



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2019

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 and requires the completion of **ten (10)** multiple choice questions, located in the answer booklet that has been provided. *(Sample provided in this paper)*

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Section A: **TWO (2)** essay-type questions, each worth 30 marks..... total 60 marks

Section B: **FOUR (4)** short-answer questions, each worth 10 marks..... total 40 marks

Section C: **TEN (10)** 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. Answer **all** parts of this question:

- a) Compare and contrast direct digital radiography (DDR) and computed radiography (CR), with reference to equipment and the process of image formation. *(12 marks)*
- b) Discuss the advantages and disadvantages of direct digital radiography (DDR) in comparison to film screen radiography (FSR). *(16 marks)*
- c) State what the acronym, DICOM, stands for and define what DICOM is. *(2 marks)*

2. Answer **all** parts of this question, stating whether your answer applies to veterinary practice within Australia or New Zealand.

Discuss the safety considerations of setting up a radiography facility in an existing building of a small animal practice, with respect to the:

- a) Layout of the room and the location of the radiography facility, considering the safety of surrounding rooms. *(10 marks)*
- b) Required shielding equipment for personnel, and maintenance of that equipment. *(5 marks)*
- c) Monitoring of staff for radiation exposure. *(5 marks)*
- d) Aspects of the Radiation Management Plan/Radiation Safety Plan procedures that deal with:
 - i. actions required when a female worker declares pregnancy *(5 marks)*
 - ii. actions required if a staff member is suspected of having been exposed to a higher than expected dose of radiation. *(5 marks)*

Section B over page

SECTION B

Answer all four (4) questions in Section B

1. Answer **both** parts of this question:
 - a) Explain why the conduct of best radiographic practice should aim to reduce the production of scatter radiation during an X-ray exposure. (2 marks)
 - b) List the steps that a radiographer may take to reduce the production of scatter radiation. For each step, briefly describe how the production of scatter radiation is reduced, with reference to principles of radiation physics. (8 marks)

Section B continued over page

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

- a) A colleague has requested a second opinion on the following image of a dog's spleen. The image was obtained using a transducer set at 5 MHz. Describe what your colleague should do to improve the quality of this image. (6 marks)

