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THE UNIVERSITY OF ZAMBIA

UNIVERSITY EXAMINATIONS (1986)

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|--|-----------|
| 1. Statistics and Experimental Design  | - VMA 221 |
| 2. Veterinary Embryology               | - VMB 211 |
| 3. Veterinary Physiology               | - VMB 320 |
| 4. Veterinary Biochemistry             | - VMB 325 |
| 5. Veterinary Pharmacology             | - VMB 425 |
| 6. Veterinary Pathology                | - VMP 410 |
| 7. Veterinary Microbiology             | - VMP 430 |
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| 9. Veterinary Parasitology (Practical) | - VMP 440 |

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THE UNIVERSITY OF ZAMBIA  
UNIVERSITY MID-SESSIONAL EXAMINATIONS - MARCH 1986

VMA 221  
STATISTICS AND EXPERIMENTAL DESIGN

TIME: THREE HOURS.

ANSWER: ALL THE QUESTIONS.

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1. A researcher wants to investigate milk yield of two breeds of cattle. He has a Zambian (indigenous) breed and a European (exotic) breed. He codes the breeds (X) into 1 for European breed and 2 for Zambian breed and he codes milk yield (Y) into 1 for 0 to 5 litres, 2 for more than 5 to 10 litres, and 3 for more than 10 to 15 litres of milk yield per day. If the joint probability density function of X and Y (ie breed and milk yield) is assumed to be

$$f(x,y) = \frac{x+y}{21} \quad x=1, 2; y=1,2,3$$

= 0 otherwise

- a) What kind of association is there between breeds and milk yield?
- b) Which of the two breeds yield more milk on the average?
- c) In which of the two breeds is variability in milk yield largest? (25 points)

2. A population of Angoni cattle in the Eastern Province was of interest to the Director of Agriculture. He went and saw a Provincial Veterinary Officer and asked him about the expected butterfat production in the Angoni population. The Officer claimed it to be 40 Kg per lactation. If the following data were collected from that population

<u>Observation</u>	<u>Butterfat yield (Kg)</u>
1	65
2	37
3	17
4	34
5	51
6	18
7	46
8	36
9	15
10	45

- a) Does the data set confirm the officer's claim at 5% probability of making type one error?
- b) What is the 95% confidence interval for the true population mean of butterfat yield based on this data set? (20 points)

3. A drug company produced five new brands of medicine for treating tumors caused by a particular food poison which happens to be common when cattle are grazed on sour dambos.

a) To test the drug 3 mice with ten tumors each per brand of medicine were used as experimental units and the following data set was obtained

Drug	Number of tumors after treatment		
	Mouse 1	Mouse 2	Mouse 3
A	5	4	3
B	4	5	6
C	6	3	9
D	7	6	8
E	3	2	4

Test the hypothesis that there are no significant differences in curing strength among the drugs, as determined by the number of remaining tumors, at 1% probability of type one error risk.

(Question 3.(b) continued..)

- b) If the researcher used three breeds of mice each with 10 mice and ten tumors per mice per brand of medicine and obtained the following data

Drug	Number of cured mice after the treatment.		
	breed 1	breed 2	breed 3
A	5	4	3
B	4	5	6
C	6	3	9
D	7	6	8
E	3	2	4

Test the same hypothesis which is in (a) above. (25 points)

4. Given the following average body weight in lbs and food consumption in lbs over 350 days period for ten chickens

Bird	Body weight (lbs)	Food consumption (lbs)
1	4.6	87.1
2	5.1	93.1
3	4.8	89.8
4	4.4	91.4
5	5.9	99.5
6	4.7	92.1
7	5.1	95.5
8	5.2	99.3
9	4.9	93.4
10	5.1	94.4

- a) What amount of food consumption is associated with one lb increase in body weight?
- b) Is the associated amount of food consumption ~~is~~ significantly different from zero? (15 points)

- 5(a). What do you understand by experimental design?
- (b). Distinguish among completely Randomized design, Randomized Complete Block design and Latin Square.
- (c). What do you understand by Factorial <sup>treatment</sup> design, Fixed model, Random model, and Mixed model.

(15 points).

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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - OCT. 1986

VMB 211  
VETERINARY EMBRYOLOGY

TIME: THREE HOURS.

