

THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

TUESDAY 7 JULY 2009

PAPER I
(GENERAL)
(3 hours)

Candidates are required to answer **ALL TEN** of the following questions.

Allow 18 minutes per question.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Explain **briefly**, the nitrogen cycle in aquaculture.

List possible causes and effects of increased concentrations of:

- a) ammonia
- b) nitrite
- c) nitrate.

2. **Discuss briefly** how you would investigate an outbreak of sudden death in common frogs (*Rana temporalis*) in a United Kingdom garden pond.

3. **List** possible contraceptive methods for the following animals, giving your reasons:

- a) male lion (*Panthera leo*) in a safari park
- b) female golden-headed lion tamarin (*Leontopithecus chrysomelas*) in a zoo
- c) a herd of fallow deer (*Dama dama*) in a deer park.

P.T.O. for Questions 4 - 10

4. **List** the causes of urine scalding in the domestic rabbit.
 5. **List** the main groups of animals which may suffer from iron storage disease in captivity. For **ONE** of them, **describe** the clinical signs, diagnostic testing and possible aetiologies for the disease.
 6. Write **brief notes** on the following:
 - a) mange in wild foxes
 - b) snake mites
 - c) tick-associated deaths in captive birds.
 7. An owner with an aviary of pope cardinals (*Paroaria dominicana*) is concerned by the number of individuals looking in poor condition and fluffed-up. Food intake has dropped and there have been one or two deaths. **Describe briefly** how you would investigate the problem and give a **list** of differential diagnoses.
 8. **Discuss briefly** suitable protocols for safe general anaesthesia in the following situations:
 - a) an adult female spur-thighed tortoise (*Testudo graecae*) undergoing a coeliotomy for the removal of retained eggs,
 - b) a juvenile male Harris hawk (*Parabuteo unicinctus*) undergoing investigation for dyspnoea,
 - c) an obese domestic ferret undergoing surgical removal of a skin tumour.
 9. Write **short notes** on the following:
 - a) bat lyssavirus infections
 - b) lymphocytic choriomeningitis virus infection
 - c) transmissible spongiform encephalopathies in non-domestic species
 - d) paramyxovirus infection of pinnipeds.
 10. **Write short notes on bumblefoot in birds. Compare and contrast** the treatment options for the disease in raptors and waterfowl.
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DIPLOMA IN ZOOLOGICAL MEDICINE

TUESDAY 7 JULY 2009

PAPER II
(MAMMALIAN)
(3 hours)

Candidates are required to answer **FOUR** of the following **six** questions.

Allow 45 minutes per question.

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1. **List** the species of *Baylisascaris* and **describe** their life-cycle in their natural hosts. **Discuss** the pathogenicity of *Baylisascaris* species in their definitive and any intermediate and aberrant hosts, and **describe** methods of treating and controlling disease.
 2. **List** the major neurological diseases found in captive exotic Felidae, indicating for **each** the clinical signs, aetiology, and the species which are mainly affected.
 3. Zoo staff have arrived one morning to find a two year-old male giraffe dead in its outdoor paddock. No clinical signs were evident when staff left the previous evening, and the remaining giraffes are unaffected. As staff veterinarian, you are in overall charge of dealing with the veterinary and management aspects of this incident.

Describe how you would do this. Include in your answer the differential diagnoses you would need to consider, and how these may influence subsequent events.

P.T.O. for Questions 4 – 6

4. A small cetacean (unknown species) has been reported as stranded at low tide on a local rocky beach by a member of the public. You are called in by the police as a wildlife veterinarian to respond to the situation.
- a) What criteria would you use to decide whether this animal should be refloated?
 - b) What would you need to organise if this were to be attempted?
 - c) What are the welfare issues involved?
5. Ten confiscated young chimpanzees (*Pan troglodytes*) have been handed to a wildlife rehabilitation centre. How would you advise the centre on the **advantages and disadvantages** of rehabilitation and release, taking into account their health, the health of free-living chimpanzees in the same area, and the health of staff and local people?
6. You are asked to investigate chronic poor condition and increased mortality in a herd of scimitar-horned oryx (*Oryx dammah*) released into a fenced reserve in orth Africa. **List** your differential diagnoses and **describe** how you would carry out an investigation to diagnose the cause(s) and any predisposing factor(s).
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

TUESDAY 8 JULY 2008

PAPER I
(GENERAL)
(3 hours)

Candidates are required to answer **ALL TEN** of the following questions.

Allow 18 minutes per question.

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1. **List** the known calicivirus infections of wild mammals. For **each briefly** indicate the clinical signs seen and the species of mammal affected.