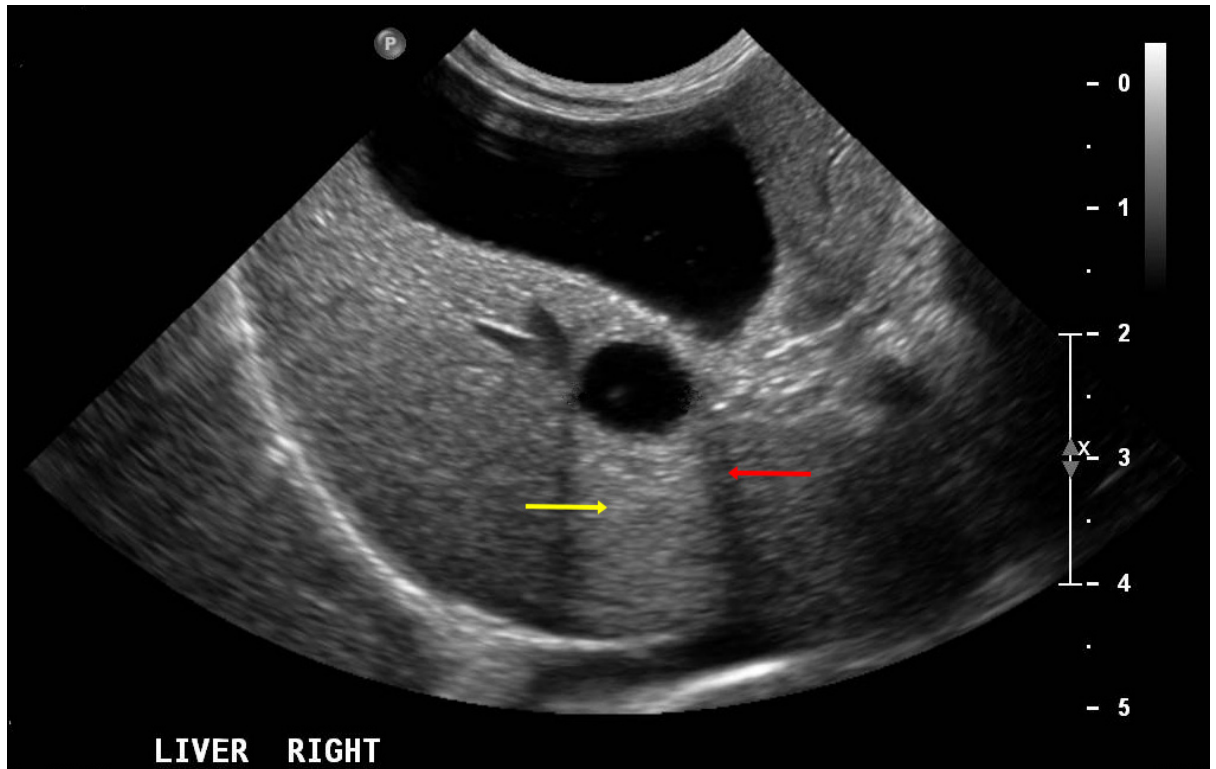


- b) Explain how ultrasound frequency affects image resolution. (2 marks)
- c) Explain why abdominal ultrasound of the dog is typically performed using one focal zone, instead of three focal zones. (2 marks)

Section B continued over page

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

Review the ultrasound image below:



- Name the artefact indicated by the yellow arrow and explain how that artefact occurs. (3 marks)
 - Name the artefact indicated by the red arrow and explain how that artefact occurs. (3 marks)
 - For the artefact indicated by the yellow arrow, explain how the presence of this artefact may aid image interpretation. (4 marks)
4. Compare and contrast the use of a high-output versus a low-output X-ray machine when making a radiograph of a Saint Bernard's abdomen. Your answer should include details on the differences between the structure of high- and low-output X-ray machines. (10 marks)

Please complete Section C in the provided answer booklet

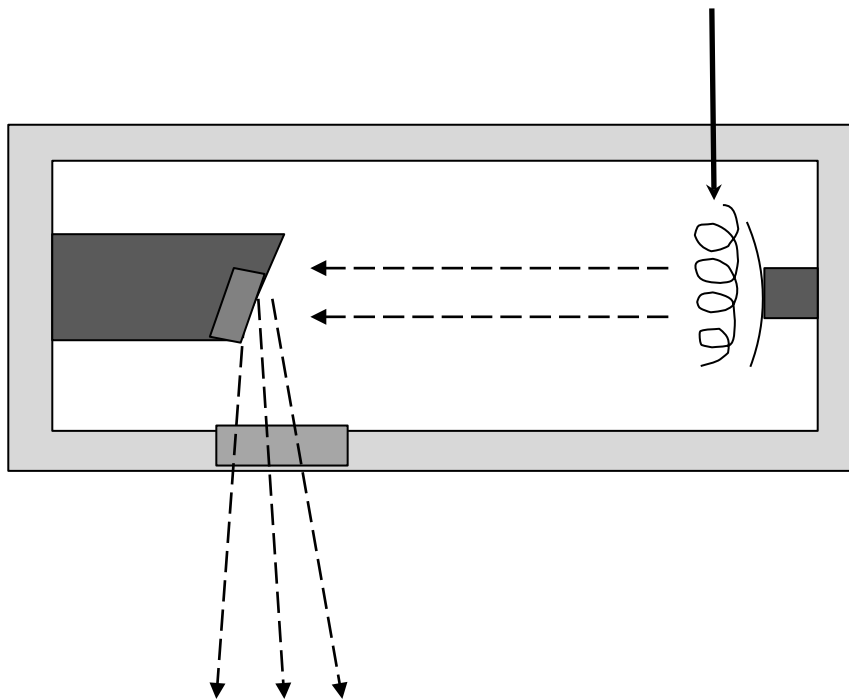
Paper 1: Veterinary Radiology (Small Animal)

SECTION C

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. There is no negative marking.

(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



Australian and New Zealand College of Veterinary Scientists

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June 2019

Veterinary Radiology (Small Animal)

Paper 2

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

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Section A: **TWO (2)** essay-type questions, each worth 30 marks..... total 60 marks

Section B: **FOUR (4)** short-answer questions, each worth 10 marks..... total 40 marks

Section C: **TEN (10)** 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 seven-month-old Labrador puppy is presented with a two-day history of vomiting and anorexia, but no diarrhoea.

