

Australian College of Veterinary Scientists

## Membership Examination

June 2011

# Veterinary Emergency and Critical Care Paper 1

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

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

Answer your choice of any **FOUR** (4) questions from the five questions **ONLY**.

All five main questions are of equal value.

Answer **FOUR** questions each worth 30 marks ..... total 120 marks

# Paper 1: Veterinary Emergency and Critical Care

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Answer your choice of any **FOUR (4)** questions from the five questions **ONLY**

1. Haemostasis may be defined as the formation of a clot in order to stop extravascular bleeding. Answer **all** subparts of this question:
  - a) Describe the steps involved in the formation of a platelet plug, otherwise known as primary haemostasis. Briefly describe **each** step in one to two sentences and include any proteins or mediators that may contribute to each step. *(15 marks)*
  - b) In regards to secondary haemostasis, explain the difference between the traditional coagulation cascade and the 'modern' or cell-based model for coagulation. Name **one (1)** clotting factor that is now considered almost unnecessary for *in vivo* coagulation. *(5 marks)*
  - c) Compare the activated clotting time and the activated partial thromboplastin time. Include in your answer what they test and how they differ. Under what circumstances you would choose one test over the other? Explain why. *(10 marks)*
  
2. In regards to anaemia, answer **all** subparts of this question:
  - a) Explain the difference between a non-regenerative and a regenerative anaemia. List the important parameters on a complete blood count to help differentiate between these two types of anaemia. *(8 marks)*
  - b) Consider the following **two (2)** causes of severe anaemia: chronic renal failure in a cat and acute haemolytic anaemia in a dog. For **each** cause describe:
    - i. the pathophysiology underlying the anaemia. *(8 marks)*
    - ii. how you would decide on the transfusion trigger point (when to give a blood transfusion). Include in your answer factors that apply to both causes of anaemia as well as factors that may be considered for each patient specifically. *(10 marks)*
    - iii. any complications you foresee relating to a transfusion in that patient. *(4 marks)*

**Examination continued on next page**

3. In regards to the problem of vomiting, answer **all** subparts of this question:
- a) Identify the common differences between regurgitation and vomiting. *(8 marks)*
  - b) Name **three (3)** receptors or mediators that stimulate vomiting. For **each** receptor or mediator, state the location in which they act to stimulate vomiting. *(6 marks)*
  - c) List **four (4)** drugs that are used for the control of vomiting and provide the modes of action of each. Also, list any possible contraindications for the use of each drug, or complications of the drug. *(16 marks)*

4. Consider the following two scenarios.

**Patient A** has been regurgitating due to an oesophageal foreign body and **Patient B** has been regurgitating secondary to megaesophagus associated with generalised myasthenia gravis.

The following are the room-air arterial blood gas values from each patient:

**Patient A:** pH 7.48, PaCO<sub>2</sub> 34 mm Hg, PaO<sub>2</sub> 79 mm Hg, SaO<sub>2</sub> 94%

**Patient B:** pH 7.32, PaCO<sub>2</sub> 74 mm Hg, PaO<sub>2</sub> 55 mm Hg, SaO<sub>2</sub> 85%

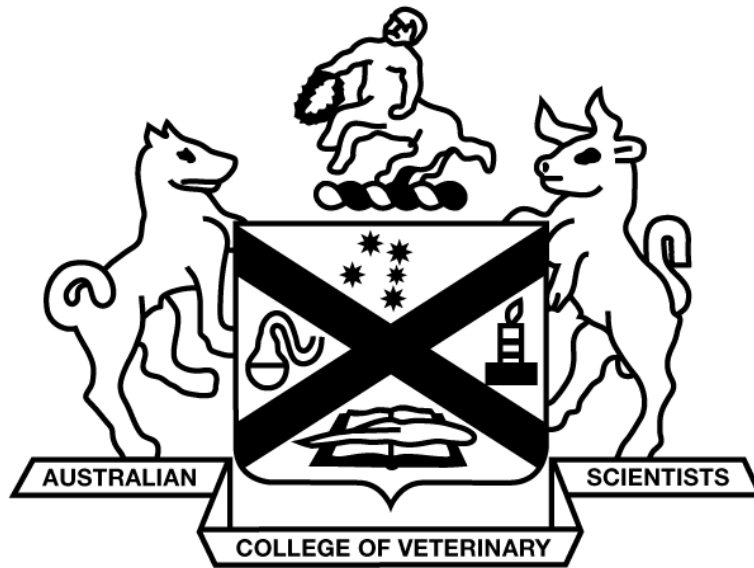
Answer **all** subparts of this question:

- a) Interpret the two patients' results. *(9 marks)*
- b) What does the abbreviation SaO<sub>2</sub> represent? *(1 mark)*
- c) Patient B has a PaO<sub>2</sub> 24 mm Hg lower than that of Patient A, but its SaO<sub>2</sub> is only 9 per cent lower than Patient A's. Explain this finding. *(14 marks)*
- d) You administer oxygen at a high flow rate by mask to Patient B, the dog with myasthenia gravis. The PaO<sub>2</sub> increases to 255 mm Hg. Explain what you would expect to happen to the dog's PaCO<sub>2</sub> and why this would occur. *(6 marks)*

**Examination continued on next page**

5. Answer the following questions in regards to feline hypertension. This question relates specifically to cats.
- a) Describe **three (3)** methods of measuring arterial blood pressure in order to detect hypertension. Include in your description of each method reference to the factors that may decrease the accuracy of the measurement. *(10 marks)*
  - b) Discuss the risk of future end organ damage in an individual patient, including determination of the level of risk and how individual organ systems may be affected. *(10 marks)*
  - c) Name **three (3)** commonly used drugs for severe hypertension. State their modes of action. *(6 marks)*
  - d) Describe **two (2)** complications that can occur during treatment of severe hypertension. *(4 marks)*

**End of paper**



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## Membership Examination

June 2011

# Veterinary Emergency and Critical Care Paper 2

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

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

Answer your choice of any **FOUR** (4) questions from the five questions **ONLY**.

All five main questions are of equal value.

Answer **FOUR** questions each worth 30 marks ..... total 120 marks

# Paper 2: Veterinary Emergency and Critical Care

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Answer your choice of **FOUR** (4) questions from the five questions **ONLY**.

1. You are presented with an eight-week-old male Labrador puppy which has a 24-hour history of vomiting (three times) and some brown diarrhoea. The puppy has also been anorexic for six hours. On physical examination, he is obtunded with a heart rate of 145 beats per minute, a respiratory rate of 35 breaths per minute, pale pink mucous membranes, a capillary refill time of 2.5 seconds, fair pulse quality and his limbs feel cooler than his body. He has mild abdominal pain. On rectal exam, there is frank blood and his rectal temperature is 36°C. The rest of the examination is unremarkable. You perform a faecal parvovirus test per rectum, which is positive.

Answer **all** subparts of this question in regards to this case:

- State what type of test the in-house faecal parvovirus test is. Comment on the sensitivity and specificity of this test. (4 marks)
- Describe the immediate treatment you would give this puppy in the next hour. Give doses and rates where applicable. (10 marks)
- Consider the following pre-treatment blood work for this case (Table 1). Give the most likely cause for each abnormality (bold). Also indicate if there are any values within the reference range that are significant for the management of this case. (15 marks)
- Briefly comment on the efficacy of oseltamivir (Tamiflu) for the treatment of canine parvoviral enteritis. (1 mark)

**Table 1 – Biochemistry and blood gas results of an eight-week-old Labrador**

| Reading            | Result       | Reference range |
|--------------------|--------------|-----------------|
| Sodium             | <b>131</b>   | 136-154 mmol/L  |
| Potassium          | <b>3.3</b>   | 3.4-5.3 mmol/L  |
| Chloride           | 97           | 96-113 mmol/L   |
| Calcium (ionised)  | 1.35         | 1.12-1.4 mmol/L |
| Glucose            | 3.6          | 3.6-6.8 mmol/L  |
| Lactate            | <b>4.2</b>   | <3 mmol/L       |
| pH                 | <b>7.274</b> | 7.34-7.46       |
| PvO <sub>2</sub>   | 36.5         | 24-48 mm Hg     |
| PvCO <sub>2</sub>  | 43           | 36-44 mm Hg     |
| Bicarbonate        | <b>19.5</b>  | 24-26 mmol/L    |
| Base excess        | <b>-7.1</b>  | -3 to 0         |
| Packed cell volume | <b>35</b>    | 37-55%          |
| Total protein      | 56           | 55-75 g/L       |

**Examination continued on next page**

2. A two-year-old male castrated Labrador is presented to you by its owner for the problem of vomiting. He scavenged in the rubbish bin within the last six hours and had eaten various food wastes, including approximately half a kilogram of raw pizza dough that contained active yeast. In the last three hours, he has vomited several times and become ataxic.