2. Write **short notes** on the following topics:
 - a). Aetiology for shell pyramiding in a growing African spurred tortoise (*Geochelone sulcata*) and the possible problems that shell pyramiding can cause.

 - b). Differential diagnoses of respiratory disease in the domestic ferret (*Mustela putorius furo*) and their aetiologies.

3. A colony of Canaries has experienced increased mortalities amongst the younger birds and chicks this breeding season compared with last year. You are asked to investigate. **List** the possible differential diagnoses, the tests you would need to perform to make a diagnosis and possible treatments or procedures that could be introduced to stop the problem.

4. **Discuss** the incidence and clinical signs of West Nile Virus in European wildlife and compare this with the situation in the United States of America. **Outline** the impact the virus may have on human and domestic livestock.

P.T.O. for questions 5 – 8

5. Write **short notes** on appropriate anaesthetic regimes and monitoring for the following:
- A spur-thighed tortoise (*Testudo graeca*) undergoing coeliotomy for the treatment of pre-ovulatory stasis.
 - An African grey parrot (*Psittacus erithacus*) undergoing investigation of condition loss and passage of undigested food in the faeces.
 - An adult male giraffe (*Giraffa camelopardalis*) receiving treatment for overgrown hooves.
6. Write **short notes** on the following:
- 'Young bird sickness' of racing pigeons (*Columba livia domestica*).
 - Control of aggressiveness of sexually mature male Green iguanas (*Iguana iguana*).
 - Edwardsiella* spp. infection of ornamental fish.
7. Write **short notes** on the following:
- Husbandry and common medical conditions of the Hissing cockroach (*Gromphadorhina portentosa*).
 - Husbandry and common medical conditions of the Coatimundi (*Nasua* sp.).
8. Name the causal agent, method of spread and **briefly describe** the clinical signs in the following diseases:
- Encephalomyocarditis in elephants.
 - Lucke's renal tumour/adenocarcinoma of Leopard Frogs.
 - Grey patch disease of green turtles.
 - Blackleg of deer.

P.T.O. for Questions 9 – 10

9. **Discuss** the condition 'capture myopathy' with reference to wild deer in the United Kingdom. **Describe** the pathogenesis and clinical presentation of the condition and what techniques and therapies can be performed to minimise its occurrence during restraint.
10. Write **short notes** on the following topics:
- a). Pregnancy diagnosis in elephants giving an indication of the stage during pregnancy when the diagnostic tests would be useful.
 - b). Chronic wasting disease of deer.
 - c). Contraception in hippos (*Hippopotamus* spp.) and any complications associated with these methods.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

TUESDAY 8 JULY 2008

**PAPER II
(MAMMALIAN)
(3 hours)**

Candidates are required to answer **FOUR** of the following **six** questions.

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1. **Describe** the pathology and epidemiology of *Mycobacterium bovis* infection in United Kingdom native mammals. Summarise the arguments for and against culling badgers (*Meles meles*) as part of the control measures to reduce infection in domestic cattle.
 2. **Describe** the clinical signs and pathology, methods of detection and control program that you would institute should you suspect and then confirm Johne's disease in a mixed collection of hoofstock.
 3. You have been asked to provide a primate disease health and safety protocol for staff working in a primate collection. **List** the zoonotic diseases you would be chiefly concerned with, their method of spread and the disease they cause in humans. **Discuss** the methods and procedures that should be taken to safeguard workers against these diseases in such an exhibit.

P.T.O. for Questions 4 - 6

4. You are asked by a wildlife rehabilitation centre to design a clinical assessment protocol for triaging grey and common seal pups brought into the centre. Detail what you would do and what you are looking for when performing a clinical examination. **Discuss** the factors which would determine whether you would go on to release a seal pup after treatment/rehabilitation.

 5. You are the veterinary surgeon for a wildlife rehabilitation charity. You are asked to provide information to the staff on conditions likely to affect the European hedgehog (*Erinaceus europaeus*). **Describe** the common diseases you would expect to see and their therapies, noting any potentially zoonotic conditions. Provide guidance for making a decision on whether it is safe to release a treated hedgehog into the wild; indicate how you would choose the site for release.

 6. **Describe** the aetiologies, clinical presentation and diagnosis of the main forms of lymphoma in the domestic ferret (*Mustela putorius furo*). **Discuss** treatment options and the likely success rates of these therapies.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

MONDAY 9 JULY 2007

PAPER I

(GENERAL)

(3 hours)

Candidates are required to answer **ALL TEN** of the following questions.

Allow 18 minutes per question.