ANSWER: ANY FIVE QUESTIONS.

USE DIAGRAMS TO ILLUSTRATE YOUR ANSWERS.

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1. In order for the embryo to grow into a foetus and eventually to full term it needs nutrients and oxygen for its metabolism, to get rid of the waste products to avoid toxic effects from their accumulation and protection from untoward environmental influences. Describe how these functions are made possible in a named animal embryo.
2. Give an account of the development of the arterial blood circulatory system in a named animal embryo.
3. Describe how the development of a mammalian urinary system takes place.
4. Give an account of the processes by which bone is formed in a named animal embryo. How do long bones develop the shape that they have in an adult animal?

- 5.a. ~~Reproduction does not take place until~~ an animal has attained puberty. Why do you think ~~the organs~~ of reproduction have to develop early in embryonic life when in actual fact are not functional at that time?
- b. Describe how the female genital tract develops into that of a named adult animal.
6. Write short notes on any five of the following as relates to embryos.
- a) Developmental relationships of the parts of the Central Nervous System.
  - b) Anatomical structure of the pharynx.
  - c) Development of the pituitary glands.
  - d) Gastrulation.
  - e) Development of nasal chambers.
  - f) Induction.

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END OF EXAMINATION



**THE UNIVERSITY OF ZAMBIA**  
**UNIVERSITY EXAMINATION - JULY 1986**  
**VMB 310**

**VETERINARY ANATOMY**

**TIME: THREE HOURS**

**ANSWER: FIVE QUESTIONS**

**ILLUSTRATE YOUR ANSWERS WHEREVER POSSIBLE WITH DIAGRAMS**

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1. Describe the structure of a typical vertebra. What are the important differences in the vertebrae of the cervical, thoracic, lumbar and sacral regions?
2. Give a detailed account of the anatomy of the stifle joint in the ox. How does this differ from that of the dog?
3. Give an account of the anatomy of the muscles of the carpus and digits in the bovine. Indicate the function and the innervation of the muscles you describe.
4. Describe the anatomy of the bovine lungs. Give the distinctive features in the other domestic mammals. Describe the distribution of the pleura in the ox.
5. Describe the position and structure of the kidney. Indicate the important species differences.
6. Describe the reproductive organs of the hen and the structure of the egg.
7. Give an account of the anatomy of the brainstem. Indicate its subdivisions and ventricles.

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**END OF EXAMINATION**

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - JULY 1986

VMB 315

VETERINARY HISTOLOGY

**TIME: THREE HOURS**

**ANSWER: ALL QUESTIONS**

**ALL QUESTIONS CARRY EQUAL MARKS**

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1. a) Define and classify covering epithelium.  
b) Describe briefly epithelium in lamina epithelialis of uterus of the cow during anoestrus cyclic changes.  
c) How is glandular epithelium classified?
2. a) Give a concise but detailed comparison of the different muscular tissues.  
b) Write short notes on any three of the following:
  - i) hippocampus
  - ii) osteoid
  - iii) spinal cord
  - iv) functions, primary and secondary, of connective and supportive tissue.
3. Describe the microscopic anatomy of the wall of the duodenum. Microscopically, how would you differentiate duodenum from the other parts of intestinum (small and large).
4. EITHER  
a) Describe by means of diagrams the cells which might be seen in a blood smear of a sheep.  
Give an account of the development of red blood cells in the sheep.  
  
OR  
b) Compare the microscopic structure of a lymph node with that of lymphatic nodules of the tonsils.
5. Describe the structure and function of ONE in each of the following groups:-  
  
GROUP A
  - i) spleen
  - ii) nephron
  - iii) liver lobule

(5 continued)

