Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2016

Veterinary Pharmacology

Paper 1

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

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

Answer **ALL <u>FOUR (4)</u>** questions

Answer **<u>FOUR</u>** questions each worth 30 marks .....total 120 marks

Paper 1: Veterinary Pharmacology

Answer all four (4) questions

1. Pharmacokinetics

Answer **both** parts of this question:

a) Loading dose and maintenance dose rate:

i. Define **each** of these two terms and using formulae, explain the differences between them. *(12 marks)*

ii. Explain the difference between a dose and a dose rate. *(3 marks)*

b) Drug metabolism:

i. Describe the **two (2)** phases of drug metabolism. *(6 marks)*

ii. Discuss the factors affecting drug biotransformation. *(9 marks)*

2. Antibiotics

Answer **all** parts of this question:

a) Define MIC and Disc diffusion. *(4 marks)*

b) Compare the advantages and disadvantages of these two tests. *(10 marks)*

c) PK-PD:

i. Briefly describe the parameters that are typically included in PK-PD estimations. *(6 marks)*

ii. Explain how these parameters relate to maximising the efficacy of time-dependent and concentration (dose)-dependent antibiotics. *(10 marks)*

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3. You are asked to design a multi modal analgesic technique for a small animal general practice clinic. Using your knowledge of pain and its control, discuss the classes of drugs you would recommend to use, their pertinent features (including mechanisms of action) and where and when they should be used. Provide examples of specific drugs within **each** class but keep your discussion at the level of the drug classes.

(30 marks)

4. Vaccination is a widely utilised mechanism to prevent various diseases.

Answer **all** parts of this question:

a) Discuss the source of the viral antigens that exist in viral vaccines. *(6 marks)*

b) For viral vaccines, describe the manufacturing processes that are used to prevent the vaccine causing disease in the host. *(6 marks)*

c) Explain the difference between tetanus toxoid and tetanus antitoxin *(5 marks)* **and** describe the clinical indications for **each** *(3 marks).*

d) Discuss, using examples, how adjuvants promote an immune response.

(10 marks)

End of paper

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Paper 2

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Answer **ALL <u>FOUR (4)</u>** questions

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Paper 2: Veterinary Pharmacology

Answer all four (4) questions

1. Drug resistance in the parasites of sheep is a major economical and welfare concern in Australia and New Zealand.

   Answer **both** parts of this question:

   a) Describe the use of macrocyclic lactones in sheep and the current state of resistance to these drugs. Include in your answer the mechanisms of action of these drugs **and** provide examples of some of the parasites that are targeted by them. *(12 marks)*

   b) Critique some methods for managing anthelmintic resistance in sheep:

      i. using drugs *(9 marks)*

      ii. using management. *(9 marks)*

2. Medetomidine and atropine are two drugs that are commonly used in small animal practices.

   Answer **all** parts of this question:

   a) Explain, with the aid of graphs, the likely changes in heart rate and blood pressure following the administration of a high dose of intravenous medetomidine to a dog. *(14 marks)*

   b) Describe the effects on the cardiovascular system that you would normally anticipate following the administration of atropine. *(6 marks)*

   A colleague rings you up for some advice about a middle-aged mixed-breed dog with exercise intolerance. The dog is not currently on any medication. It was given a very large intravenous dose (100µg/kg) of medetomidine to facilitate radiographs of its chest. The dog became overly sedated and so atropine was administered. The animal then recovered uneventfully without any other medications being administered.

Question 2 continued over page

Question 2 continued:

c) Discuss the impact that the atropine likely had on the cardiovascular system in this situation. Include in your answer how the time of administration of atropine, relative to the time of administration of medetomidine, would influence this impact. *(6 marks)*

d) Describe **and** justify a drug-based therapeutic option that might have been a safer choice than atropine. *(4 marks)*

3. You are called to a dairy farm where a high proportion of cows have not cycled within six weeks of calving. You need to provide advice to the farmer so that the farm may return to optimal reproductive efficiency.

Answer **both** parts of this question:

a) Briefly outline the first steps you would take in assessing the reproductive health of these cows. *(4 marks)*

b) Compare the drugs available for oestrus synchronisation and the timing of their administration. *(26 marks)*

4. Drug toxicity occurs occasionally in veterinary practice. Explain the mechanisms of toxicity and prescribe management strategies for the following toxicoses:

a) cyclophosphamide toxicity in a dog *(6 marks)*

b) paracetamol toxicity in a cat *(6 marks)*

c) nitrate poisoning in cattle *(6 marks)*

d) ionophore toxicity in the horse *(6 marks)*

e) copper poisoning in a sheep. *(6 marks)*

End of paper