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1. Write **short notes** on the following:
 - a. The species of animal affected and pathology caused by infection with *Chrysosporium* Anamorph of *Nannizziopsis vriesii*.
 - b. The possible causes of anaemia in the rabbit (*Oryctolagus cuniculi*), indicating which type of anaemia would be present.

2. **LIST** the endoparasites (according to their Class and Species) that affect waterfowl.

For **each** endoparasite give a **brief** overview **in note form** of the clinical disease it causes, the species of waterfowl it has been reported in and an endoparasiticide that may be used to eradicate it.

3. **LIST** the antifungal agents used in birds giving the drug group from which **each** derives, its mode of action and its suitability and dosage/method of administration for treating respiratory tract aspergillosis in an African Grey Parrot (*Psittacus erithacus*).

4. Write **short notes** on Wasting disease or syndrome in callitrichids including a **brief** indication of how you would investigate such a case.

5. Write **short notes** on aquatic environmental poisons including the species of aquatic mammals affected by them, the pathology caused by the relevant poison and the samples which may be taken to confirm the poison involved.

P.T.O. FOR QUESTIONS 6 - 10

6. Write **short notes** on the causes of respiratory disease in seal pups including how you would go about confirming the diagnosis.

7. You have been approached by the local council to perform a veterinary visit under the Dangerous Wild Animals Act (1976) legislation for a private owner who is intending to keep a Gila Monster (*Heloderma suspectum*) in his home.

List the facilities and protocols you would require to be in place and any other factors you would be ensuring were provided for before issuing a successful certificate.

8. **Briefly** describe the clinical signs that have been associated with prion diseases in non-domestic mammals indicating the rapidity of development of signs.

What Families of **zoo** animals have been affected with prion disease to date?

What prion diseases exist in free-living wild mammals in the United States of America and how is the condition diagnosed?

9. A number of Koi carp in an outdoor pond system have developed small discrete cutaneous swellings along their bodies over the last few weeks.

LIST the possible differential diagnoses and describe how you would go about ascertaining the true cause of the condition including methods of chemical restraint.

10. You are asked to visit a collection of amphibians of the family Ranidae that has been experiencing mortalities. Some of the adult amphibians are exhibiting hyperaemia and ulceration of the skin and some are losing digits.

LIST the possible aetiological causes of this condition and **briefly outline** samples you would need to take to make a diagnosis.

THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

MONDAY 9 JULY 2007

**PAPER II
(MAMMALIAN)
(3 hours)**

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1. A United Kingdom zoological collection is planning to import and maintain a small group of cheetahs (*Acinonyx jubatus*) from a European Zoo. The collection has not kept this species before. As the veterinarian for the collection, **describe briefly** the major infectious and non-infectious diseases that you would need to consider when managing this species, and how these would shape an import schedule and a preventive medicine/ health care programme that you wish to put in place prior to the animals' arrival.
 2. Describe the ways in which marsupial anatomy and physiology differs from that of eutherian mammals. Illustrate your answer with examples of how these differences may affect your clinical approach to this taxa.
 3. Mycobacterial disease is a significant concern to any zoological collection of mammals. **LIST** the major mycobacterial species or complexes that can cause significant disease in zoo mammals, and in **each** case describe the taxa or species most commonly affected, clinical signs, any zoonotic implications, and methods of diagnosis.
 4. What do the terms "classical conditioning" and "operant conditioning" mean? **Outline** the processes involved for **each**, and discuss the pros and cons of applying these to zoo mammals.

P.T.O. FOR QUESTIONS 5 - 6

5. Write an essay on the use of tranquilisers in wild hoofstock.

 6. Discuss renal disease of rabbits with particular reference to its aetiology, diagnosis and management.
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DIPLOMA IN ZOOLOGICAL MEDICINE

MONDAY 10 JULY 2006

**PAPER I
(GENERAL)
(3 hours)**

Candidates are required to answer **ALL TEN** of the following questions.

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1. **List** those zoonotic pathogens which may infect those persons handling fish and other aquatic animals. Mention any signs of disease in infected fish, the methods of spread and the mode of infection in both fish and humans, together with the signs and symptoms of human infection.
2. What is the PILANESBURG RESOLUTION? When and by which organisations was this promulgated?
3. **Write short notes on the concluding resolutions.**
3. **The Secretary of State's Standards for Modern Zoo Practice lays down detailed and comprehensive rules for the management of United Kingdom Zoos.**

Write **short notes** on that section dealing with the guidelines for the welfare of animals kept in zoos paying particular attention to the parameters for *the early signs of disease* as laid down in section 2.4 entitled "Clinical and pathological signs as indicators of welfare" and which are tabulated in table 2.4.1.

