Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2016

Veterinary Radiology (Small Animal)

Paper 1

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

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

Section A: Answer **ALL** **TWO (2)** questions

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

Section C: Answer **ALL** **TEN (10)** questions

Section C is multiple choice which requires completion of **ten (10)** multiple choice questions located in the answer booklet you have been provided. *(Sample provided in this paper)*

Section A: **TWO** essay-type questions each worth 30 marks .....total 60 marks

Section B: **FOUR** short-answer questions each worth 10 marks .....total 40 marks

Section C: **TEN** multiple choice questions each worth 2 marks .....total 20 marks

Paper 1: Veterinary Radiology (Small Animal)

SECTION A
Answer both questions in Section A

1. Briefly describe the following with respect to an ultrasound examination of the liver in a German shepherd dog:

   a) Approach to performing the examination including preparation of the animal, scanning technique, and scanning environment. *(5 marks)*

   b) Image optimisation. *(5 marks)*

   c) Transducer selection. Include in your answer differences between the transducers that may be used for examination of a cat and a German shepherd dog. *(5 marks)*

   d) List **three (3)** artefacts that may be encountered when performing an ultrasound examination of the normal or diseased liver. Describe how **each** artefact is created. *(15 marks)*

Continued over page

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

a) With the aid of a diagram, label the components of a basic X-ray tube which has a stationary anode. For **each** labelled component, briefly describe the role it plays in the process of X-ray production. *(21 marks)*

b) Define the 'heel effect'. Provide an example of when the 'heel effect' could be used advantageously when performing a radiographic study. *(3 marks)*

c) List **four (4)** methods that may be used to reduce the amount of scatter radiation reaching the plate/film. *(4 marks)*

d) For **one (1)** of the methods listed in 2 c) briefly describe how scatter radiation is reduced. *(2 marks)*

Section B over page

SECTION B

Answer all four (4) questions in Section B

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

   a) List **two (2)** abnormalities that may be seen in a thoracic radiograph performed under general anaesthesia that do not represent pathology, but may occur due to the use of general anaesthesia. Briefly describe how these abnormalities may be minimised. *(5 marks)*

   b) Briefly discuss **three (3)** advantages of performing thoracic radiography under general anaesthesia compared with sedation. *(5 marks)*

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

   a) Briefly discuss why ionic iodinated contrast agents are more likely to result in contrast reactions than non-ionic iodinated contrast agents, when given intravenously. *(4 marks)*

   b) Describe the technique for a retrograde urethrogram in a 20 kg male dog, including the contrast agent, contrast dose, equipment and procedure. *(6 marks)*

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

   a) In regards to digital radiography, define the acronym PACS. *(1 mark)*

   b) List the basic components of a PACS that would be typical for a 4-veterinarian small animal veterinary practice. *(5 marks)*

   c) State the cause **and** remedy for the following digital radiography artefacts:

      i. phantom image *(2 marks)*

      ii. quantum mottle. *(2 marks)*

4. With reference to the ALARA principle, describe how radiation exposure to personnel can be minimised in a small animal practice setting. *(10 marks)*

Section C continued in provided answer booklet

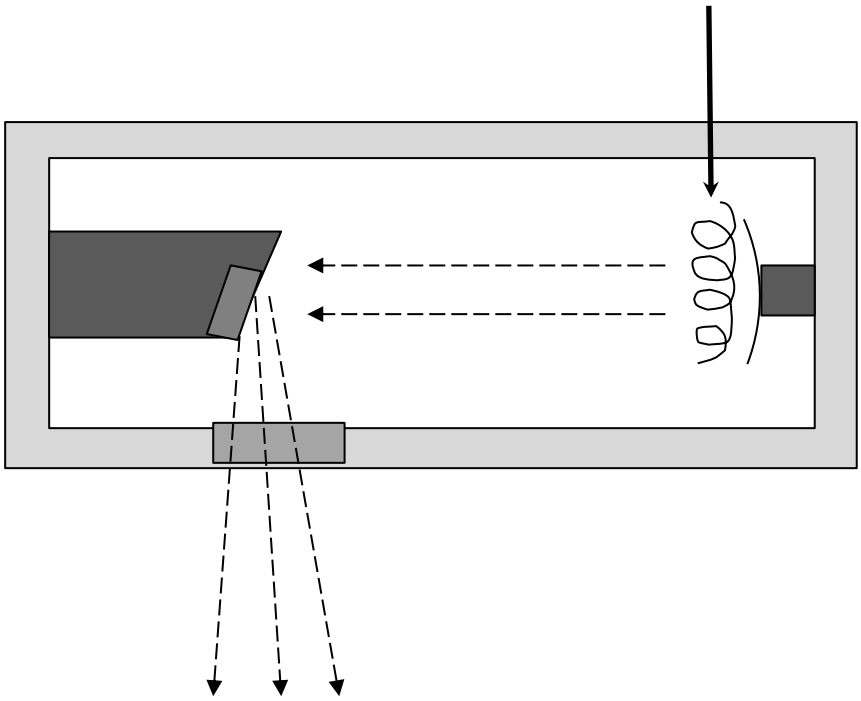
Paper 1: Veterinary Radiology (Small Animal)