GROUP B

- i) pancreas
- ii) adrenal gland
- iii) testis

END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA

UNIVERSITY EXAMINATIONS - JUNE 1986

VMB 320

VETERINARY PHYSIOLOGY

TIME: THREE HOURS

ANSWER: FIVE QUESTIONS

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1. Discuss the regulation of respiration by the nervous system.
  2. What is the role of calcium in the initiation of contraction in skeletal muscle? Discuss the sliding filament theory.
  3. The juxtaglomerular apparatus plays a fundamental role in the conservation of sodium and water balance in the body. Discuss.
  4. The neurohypophysis is not an area of hormone formation whereas the adenohypophysis can, functionally, be considered as six endocrine glands. Discuss.
  5. Discuss the following:
    - i) the effect of blocking the bile duct on digestion.
    - ii) the control of primary cycle reticulo-rumen contractions.
  6. Describe the functional organisation of the autonomic nervous system and discuss the synaptic transmission mechanisms in its peripheral efferent section.
  7. Write brief notes on the following:
    - i) thermoregulatory heat production
    - ii) the regulatory responses to elevated extracellular fluid calcium levels.
    - iii) receptor and generator potentials.

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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA

UNIVERSITY SUPPLEMENTARY/DEFERRED EXAMINATIONS - DECEMBER 1986

VMB 320

VETERINARY PHYSIOLOGY

TIME: THREE HOURS.

ANSWER: ALL FIVE QUESTIONS.

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1. Discuss the nervous control of the simple (non-ruminant) stomach.
  2. Outline the functional anatomical changes that occur in the cardiovascular system soon after birth and discuss their functional significance.
  3. Write brief notes on the following:
    - (I) The functions of the iodothyronine hormones.
    - (II) Defecation.
    - (III) Sweating.
  4. Compare and contrast the response of a single nerve with that of a preparation of mixed nerves to electrical stimulation.
  5. Discuss four major effects of the preovulatory LH surge on the antral follicle.
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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA

UNIVERSITY EXAMINATIONS - JULY 1986

VMB 325

VETERINARY BIOCHEMISTRY

TIME: THREE HOURS

ANSWER: FIVE QUESTIONS ONLY  
ALL QUESTIONS HAVE EQUAL VALUE

1. Discuss the differences shown by ruminants in energy metabolism compared with other animals.
2. Describe the breakdown of glucose to pyruvate in an animal, giving all details.  
  
Discuss why pyruvate is converted to lactate in a muscle cell rather than fully oxidised to carbon dioxide and water.
3. Describe the action of a competitive and a non-competitive inhibitor on an enzyme. Certain enzymes which are affected by inhibitors are allosteric enzymes. What are the special properties of allosteric enzymes?
4. Write short notes on THREE of the following:
  - i) Calcium
  - ii) Fructose diphosphatase
  - iii) Chylomicrons
  - iv) Ketogenic amino acids
5. The genetic material in an animal cell is deoxyribonucleic acid. Describe the replication of DNA in detail.
6. a) Describe the synthesis of phospholipids from glycerol and fatty acids.  
  
b) Phospholipids are an important constituent of membranes. Describe the role of membranes in an animal cell.
7. Assessment of levels of plasma albumin, immunoglobulins, and certain plasma enzymes assist in clinical diagnosis. Discuss this.
8. Give the structure and list the functions of cholesterol. Cholesterol in blood can be estimated using colorimetry. A sample of bovine serum was analysed for cholesterol as follows:  
0.2 ml serum was mixed with 1.8ml isopropanol, shaken and centrifuged at 2000 rpm for 5 minutes. 0.5ml of the

supernatant was treated with 2.9ml of colour reagent and 3.6ml acetic acid, mixed well and left for 20 minutes for the colour to develop.

Duplicate samples gave the following absorbance at 580nm:

A 0.142

B 0.146

A set of cholesterol standard samples were prepared from a solution 20mg cholesterol in 100ml. 2.9ml of colour reagent and 3.6ml acetic acid were added, they were left for 20 minutes and the absorbance at 580nm measured.

Tube	1	2	3	4	5	6
Vol. Cholesterol standard (ml)	0.0	0.1	0.2	0.3	0.4	0.5
Vol. Isopropanol (ml)	0.5	0.4	0.3	0.2	0.1	0.0
A <sub>580</sub>	0.0	0.057	0.115	0.175	0.230	0.290

Draw a standard curve for cholesterol from these results and use it to calculate the concentration of cholesterol in the bovine serum sample in mg per dl.

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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - JUNE/JULY 1986

VMB 425

VETERINARY PHARMACOLOGY

TIME: THREE HOURS

ANSWER: FIVE QUESTIONS

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1. What classes of drug can cause decreased skeletal muscle activity?