4. During the last few years there has been a steep decline in vultures in the Indian sub-continent.

Write **short notes** on this problem taking into account:

- a) The main species of vulture involved mentioning if possible the genus and species, but at least the genus,
- b) the reasons for this decline,
- c) the possible solution
- d) the effect on the environment and the implications for the conservation of any associated Taxa.

5. **Briefly** describe the effects of optical and radiant energy within the wave lengths of 100nm –1mm on the physiology of all animal species across the taxonomic range.

Also, **list** the common mistakes made by all animal keepers when using artificial light sources for animals.

6. Write **notes** on Lyssavirus infection in bats. Include information on virus serotypes involved, their worldwide distribution and significance to wildlife and humans in these areas.

7. Write **short notes** on the following:

- a) *Shigella* spp.infections in primates.
- b) Rickettsial infections of birds.

8. Write **notes** on commonly seen traumatic and infectious ocular diseases in birds.

9. **Briefly** describe the anaesthetic risks for the following species. Suggest a suitable protocol for the safe anaesthesia in **each** case:

- a) Californian sealion (*Zalophus californianus*).
- b) Common hippopotamus (*Hippopotamus amphibius*).
- c) Giraffe (*Giraffa camelopardalis*).

10. What is meant by the 'Frozen Zoo'? How would you set up a frozen zoo on behalf of a major zoo?
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**PAPER II
(MAMMALIAN)
(3 hours)**

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1. You have a collection of Big Horn sheep (*Ovis canadensis*) in a United Kingdom zoo which have been showing signs of oedema of the muzzle and ears with excessive salivation. There is obvious respiratory distress and one animal had a temperature of 40°C. Two to three weeks previously a neighbouring paddock of Guanaco (*Lama huanacos*) were showing signs of patchy necrosis of the muzzle and a patchy dermatitis but this cleared up spontaneously. How would you investigate this problem and what would be your differential diagnosis?
2. **You have to go to Tasmania to supervise the transport of a group of Macropods to the United Kingdom by air:**
 - a) **Describe in detail what preparations you would make and how you would go about this task.**
 - b) **On arrival, one of these animals was found to have a deep wound over one of the hind legs. Describe in detail how you would proceed.**
3. You are employed by a zoological collection which has had a small number of White Rhinos (*Diceros simus*) for some time. The zoo management is now considering taking on some Black Rhinoceros (*Diceros bicornis*.)

Discuss the differences in the diet of Black and White Rhino. How is the range of the wild Black Rhino affected by the vegetation in the habitat?

4. You are asked to be the veterinarian for a field project to translocate approximately 30 gazelles (*Gazella* species) between two National Parks in North Africa. The species is present in the receiving park, but the authorities are concerned about possible inbreeding because of poor neonatal survival. Describe, and explain, the steps you would take from initial planning to completion.
 5. What are the current theories to explain cetaceans entering coastal waters and potentially stranding? Describe, in detail, a protocol for dealing with a stranded sperm whale.
 6. Describe a health screening and intervention programme for a primate collection in a medium-sized zoo (approximately 120 individual primates of 15 different species of Old World monkeys, plus chimpanzees). What extra implications are there if enclosures house mixed species?
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

MONDAY 10 JULY 2006

PAPER II
(REPTILIAN) (3 hours)

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1. Describe the incidence, diagnosis and clinical presentation of mycobacteriosis in reptiles. Mention the species of mycobacteria commonly seen and the species of reptile in which mycobacteriosis has been reported.
2. What viruses are associated with respiratory disease in reptiles? Describe for each virus mentioned the species of reptile affected, the means of confirming a diagnosis, the clinical presenting signs and any therapies that may be useful in the management of the disease.
3. What are the possible aetiologies for the development of hepatic lipidosis in reptiles? Describe the clinical techniques used to make a diagnosis of hepatic lipidosis and outline a possible treatment plan for a named species of reptile with hepatic lipidosis.
4. Discuss the incidence of *Cryptosporidium* spp. infection in reptiles with particular reference to the species of reptile affected, its diagnosis and clinical presenting signs. Give an overview of the therapies described in the literature for its treatment/management.
5. Describe the possible aetiologies and the clinical investigation involved in identifying the cause of a cloacal prolapse in a female 3 year-old Green Iguana (*Iguana iguana*). Suggest a surgical method of successfully treating such a prolapse.

P.T.O. for Question 6

6. **Write notes** on the clinical signs, pathogenesis and diagnosis of **TWO** of the following:

- a. Chlamydiosis in reptiles.
 - b). Adenovirus infections in Agamidae.
 - c). Lytic agent 'X' infections in reptiles.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

WEDNESDAY 13 JULY 2005

**PAPER I
(GENERAL)
(3 hours)**

Candidates are required to answer **ALL TEN** of the following questions.