Section C: Answer all ten (10) multiple choice questions in this section on printed pages 5 to 8 in this answer booklet.

Answer all ten (10) questions on the examination paper. This section is worth 20 marks. Each question is worth two (2) marks. Circle the letter corresponding to your chosen answer.

(10 multiple choice questions will be part of this examination located in a separate answer booklet that will be provided. Two examples for each paper have been made available.)

1. In the diagram below, which of the following options is the correct name for the component of an x-ray tube indicated by the solid arrow? *(2 marks)*



a) tungsten target

b) anode

c) tube port

d) cathode filament

2. Which of the following actions can a radiographer take to reduce the amount of scatter radiation produced by a patient? *(2 marks)*

a) collimate the beam

b) reduce mAs

c) use a grid

d) increase kVp

End of paper

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Paper 2

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

Section A: Answer **ALL** **TWO (2)** questions

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

Section C: Answer **ALL** **TEN (10)** questions

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Section B: **FOUR** short-answer questions each worth 10 marks .....total 40 marks

Section C: **TEN** multiple choice questions each worth 2 marks .....total 20 marks

Paper 2: Veterinary Radiology (Small Animal)

SECTION A
Answer both questions in Section A

1. A male neutered nine-year-old German shepherd dog is presented unable to walk, with upper motor neuron signs to the pelvic limbs and normal thoracic limbs.

   Answer **all** parts of this question:

   a) List the anatomic region of the spine that should be included in imaging, and justify your answer. *(2 marks)*

   b) For **each** of the following imaging options, list **one (1)** advantage and **one (1)** disadvantage:

      i. spinal radiography performed in your practice *(2 marks)*

      ii. referral computed tomography (CT) myelography *(2 marks)*

      iii. referral spinal magnetic resonance imaging (MRI) at 1.5T field strength. *(2 marks)*

   c) Differential diagnoses include discospondylitis, vertebral body neoplasia and intervertebral disc disease. For **each** of these differential diagnoses, describe in detail the expected radiographic findings. *(22 marks)*

Continued over page

2. A 60 kg, nine-year-old, male neutered Rottweiler is presented with a three-day history of vomiting and anorexia.

Answer **all** parts of this question:

a) List **three (3)** differential diagnoses for the presenting clinical signs in this patient. *(3 marks)*

b) For **each** of the differential diagnoses listed in 1a), describe the expected radiographic findings on survey abdominal radiographs. *(15 marks)*

c) Abdominal radiographs reveal gas diffusely throughout the stomach, and small and large intestine. The remainder of the study is unremarkable. You decide to perform an abdominal ultrasound examination. Describe **two (2)** limitations of performing abdominal ultrasound in this patient and briefly discuss how these limitations could be minimised. *(6 marks)*

d) After performing abdominal ultrasound you suspect there is pathology in the cranial abdomen but your ultrasound examination was severely limited. You decide that abdominal computed tomography (CT) is indicated.

