



# Australian and New Zealand College of Veterinary Scientists

## Membership Examination

June 2017

## 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)*

© 2017 Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208

*This publication is copyright. Other than for the purposes of and subject to the conditions prescribed under the Copyright Act, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the Australian and New Zealand College of Veterinary Scientists*

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

- a) Define ionising radiation. (2 marks)
- b) The X-ray photons produced by the X-ray tube have a range of energies.

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

- i. Explain the **two (2)** interactions that occur at the anode to produce X-ray photons. (12 marks)
  - ii. Explain the contribution of these interactions to the range of energies in the resultant beam of X-ray photons. (3 marks)
- c) List the **three (3)** potential outcomes of an X-ray photon when it reaches a patient. (3 marks)
  - d) Explain why the photoelectric effect is important in the formation of the radiographic image. (5 marks)
  - e) What is the probability of a photoelectric effect occurring during X-ray exposure? (5 marks)

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

- a) Discuss the major advantages **and** disadvantages of digital radiography (DR) versus film-screen radiography. (21 marks)
- b) Describe the process of image formation in computed radiography. (9 marks)

**Section B over page**

## SECTION B

Answer all four (4) questions in Section B

1. Answer **both** parts of this question:
  - a) Explain the difference between an ionic and non-ionic iodinated contrast agent. *(3 marks)*
  - b) Describe how to perform an oesophagram in a 12-week-old German shepherd dog with regurgitation. *(7 marks)*
  
2. Answer **both** parts of this question:
  - a) For echocardiography, state **one (1)** advantage of a phased array transducer compared to a microconvex transducer for **each** of the following procedures:
    - i. B-mode imaging and assessment of the anatomy of the heart. *(2.5 marks)*
    - ii. Colour Doppler assessment for turbulent blood flow. *(2.5 marks)*
    - iii. Estimation of the velocity of blood flow with continuous wave Doppler. *(2.5 marks)*
  - b) Draw a picture of the shape of the ultrasound image from a phased array transducer and a microconvex transducer. *(2.5 marks)*
  
3. Describe the advantages **and** disadvantages of abdominal ultrasound compared to abdominal radiography for the investigation of a high (orad) duodenal complete obstruction in a dog.
  - advantages of ultrasound/disadvantages of radiography *(5 marks)*
  - disadvantages of ultrasound/advantages of radiography. *(5 marks)*

**Section B continued over page**

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

- a) Write notes on the usefulness of plain radiography, contrast radiography and ultrasound for the investigation of the source of uroabdomen in a male dog due to recent trauma from a motor vehicle accident. You **do not** need to describe the technique for these procedures. (8 marks)
  
- b) List the study/ies you would perform for this patient and what part of the urinary tract is being assessed by **each** study/ies. You **do not** need to describe the technique for these procedures. (2 marks)

**Section C continued in provided answer booklet**

# Paper 1: Veterinary Radiology (Small Animal)

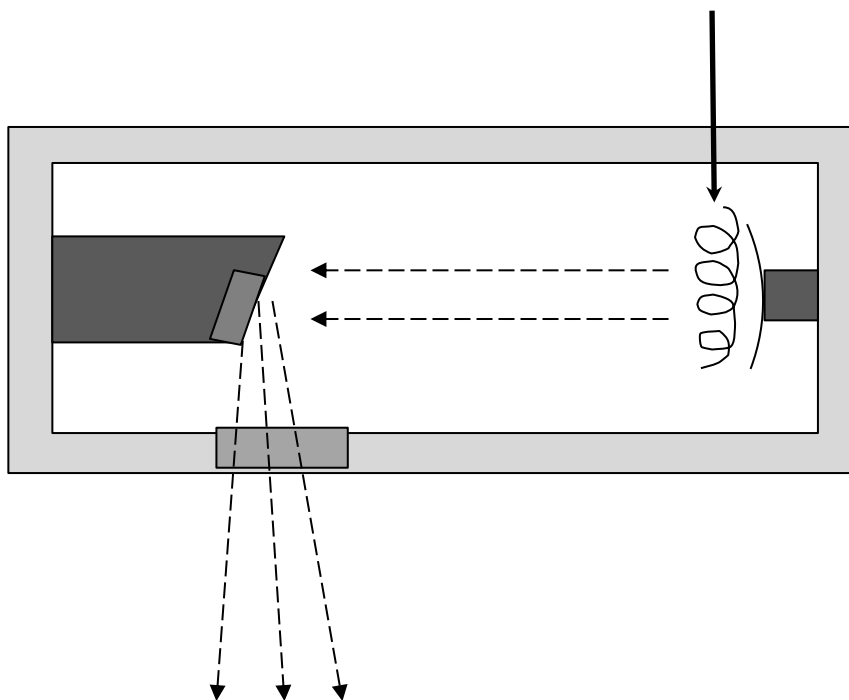
**Section C: Answer all ten (10) multiple choice questions in this section on printed pages 5 to 8 in this answer booklet.**