Allow 18 minutes per question.

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1. Write **short notes** on the importance of *Macrorhabdus ornithogaster* (Megabacteria) in Budgerigars. How you would design suitable hospital caging for birds?
2. Write **short notes** on dealing with an outbreak of chytridiomycosis in poison arrow frogs. How you would diagnose, and treat the condition and measures to be taken for the future management keeping and breeding sugar gliders?
3. Explain the principles and application of allometric scaling in nutrition and therapy.
4. How important is Air Sacculitis in the Pongidae? How would you diagnose it and treat the condition?
5. Describe the management factors and the routine attention required to maintain the feet of Zoo Elephants.
6. Write **short notes** on the importance of ectoparasites in Hedgehogs(*Erinaceus europaeus*).
7. Give the clinical importance of the following when assessing a Iguana iguana for Renal disease:
 - a. Uric Acid
 - b. Urea
 - c. Calcium
 - d. Phosphorus.
8. Describe the clinical significance of **each** of the following having been feed daily on Cat

P.T.O. for Questions 8 – 10

Food:

- a. Testudo sp.
- b. Iguana iguana.
- c. Trachemys sp.

9. Give the following information relating to "Bat rabies" in the United Kingdom:

- a. Which virus that has been found to be present since 1996?
- b. What is the only species of Bat in which this virus has been isolated?
- c. Why is this virus of importance?

10. Write **short notes** on:

- a. Application of endoscopy in fish diagnosis.
 - b. Post-mortem examination protocols applicable to a medium sized United Kingdom aquarium to comply with Zoo Licensing legislation.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

WEDNESDAY 13 JULY 2005

PAPER II

(AVIAN)

(3 hours)

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1. You are requested by a local authority to give advice regarding the conditions to be attached to a licence which they are considering granting to an organisation which wishes to hold a large (c.10, 000 birds) bird market/show for the exhibition and sale of a variety of birds with the exception of raptors.

For political reasons the authority does not wish to refuse the license but does wish to impose strict licensing conditions. The authority is concerned about the welfare of the birds and the bio-security for both Humans and the birds.

2. Some weeks after the introduction of some Black-winged Lovebirds (*Agapornis taranta*), which looked quite normal, into a zoological collection, it was noticed that some Lesser Vasa or Black Parrots (*Coracopsis nigra*) in a neighbouring aviary started to show white feathers in their newly emerging plumage.

How would you investigate this problem? What advice would you give the staff at the zoo?

3. Discuss the safety of various anthelmintics for use in birds.

P.T.O. for Questions 4 - 6

4. Discuss the various methods of monitoring Avian anaesthesia and the relevant importance of each of these methods.

5. A Double-wattled Cassowary (*Casuarius casuarius*) kept in a small zoo, is seen to have a large wound over its right knee joint from which it is bleeding. It is obvious that the wound will need attention. Describe in detail how you would proceed.

6. A Golden Eagle (*Aquila chrysaetos*), one of a breeding pair kept in a large aviary 70 metres x 50 metres x 4 metres high, is seen to be inactive spending a lot of time on the ground. Also it seems rather unsteady on its legs. Its mate the female bird, appears to be all right. There are a number of other large raptors and a pair of Ravens in adjoining aviaries which do not seem to have any problems. All these large birds of prey are fed on a similar diet of quail, hatchery chicks on two days in each week, laboratory rats, rabbits shot by a local boy and they are said to catch squirrels if these venture into their aviary.

How would you investigate this problem?

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**PAPER II
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(3 hours)**

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1. The xenarthrans (previously Edentata) are a fascinating group and a north of England zoological garden decides that it should expand its collection by adding members of this order and they ask you, their veterinary adviser which of the various fascinating species should be most suitable.

Outline your thoughts on the **THREE** main sub-orders, including some of the interesting morphology and biology and their general requirements.
2. An exhibit of South African fur seals (*Arctocephalus pusillus pusillus*) on the south coast has been marred by corneal opacities affecting the animals. Before committing to a spend of £200,000 on new filtration the zoo management would like to have information on the background environmental factors influencing development of this condition and how it is likely to change if the filtration changes are made. Discuss choices of management and filtration and why particular systems may be better than others. What do you tell them?
3. Describe the unusual features of Camelidae dentition and the indications for dental management within this order covering a typical zoo exhibit with camels, a Hampshire downland alpaca farm and a llama trekking situation.

P.T.O. for Questions 4, 5 and 6

4. Your zoo clients are concerned that in addition to the familiar concerns of Foot and Mouth and Bovine Spongiform Encephalopathy (BSE) some new viruses are appearing such as WNV, Simian Herpes and Bird flu.