Discuss the problems which might arise from the use of depolarising muscle relaxants in veterinary practice.

2. Compare and contrast the actions and uses in veterinary medicine of thiopentone, "Saffan" and ketamine.
3. What properties should drugs used in the treatment of congestive heart failure possess? Discuss the extent to which available drugs meet these requirements.
4. Discuss the pharmacology and therapeutics of drugs which affect prostaglandin synthesis.
5. Much of human pharmacology has no veterinary parallel. Discuss.
6. Discuss the pharmacology and clinical uses of corticosteroids.
7. Enumerate the objectives of veterinary fluid therapy and relate them to the types of solution available.

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END OF EXAMINATION



THE UNIVERSITY OF ZAMBIA  
UNIVERSITY SUPPLEMENTARY/DEFERRED EXAMINATIONS - DECEMBER 1986

VMB 425  
VETERINARY PHARMACOLOGY

TIME: THREE HOURS.  
ANSWER: FIVE QUESTIONS.

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1. Discuss the pharmacology and clinical uses of prostaglandins.
  2. How would you treat a case of severe haemorrhage resulting from a broken leg?
  3. Discuss the pharmacology and clinical uses of either:  
(a) one named local anaesthetic drug  
OF  
(b) one named general anaesthetic drug.
  4. From its actions at the cellular level, predict the possible clinical uses and side-effects of isoprenaline (isoproterenol).
  5. Discuss the principles behind the therapeutic management of ketosis in cattle.
  6. Why does 'bloat' develop and how can it be treated?
  7. Discuss the pharmacology, clinical uses and side-effects of anti-cholinergic drugs.
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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - OCT. 1986

VMP 410  
VETERINARY PATHOLOGY

TIME: THREE HOURS.

ANSWER: ALL EIGHT QUESTIONS. THE QUESTIONS CARRY EQUAL MARKS.

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SECTION A  
GENERAL PATHOLOGY

1. Define thrombus and describe the factors influencing thrombosis.
2. What do you understand by chronic granulomatous inflammation.
3. Describe and compare the characteristics of benign and malignant neoplasms.

SECTION B  
SPECIAL PATHOLOGY

1. Describe the causes and sequelae of pericarditis.
2. Define cirrhosis of the liver and describe the different types of cirrhosis which can occur.
3. What are the consequences of cerebral haemorrhage?
4. Write short notes on each of the following:-
  - i) Nutmeg liver.
  - ii) Osteodystrophia fibrosa.
  - iii) Pulmonary adenomatosis of sheep.
5. Describe the aetiology, gross and microscopic pathology of pyelonephritis in cattle.

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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - OCT. 1986

VMP 430  
VETERINARY MICROBIOLOGY

TIME: THREE HOURS.

ANSWER: ALL THREE SECTIONS. THE SECTIONS CARRY EQUAL MARKS.

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SECTION A  
BACTERIOLOGY

Write short notes on questions 1 and 2 and any other three questions.

1. Koch's postulate (Koch's rules).
2. Methods of bacterial classification.
3. L - form.
4. Heat sterilization methods.
5. Phenotype changes (modification) of bacteria.
6. Factors influencing virulence of bacteria.
7. Zone phenomenon.
8. Toxoid.

SECTION B  
VIROLOGY

1. Write short notes on any five of the following, giving examples where applicable.

- a) Lysogeny.
- b) Weil - Felix reaction.
- c) Interferon.
- d) Oncogenic viruses.
- e) Interference.
- f) Secondary viraemia.
- g) LD<sub>50</sub>
- h) The main differences among Rickettsias, Mycoplasmas, Chlamydias and Viruses.
- i) Reverse transcription.
  
- j) Plaque and pock formation.
- k) Inclusion bodies.
- l) Capsomeres.
- m) Bacteriophages.
- n) Mesogenic strains.

2. Give an example of a disseminated virus infection. Write briefly on its transmission, pathology and methods of diagnosis.

SECTION C  
IMMUNOLOGY

Answer all three questions, by use of diagrams.

1. Describe T-B cells cooperation in the immunological response to a carrier-hapten.
2. Describe the destruction of virus-infected cell by immunological function.
3. Describe (genetically) class-switch phenomenon of immunoglobulin.