Answer **all** parts of this question:

- a) Describe and justify an approach to imaging this patient in a general practice setting. Both radiography and ultrasonography are available, but endoscopy and computed tomography (CT) are not. *(10 marks)*
- b) State **one (1)** common differential diagnosis for vomiting in this patient, and describe the expected radiographic **and** ultrasonographic findings for this condition. *(12 marks)*
- c) Discuss the radiographic **and** ultrasonographic imaging signs that would indicate small intestinal perforation. *(8 marks)*

2. An eight-year-old, entire, male Border collie presents for haematuria and stranguria.

Answer **both** parts of this question:

- a) If an enlarged prostate gland is noted on rectal examination:
 - i. List **three (3)** most likely differential diagnoses in this patient. *(1 mark)*
 - ii. Describe the radiographic signs for each of these **three (3)** disease processes. Your answer should include reference to contrast studies, if appropriate. *(14 marks)*
- b) If a normal-sized prostate gland is noted on rectal examination:
 - i. List **two (2)** further likely potential differential diagnoses in this patient. *(1 mark)*
 - ii. Describe the radiographic signs for each of these **two (2)** disease processes. Your answer should include reference to contrast studies, if appropriate. *(14 marks)*

Section B over page

SECTION B

Answer all four (4) questions in Section B

1. A cat is presented with difficulty opening its mouth following a road-trauma incident one week earlier.

Answer **all** parts of this question:

- a) List the plain radiographic projections required to comprehensively image the skull in this cat. (2 marks)
- b) Briefly describe how these projections would be obtained, in terms of the method of restraint used, ancillary positioning devices and, for each radiographic projection listed in 1a), the X-ray beam angle and centring points. (5 marks)
- c) List the advantages and disadvantages of using computed tomography (CT), instead of radiography, to investigate the presenting problem. (3 marks)

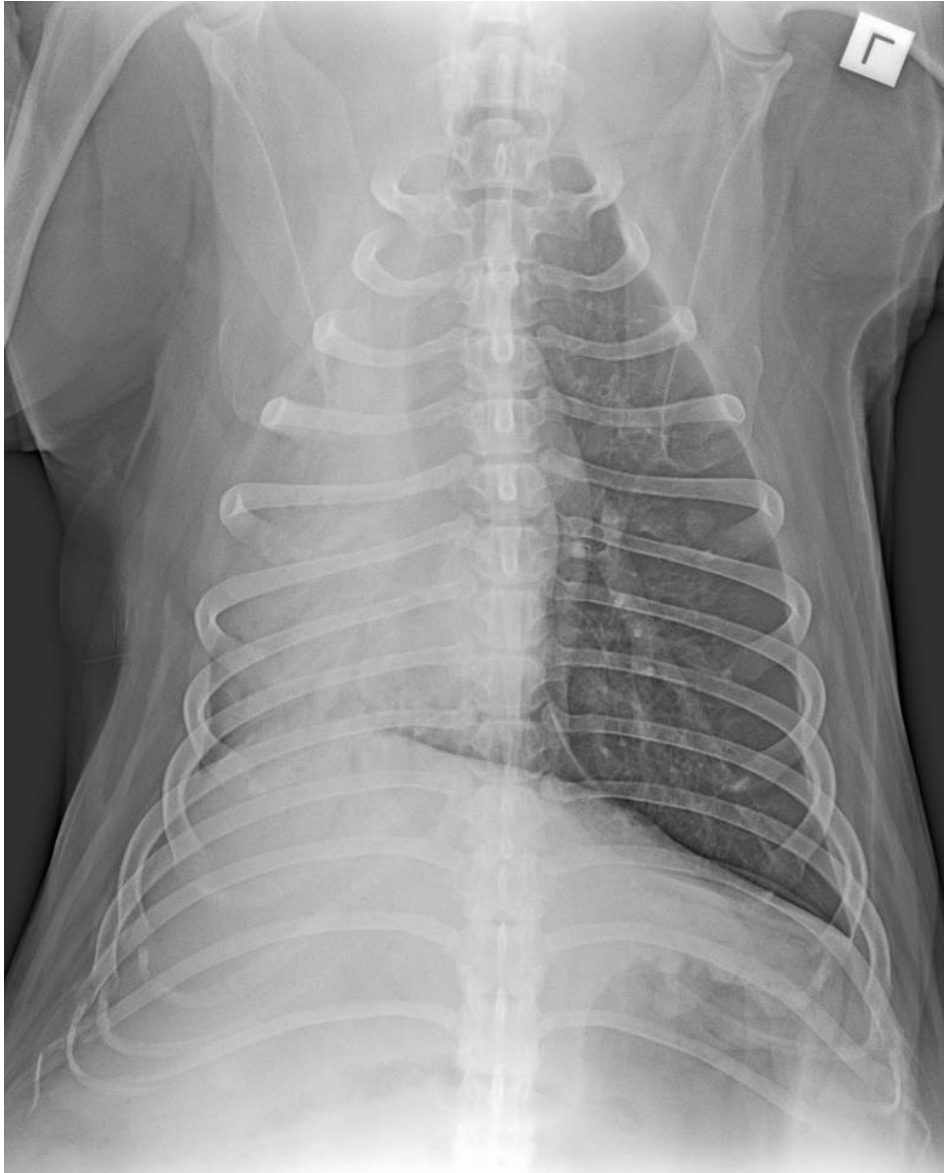
2. On thoracic radiographs, the impression of a cranial mediastinal mass may be falsely created when, in fact, there is no mass present.