List **two (2)** advantages and **two (2)** disadvantages of using CT as an imaging modality. *(6 marks)*

Section B over page

SECTION B
Answer all four (4) questions in Section B

1. Answer all parts of this question:

   a) List the **four (4)** most likely differential diagnoses for a cranial mediastinal mass in a cat or dog. *(2 marks)*

   b) Describe the expected radiographic signs associated with a large cranial mediastinal mass. *(5 marks)*

   c) List **three (3)** ways ultrasound may be useful in the investigation of a dog with a cranial mediastinal mass. *(3 marks)*

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

   a) List **four (4)** common differentials for right sided cardiomegaly (without left sided cardiomegaly) in the dog. *(2 marks)*

   b) Answer **both** parts of this sub-question:

      i. List **four (4)** radiographic findings associated with right sided heart failure (excluding right sided cardiomegaly). *(2 marks)*

      ii. List the radiographic features of **three (3)** of these findings. *(6 marks)*

Continued over page

3. An 18-month-old Bernese mountain dog is presented with a three-week history of intermittent right hind lameness which has now progressed to non-weight bearing lameness. Pain is localised to the right stifle.

Answer **all** parts of this question:

a) List **two (2)** differential diagnoses for the presenting clinical signs in this patient. *(1 mark)*

b) Briefly describe the approach to imaging this patient with radiography. Include in your answer patient restraint and radiographic projections. *(4 marks)*

c) For **each** of the differentials listed in 3 a), list **three (3)** expected radiographic findings. *(5 marks)*

4. A 12-year-old Cocker spaniel with chronic diabetes is presented with a history of hematuria. Abdominal radiographs are performed and confirm radiopaque calculi within the urinary bladder.

Answer **all** parts of this question:

a) List **three (3)** possible compositions of the calculi identified on the radiographs. *(3 marks)*

b) The calculi are also seen on abdominal ultrasound. In addition there is concern about emphysematous cystitis and acute pyelonephritis. For **each** of these differential diagnoses, list **three (3)** expected sonographic findings. *(6 marks)*

c) Name the most likely bacterial agent responsible for emphysematous cystitis in this patient. *(1 mark)*

Section C continued in provided answer booklet

Paper 2: Veterinary Radiology (Small Animal)

Section C: Answer all ten (10) multiple choice questions in this section on printed pages 6 to 8 in this answer booklet.

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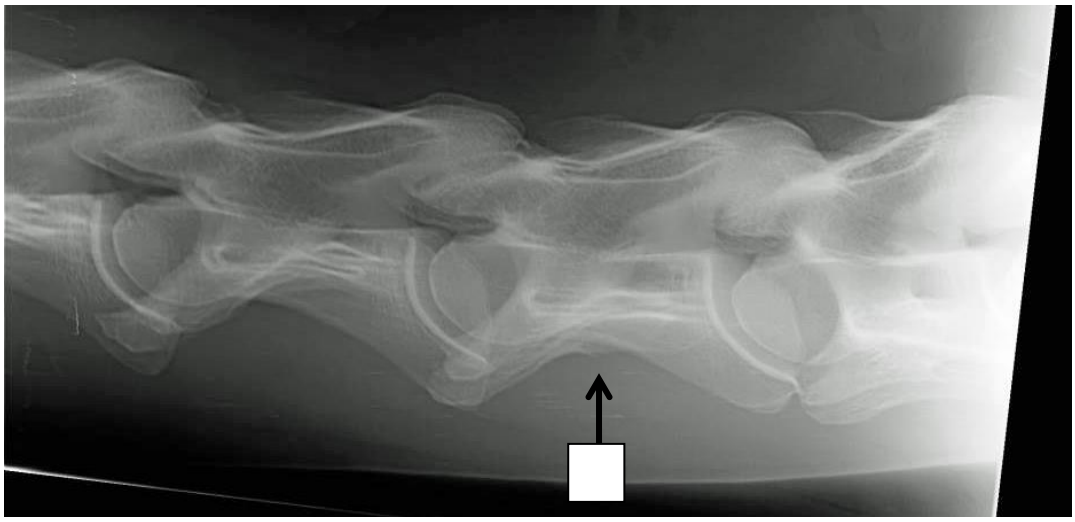

1. On the radiograph provided above the cervical vertebra labelled (x) is: *(2 marks)*

   a) C4

   b) C5

   c) C6

   d) C7

2. Which surface of the equine carpus will be projected in an unobstructed manner ('free projected') in a dorsolateral-palmaromedial radiograph? *(2 marks)*

   a) Dorsomedial

   b) Dorsolateral

   c) Lateral

   d) Dorsal

End of paper