---

**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. 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

## Membership Examination

June 2017

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

© 2017 Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208

*This publication is copyright. Other than for the purposes of and subject to the conditions prescribed under the Copyright Act, no part of it may in any form or by any means (electronic, mechanical, microcopying, photocopying, recording or otherwise) be reproduced, stored in a retrieval system or transmitted without prior written permission. Enquiries should be addressed to the Australian and New Zealand College of Veterinary Scientists*

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 2: Veterinary Radiology (Small Animal)

---

## SECTION A

Answer both questions in Section A

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

- a) A 10-year-old, female, neutered Fox terrier dog presents with a cough and a grade 4/6 systolic heart murmur loudest over the mitral valve. List the **three (3) most likely differential diagnoses**. (3 marks)
- b) For **each** of the differentials listed in 1 a), write short notes on the usefulness of thoracic radiography as a diagnostic tool in investigating the cause of the cough. You **do not** need to list radiographic signs. (6 marks)
- c) Discuss in detail the possible abnormalities on thoracic radiographs in:
  - i. a dog with mitral valve insufficiency
  - ii. a cat with hypertrophic cardiomyopathy
  - iii. and a dog with pericardial effusion.

Include in your answer a comparison of the radiographic appearance of heart failure for these **three (3)** conditions. (21 marks)

2. A seven-month-old, male neutered, German shepherd dog presents for left forelimb lameness and has pain on manipulation of the elbow.

Answer **all** parts of this question:

- a) List **three (3)** differential diagnoses for this patient other than elbow dysplasia. (3 marks)
- b) List the **four (4)** radiographic projections for the complete evaluation of the canine elbow. (4 marks)
- c) Describe the possible radiographic features of the **three (3)** main conditions that comprise elbow dysplasia. (17 marks)

Section A continued over page



- d) Elbow radiography for this patient was unremarkable. What advice should be given to the owner as to the **most** likely cause of the clinical signs? *(4 marks)*
  
- e) List **one (1)** additional diagnostic imaging procedure that could be performed in this patient. State **one (1)** reason for recommending this procedure. *(2 marks)*

**Section B over page**

## **SECTION B**

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

1. List the radiographic appearance of the following conditions:
  - a) Lung lobe torsion in a Pug. *(5 marks)*
  - b) Chronic pleural effusion in a domestic shorthair cat. *(5 marks)*
  
2. Answer **both** parts of this question:
  - a) List the expected plain radiographic features of complete mechanical small intestinal (distal jejunal) obstruction due to a corn cob. *(5 marks)*
  - b) List the sonographic features you would expect for acute pancreatitis. *(5 marks)*
  
3. A veterinarian asks you for advice on which canine hip dysplasia scheme you would recommend to a breeder client, the PennHIP scheme or the CHEDS scheme (canine hip and elbow scheme). Compare the schemes under the following headings:
  - a) Certification/training requirements. *(1 mark)*
  - b) Required views. *(2 marks)*
  - c) Personnel radiation safety. *(2 marks)*
  - d) Accuracy. *(5 marks)*

**Section B continued over page**

4. List the possible sonographic findings of the urinary bladder in a female dog for the following diseases:
- a) Transitional cell carcinoma of the urinary bladder. (3 marks)
  - b) Cystolithiasis. (7 marks)

**Section C continued in provided answer booklet**

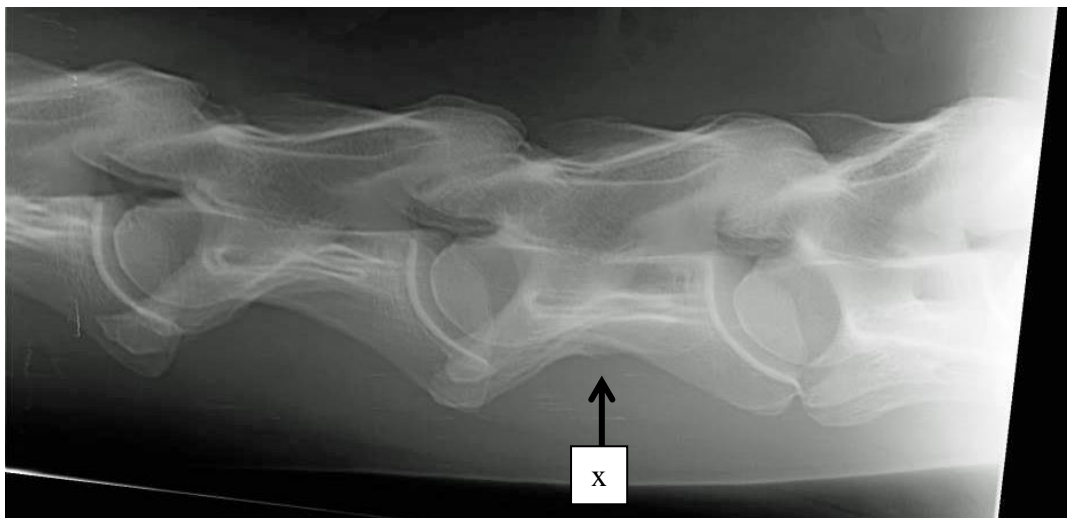
## Paper 2: Veterinary Radiology (Small Animal)

**Section C: Answer all ten (10) multiple choice questions in this section on printed pages 6 to 9 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. 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. 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**