrast the cathode, anode and generator circuit in the two types of machines to help explain why shorter times are possible in a sophisticated machine.

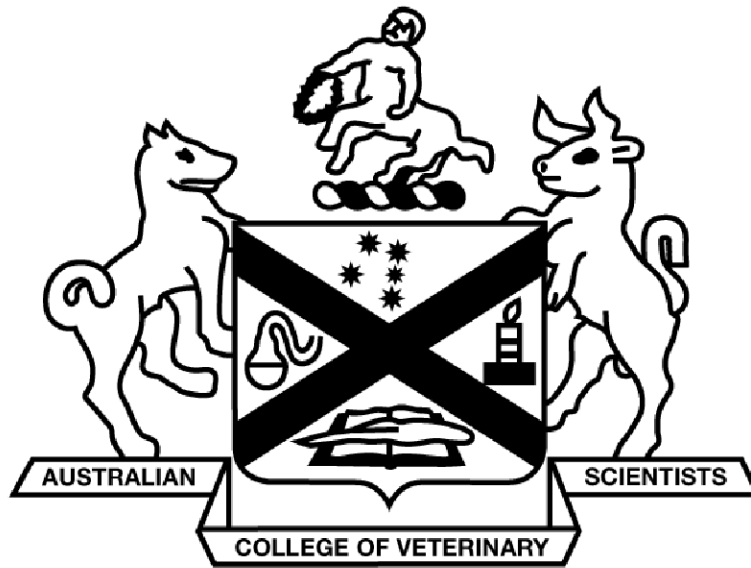
2. The photoelectric effect and Compton scatter are two potential interactions that may occur when the beam of x-ray photons interacts with the patient.
 - a) Draw and label a diagram to illustrate the photoelectric effect.
(20% of question marks)
 - b) Explain why the photoelectric effect is important in the formation of the radiographic image.
(30% of question marks)
 - c) Draw and label a diagram to illustrate Compton scatter production.
(20% of question marks)
 - d) Describe techniques that can be used to limit the production of scatter and reduce the effects of scatter on the radiographic image.
(30% of question marks)

3. Write notes on **all** of the following:
 - a) the steps involved in manual processing of radiographs, and the purpose of **each** step
 - b) A method for testing if there is excess light in the darkroom (eg from the safelight or light leaks).
 - c) A radiograph that lacks density may be the result of underexposure or underdevelopment of radiographs. Describe how to tell the difference between these two, and list **one (1)** possible cause for **each**.

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4. Describe how to perform a high quality radiographic examination in **all** of the following patients. In your answer, include a description of the method of patient management, radiographic projections, radiographic technique and any equipment used:
- a) assessment for otitis media in a four-year-old German shepherd dog
 - b) a two-year-old domestic short haired cat with severe respiratory distress, after a road traffic accident
 - c) a pony with laminitis
 - d) a yearling thoroughbred with suspected osteochondrosis of the stifle.
5. Write notes on **all** of the following:
- a) acoustic impedance and its role in ultrasound image formation
 - b) The factors that need to be considered when purchasing ultrasound transducers for small animal practice.
 - c) An 'audit' of the radiography facility must be done before making a technique chart. Explain the things that need to be considered in this 'audit', and the equipment needed to make a technique chart.
6. Answer **all** the following questions with regard to radiation safety:
- a) List the basic rules of radiation safety. **(50% of question marks)**
 - b) List the facilities/equipment required to assist with adherence with these basic radiation rules in small animal practice and ambulatory equine practice. **(25% of question marks)**
 - c) Define stochastic effects of ionising radiation. **(25% of question marks)**

End of paper



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Paper 2

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Answer **four (4)** from six questions **only**.

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Paper 2: Veterinary Radiology

Answer four (4) from the six questions only.

1. A six-year-old female neutered Labrador retriever presents with a two day history of vomiting and anorexia. She has not responded to 24 hours of medical therapy. Blood tests are suggestive of your clinical suspicion of pancreatitis; however you are still concerned about gastrointestinal causes. You decide to take abdominal radiographs. Answer **both** the following:
 - a) List your differential diagnoses and provide a detailed description of the plain radiographic features of **each** condition.
 - b) Comment on the usefulness of complementing your radiographic examination with other imaging techniques.

2. You take plain abdominal radiographs from a dog that has recently been hit by a car. There is loss of serosal detail and an increase in soft tissue/fluid opacity in the retroperitoneal space. Answer **both** the following:
 - a) List your differential diagnoses. **(10% of question marks)**
 - b) Explain the contrast study you might perform to help obtain a definitive diagnosis. Include in your answer a description of how you would perform this study and the detail of the radiographic features you would expect to see. **(90% of question marks)**

3. You are presented with an eight-year-old Australian terrier with a grade 3/6 left apical heart murmur and a cough. Discuss how you would differentiate left sided congestive heart failure, chronic bronchitis, and collapsing trachea on plain radiographs.

4. Answer **each** of the following:
 - a) A six-month-old male neutered German shepherd dog presents with a left forelimb lameness. Clinical examination localises this lameness to the left elbow. List your differential diagnoses and describe in detail the radiographic features of **each** condition.
 - b) Describe in detail the radiographic features of osteochondrosis in the equine tarsus.

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5. Write notes on the radiographic features of **all** the following conditions:
- a) pneumomediastinum in a cat
 - b) left adrenal gland mass in a dog
 - c) osteomyelitis in the third metacarpus of a horse
 - d) sesamoiditis in a horse.
6. Answer **both** the following:
- a) List the radiographic projections that are required for a complete study of the equine carpus.
(10% of question marks)
 - b) Describe in detail the radiographic features of carpal chip and slab fractures in the horse including the bones most frequently affected, the aspects of the bones involved, and the views used to demonstrate these lesions.
(90% of question marks)

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