Outline your thoughts and knowledge of these diseases and others.

What would you tell them in terms of risk analysis and potential outcomes, what should they worry about and what reasonable measures can they put in place in a zoo designed to attract the public?

5. The zoo licensing inspection now requires the answer to the following question *“Is each animal provided with a developed programme of preventative and curative veterinary care and nutrition?”*

Explain how you would structure such a program covering the main groups found in a large zoo.

What preventive medicine policies would you put in place and why?

6. As a zoo inspector you are assessing animal health and condition from perhaps a different viewpoint. Abnormal behaviour and stress are aspects of animal health which you might see as a 'fresh pair of eyes'.

What signs might you look for to indicate that stress may be a problem in a group of animals?

How might you approach this with the zoo staff and what measures might you suggest?

In your experience what factors can lead to stress in zoo kept animals? As a zoo inspector what steps can you take to improve the situation?

THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

WEDNESDAY 13 JULY 2005

PAPER II
(REPTILIAN) (3 hours)

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1. Write **notes** on the clinical signs, pathogenesis and diagnosis of **THREE** of the following:
 - a. Ranavirus in Box Turtles (*Terapene* sp.).
 - b. West Nile Virus infection in crocodylians.
 - c. Aspergillosis in *Crotalus atrox*.
 - d. Myxoa in *Hardella* sp.

2. Discuss the clinical use and pharmokinetics of Enrofloxacin in Reptiles.

3. Describe the indications and techniques that could be employed for **THREE** of the following:
 - a. Renal biopsy in *Testudo* sp.
 - b. Renal biopsy in Iguana iguana.
 - c. Renal biopsy in *Boa* sp.

d. Renal biopsy in Caiman sp.

P.T.O. for Questions 4 - 6

4. Discuss the clinical conditions caused by Herpesvirus in Testudo sp. and its diagnosis and treatment.
 5. Discuss the causes, management and treatment of Shell injury in Chelonia.
 6. In order to understand, investigate and treat respiratory disease in Reptiles it is essential to know the anatomical and physiological adaptation that aids respiration in reptiles, **describe these.**
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

TUESDAY 30 JULY 2002

**PAPER I
(GENERAL)
(3 hours)**

Candidates are required to answer **ALL TEN** of the following questions.

Allow 18 minutes per question.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Write **short notes** on the following:
 - a) infectious diseases of squirrels in the UK
 - b) feather duster syndrome in budgerigars
 - c) egg-binding in captive turtles.

2. **Discuss** the use of non-steroidal anti-inflammatory drugs in exotic, non-domesticated species.

3. **Discuss** the importance of dietary calcium for captive iguanas. How would you diagnose and treat a suspected deficiency?

4. Write **short notes** on the following:
 - a) botulism of ducks and geese
 - b) castration of male deer
 - c) the use of microchips for identification of birds and mammals.

5. Infectious disease has been found in both wild and farmed deer populations. **List** the various bacterial diseases which commonly affect deer and **discuss** the differences in the types and prevalence of bacterial diseases between wild and commercially farmed deer. How can deer farms reduce morbidity and mortality?

P.T.O. for questions 6 –10

6. **Discuss** the Dangerous Wild Animals Act (1976). Does this legislation protect the public sufficiently? Would you recommend any changes?

 7. A group of 9 male and 11 female adult tortoises *Testudo hermanni* kept in a British zoo, usually hibernate in an appropriate outdoor enclosure. In Spring, one male and three females are found dead. **List** the causes of death you consider might be responsible, and **describe** how you would make a diagnosis. What measures would you propose to reduce mortality the following year?

 8. Write **short notes** on the following:
 - a) the use of antibiotics for treating fish
 - b) humane destruction of cetaceans
 - c) the importance of vitamin A in birds.

 9. A privately-held collection of captive carnivores consisting of big cats, small cats and mustelids has experienced illness and deaths after being fed meat from fallen stock (stock which might be deemed unfit for human consumption and therefore not submitted to an abattoir) from farms. **Describe** the investigations you might conduct to discover the cause, and what steps you might take to rectify the problem.

 10. **Discuss** the problems associated with water pools and lakes for wild animals kept in captivity. How should these features be designed and maintained? What types of health problems arise if the water is poorly treated ?
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE (AVIAN)

TUESDAY 30 JULY 2002

PAPER II

(AVIAN)

(3 hours)

Candidates are required to answer **FOUR** of the following **six** questions.

Allow 45 minutes per question.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

If insufficient time is available to answer a question fully, it will be acceptable to complete in note form.