On physical examination, he is stuporous to semi-comatose, has a heart rate of 60 beats per minute, a respiratory rate of 24 breaths per minute with a mild increase in effort. He has a moderately distended abdomen (no fluid wave) with some gas palpable in bowel loops. His rectal temperature is 37.5°C. He has some flatulence. The rest of the exam is unremarkable.

Answer **all** subparts of this question:

- a) Construct a problem list for this dog and give the likely different diagnoses, or causes, for each problem. (8 marks)
  - b) What are your immediate concerns for this dog? Describe your emergency treatment and monitoring for the dog that will occur in the next hour. (12 marks)
  - c) You wish to run pre-treatment blood work as a part of your plan. Which blood tests would you request, and provide reasons why, specifically for this dog? (8 marks)
  - d) The dog progresses into a coma. Indicate which drug may be considered an 'antidote' for this dog's central nervous system depression and explain why it is useful. (2 marks)
3. A three-year-old, male, 25kg mixed breed dog presents to your emergency clinic for collapse. Physical examination reveals that he is laterally recumbent with pale mucous membranes, a prolonged capillary refill time, poor pulse quality, a pulse rate of 150 beats per minute and cool extremities. The dog's heart sounds are very quiet. Your nurses place an oxygen mask and begin placement of an intravenous catheter. Meanwhile, emergency ultrasound reveals a marked pericardial effusion and moderate peritoneal effusion. There was also a very small amount of pleural effusion.

Answer **all** subparts of this question:

- a) Outline your management (treatment and diagnostics) of this patient in the first hour, justifying your order of priority. (12 marks)
- b) Define pericardial tamponade. Explain how is it diagnosed. (3 marks)
- c) Explain why a patient with pericardial tamponade, due to any cause, may develop concurrent pleural or peritoneal effusion. (10 marks)
- d) This dog's pericardial effusion has a grossly haemorrhagic appearance. Considering recent evidence in the veterinary literature, indicate the diagnostic test(s) you would perform on the fluid to help distinguish a neoplastic from a non-neoplastic aetiology and provide reasons why. (5 marks)

**Examination continued on next page**

4. An obese 12-year-old male pug presents to your clinic with an acute onset of breathing difficulty. On arrival his temperature is 39.8°C and he has cyanotic membranes with a capillary refill time of 2.5 seconds. His pulse rate is 125 beats per minute, thoracic auscultation is impeded by loud, discontinuous noise associated with breathing. He has increased respiratory effort, hypersalivation and appears distressed.

With the information given above, answer **all** subparts of this question:

- a) List the most likely causes, or differential diagnoses, of this dog's respiratory distress. Prioritise the list according to most likely. (5 marks)
  - b) Describe how you would use the findings on physical examination to distinguish between an upper (extra-thoracic) and lower (intra-thoracic) cause of respiratory distress. (5 marks)
  - c) Discuss your management of this patient with reference to any medications used, tests or procedures performed. (20 marks)
5. A six-year-old, 20 kg, female spayed blue heeler was left inside a house during a bush fire. When the owners returned to the property three days later they found that the house had been partially burnt by the fire. The dog was outside the house and seemed very lethargic. They offered her a container of water, which she drank readily.

On physical examination, she appears obtunded and ataxic, and has a respiratory rate of 64 breaths per minute with an increase in effort. She has some superficial partial thickness burns to all four paws and mildly decreased skin turgor. Her mucous membranes are tacky. The rest of the physical exam is unremarkable.

Answer **all** subparts of this question in regards to this case.

- a) Create a problem list for this dog. For each problem, state the most likely underlying causes. (6 marks)
- b) Describe the complications that may occur in this dog. (10 marks)
- c) Outline your plan for this dog, including any diagnostics, monitoring or medications including fluid therapy. Details for fluid therapy should include the type of fluid, as well as the route, rate and duration of administration. (13 marks)
- d) State the mode of action of the antimicrobial you would use in this dog. (1 mark)

**End of Paper**