Answer **both** parts of this question:

- a) List **five (5)** circumstances that may lead to this false impression and, for each, briefly describe how the impression of a cranial mediastinal mass is created. (8 marks)
- b) Briefly discuss the use of other imaging modalities to investigate the suspected presence of a cranial mediastinal mass on survey radiographs. (2 marks)

Section B continued over page

3. A 10-year-old, male Golden retriever is presented for investigation of neoplasia. The ventrodorsal radiograph below is part of a three-view metastasis check performed with the patient under general anaesthesia.



Answer **all** parts of this question:

- State the **most** likely cause of the increased opacity in the right hemithorax of this patient. (1 mark)
- List the radiographic findings that support the answer given for part 3a). (2 marks)
- Briefly explain the mechanism for this cause and how it may be prevented. (4 marks)
- Given this finding, identify the next most appropriate step to be taken in the investigation of the increased thoracic opacity. (3 marks)

Section B continued over page

4. Compare and contrast the advantages and disadvantages of the Australian Canine Hip and Elbow Dysplasia Scheme (CHEDS; formerly administered by the Australian Veterinary Association (AVA); now Australian National Kennel Council (ANKC)) and PennHIP, to screen for canine hip dysplasia. Include in your answer the radiographic views required for submission to each scheme for scoring. *(10 marks)*

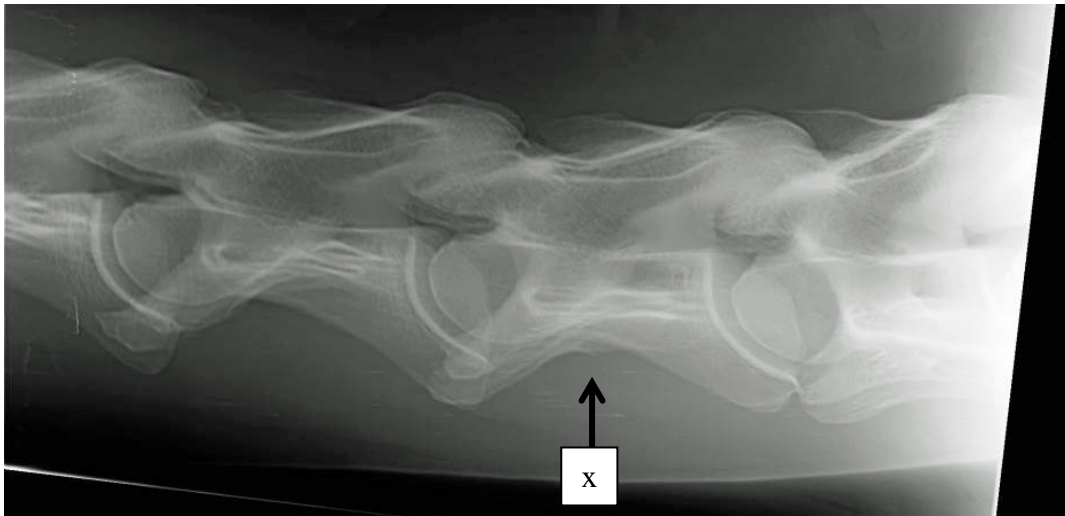
Please complete Section C in the provided answer booklet

Paper 2: Veterinary Radiology (Small Animal)

SECTION C

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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?
 - a. Dorsomedial
 - b. Dorsolateral
 - c. Lateral
 - d. Dorsal

End of paper