1. A major bird breeder has suffered unacceptable losses during the breeding season consisting of apparently infertile and infected eggs. He has decided to use incubators in the future but has no experience. How should he conduct his incubation procedure and how would he detect abnormalities?
2. Discuss the release into the wild of previously injured wild birds. What criteria would you use to determine if a bird is ready for release? Which environmental factors should be considered?
3. You are presented with an adult captive-bred European eagle owl with a fractured left radius and ulna. Describe your surgical approach to treating this patient.
4. A hyacinth macaw has been presented to you with severe dehydration following an intestinal infection. Describe your fluid therapy protocol and the reasons for it.

P.T.O. for questions 5 and 6

5. A tropical bird house with over 100 birds of mixed species has experienced five deaths. All the birds are free flying within the house, which is connected to a cafeteria for visiting members of the public. Post-mortem examination of dead birds shows good body condition but evidence of septicaemia. *Salmonella enteritidis* is isolated from two of the dead birds. Discuss your approach to dealing with this situation.

 6. Toxicology can be a major factor influencing the health of both ground-dwelling birds such as pheasants, and waterfowl. Describe some of the poisons to which birds are susceptible and the associated clinical signs and treatment.
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THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

WEDNESDAY 8 AUGUST 2001

PAPER I

(3 hours)

Candidates are required to answer **ALL** of the following TEN questions.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Discuss allometric scaling and its relevance to veterinary work with wild animals.
2. Briefly compare and contrast the structure of the skin in reptiles, amphibians and teleost fish.
3. Write short notes on the following:
 - a. rabies transmission in Europe and North America
 - b. endoscopy in the zebra
 - c. water quality in sea-lion pools.
4. How would you investigate a "feather plucking" grey parrot (*Psittacus erithacus*)?
5. Describe the structure of the "shell" (carapace and plastron) of a land tortoise (*Testudo* species). How might traumatic injuries to these structures be treated?
6. Discuss anatomical and physiological features of animals that live in arid regions. How do these influence anaesthesia?
7. Outline the important considerations when reintroducing wild animals. Which legislation might be applicable? Are there Guidelines that might assist in such work?
8. Write short notes on the following:
 - a. the use of 'squeeze cages'
 - b. rectal prolapse in the rhinoceros
 - c. keratitis in raptors.

**P.T.O. for Questions 9 and
10**

9. Discuss the monitoring of general anaesthesia in non-domesticated birds.

10. Briefly summarise the (UK) Secretary of State's Standards for Modern Zoo Practice. How applicable, in your view, to zoo animals are the 'Five Freedoms'?

THE ROYAL COLLEGE OF VETERINARY SURGEONS

DIPLOMA IN ZOOLOGICAL MEDICINE

WEDNESDAY 8 AUGUST 2001

PAPER II

(3 hours)

Candidates are required to answer **FOUR** of the following six questions.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

If insufficient time is available to answer a question fully, it will be acceptable to complete in note form.

1. Discuss perinatal and neonatal death (birth to 15 days) in captive carnivores.
2. Outline current methods of contraception in captive mammals. Which methods might be suitable for a group of mongoose?
3. A game reserve in tropical Africa has experienced an outbreak of tuberculosis among its wild ungulates. How would you deal with the problem?
4. Discuss viral hepatitis in non-human primates.
5. A 10-year-old hyena has developed persistent vomiting. How would you investigate the problem and treat the animal?
6. Your zoo has offered to provide homes to a number of primates from a pharmaceutical research facility which is due to be closed down. How would this situation differ from importation from another zoo facility? Discuss the management of these animals after arrival.

THE ROYAL COLLEGE OF VETERINARY SURGEONS
DIPLOMA EXAMINATION IN ZOOLOGICAL MEDICINE

Tuesday 28 March 2000

PAPER 1
(3 hours)

Candidates are required to answer ALL of the following 10 questions.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Write short notes on the following:
 - a) canine distemper virus in canids and felids;
 - b) hindlimb stiffness/lameness in marmosets and tamarins;
 - c) *post-partum* uterine haemorrhage in the chimpanzee.

2. Write short notes on the following:
 - a) long-acting tranquillisers;
 - b) domestic cats within zoo grounds;
 - c) lactose intolerance in young, bottle-raised, neonatal mammals.

3. Write short notes on the following:
 - a) skin disease in captive seals and sealions;
 - b) dental disease in elephants;
 - c) DNA sampling.

4. One of a group of ten monkeys recently imported from the tropics is underweight, lethargic, and appears to have intermittent fever and a cough. Describe the procedures you would follow to deal with the problem.

5. An Asian wildlife sanctuary cares for both macaque monkeys and various species of carnivores. Discuss the treatment of bite wounds to the staff from these two groups of animals.

6. A young giraffe has developed severe diarrhoea and dehydration. Discuss the appropriate treatment.

7. Describe how you would immobilise, in the field, a Nile crocodile (*Crocodylus niloticus*). What precautions would you take if it had to be transported, by Land Rover, for a distance of 200 km?

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8. Discuss critically the different anaesthetic agents that can be used for psittacine birds. How would your choice of an agent be affected if you were working with free-living macaws (Ara sp.) in the forests of Venezuela?
9. Briefly describe the anatomical and physiological features of amphibians, with particular reference to the Anura, that influence the veterinary care of these animals.
10. Write short notes on:
 - a) *post-mortem* examination of teleost fish;
 - b) handling of mygalomorph spiders;
 - c) *Pseudomonas* as a pathogen.

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THE ROYAL COLLEGE OF VETERINARY SURGEONS
DIPLOMA EXAMINATION IN ZOOLOGICAL MEDICINE

Tuesday 28 March 2000

PAPER 2
(3 hours)

Candidates are required to answer **FOUR** of the following six questions.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Describe the vascular supply to the kidneys of reptiles. Explain why an understanding of this is relevant to the medical and surgical care of these animals.
2. Describe in detail the laboratory investigations that can be carried out on a shed skin from a snake in order to obtain information about the animal's health status.
3. Discuss the role of ectoparasites of reptiles. Provide detailed information about the host:parasite relationship of ONE of those that you mention.
4. Which anaesthetic agents and which anaesthetic methods would you use:-
 - a) to anaesthetise a captive Gila monster (*Heloderma suspectum*) for surgery on the tongue;
 - b) to immobilise a free-living smooth snake (*Coronella austriaca*) for the application of a radio transmitter to the dorsal scales.
5. List and discuss methods of euthanasia that might be used for adult leopard tortoises (*Testudo pardalis*).
6. How would you assess "pain" in reptiles. Which British legislation makes the causing of "unnecessary suffering" an offence? Does it apply to reptiles?

THE ROYAL COLLEGE OF VETERINARY SURGEONS
DIPLOMA EXAMINATION IN ZOOLOGICAL MEDICINE

Tuesday 27 April 1999

PAPER I
(3 hours)

Candidates are required to answer ALL of the following 10 questions.
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1. Discuss the significance of ectothermy when treating wild animals.
2. Compare the gross anatomy of birds with that of crocodilians. Why are the latter considered to be more closely related to birds than are other reptiles?
3. Write short notes on:
 - a) benzodiazepines in small mammals;
 - b) local analgesics in birds;
 - c) water-soluble anaesthetic agents for fish.
4. Discuss:-
 - a) the impact of CITES on the movement of diagnostic specimens between the UK and North America; and
 - b) the EU Directive relating to the keeping of wild animals in zoos.
5. Briefly describe:-
 - a) the repair of exoskeleton damage in arthropods;
 - b) microchipping of tortoises;
 - c) castration of hystricomorph rodents.
6. What do you understand by "stress"?
How would you diagnose stress in a captive badger (Meles meles)?
7. Discuss the epizootiology of bovine malignant catarrh (malignant catarrhal fever) in wild ruminants.
8. Briefly describe methods of population control in zoo mammals.
9. Write short notes on:-
 - a) fungal infections of frogs;
 - b) Caryospora infection of falcons;
 - c) Lyssaviruses in fruit bats.
10. Describe how you would immobilise, in the field, an African wild dog (Lycaon pictus) in order to apply a radio-collar.

THE ROYAL COLLEGE OF VETERINARY SURGEONS
DIPLOMA EXAMINATION IN ZOOLOGICAL MEDICINE

Tuesday 27 April 1999

PAPER 2
(3 hours)

Candidates are required to answer FOUR of the following six questions.

Illegible handwriting or failure to answer the question in the form requested may result in examiners being unable to award marks for information which candidates intended to convey.

1. Describe the skin of reptiles.
Briefly outline the response of the skin of chelonians to infectious and non-infectious insults.
2. Why is water quality important when crocodiles are kept in captivity? How would you check the water?
How could you rectify deficiencies?
3. Compare and contrast the use of radiography, ultrasonography, computerised tomography and magnetic resonance imaging in reptiles.
4. Discuss the factors that may influence haematological values in lizards.
5. Write brief notes on:-
 - a) ticks on snakes;
 - b) haemogregarines of reptiles;
 - c) Entamoeba invadens;
 - d) papillomatosis of lizards.
6. Describe the sloughing process (ecdysis) in snakes.
What are the main causes of dysecdysis?