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END OF EXAMINATION

THE UNIVERSITY OF ZAMBIA  
UNIVERSITY EXAMINATIONS - OCT. 1986

VMP 440  
VETERINARY PARASITOLOGY

TIME: THREE HOURS.  
ANSWER: TWO QUESTIONS IN SECTION A, TWO QUESTIONS IN SECTION B, AND TWO QUESTIONS IN SECTION C.  
ALL THREE SECTIONS CARRY EQUAL MARKS.

SECTION A  
PROTOZOLOGY

Answer Two Questions.

By using the life cycle of Eimeria tenella show how proper animal husbandry procedures can play an important role in the control of coccidiosis in poultry.

- a) What are the most important features which distinguish stercorarian from salivarian trypanosomes.
- b) In table form clearly list the different ways by which trypanosomes belonging to the following subgenera Trypanozoon, Nannomonas and Duttonella can be differentiated giving examples.
- c) What is the significance of knowing those differences?

East Coast Fever is one of the most important diseases in East and Central Africa.

- a) Name the causative agent of this important disease and show how it is transmitted.
- b) Describe its life cycle emphasizing the most important stages.
- c) Give your own opinions about the future prospects of eradicating this parasite in Zambia.

4. Write short notes on the following giving examples and emphasizing their significance in Protozoology.
- a) Antigenic variation.
  - b) Xenodiagnosis.
  - c) Transovarian transmission.
  - d) Schizogony.
  - e) Pleomorphism.
  - f) Premunity.

SECTION B  
HELMINTHOLOGY

Answer Two Questions.

1. Using diagrams describe the larval form of tapeworms and discuss the economic and pathogenic significance of those that are of zoonotic importance.
2. Discuss the life cycle of Digenetic Trematodes emphasizing their reproduction methods and the significance of their intermediate hosts in the infection to the definitive hosts.
3. Describe the causes, symptoms and control measures relating to parasitic gastro-enteritis in cattle.
4. Describe in detail the possible routes by which helminth parasites may enter their hosts.



SECTION C  
ENTOMOLOGY

Answer Two Questions.

1. What is myiasis? Describe the different kinds of myiasis from the entomological and clinical points of view.
2. Explain the main morphological and habitual differences between argasid and ixodid ticks.
3. Describe the morphological characters of the mange mite, Sarcoptes scabiei and its firm diagnosis in animals.
4. What are the important viral diseases in horse and sheep transmitted by Culicoides biting midges? Explain the significant climatic conditions in spreading these diseases across the Mediterranean Sea.

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END OF EXAMINATION

UNIVERSITY OF ZAMBIA  
SCHOOL OF VETERINARY MEDICINE  
VMP 440 FINAL EXAMINATION  
VETERINARY PARASITOLOGY (PRACTICAL)

Time allowed: 10 minutes/question.

Answer all questions. All questions carry equal marks.

- 1- This is a blood slide from a one-year old bull that had been running a high temperature for several days and was not eating. Its superficial lymph nodes were swollen. Give your opinion as to the identity of the parasite seen and state what other materials you might examine to confirm your diagnosis.
- 2- This blood smear was collected from a horse showing intermittent fever and emaciation. Examine the smear extensively and give the generic name of any blood parasite found. Give your opinion as to the specific name of the parasite and state your reason.
- 3- Locate the blood parasite in this smear which was taken from a cow showing anaemia & emaciation. Identify the parasite and give your opinion as to its pathogenic importance.
- 4- Identify to the generic level the parasite which was recovered from the litter on the floor of a chicken house. Give your reason to support your identification. Is it an infective or pre-infective stage?
- 5- Locate the spicule of this worm and measure the length of one spicule using a) 10 objective and b) the 40 objective. Record the measurements in microns.
- 6- This parasite was found in the bile ducts of a 3 years old cow. State its generic and specific names. On a rough diagram indicate the presence of eggs. Give your opinion as to the minimum length of time the cow has been infected.

7- This egg was found during the course of examining a faecal sample from a pig. Locate and name any two worm egg present.

8- These parasitic cysts were found in the peritoneal cavity of a goat. Give your opinion as to their generic and specific identification and state your reason. How do you think the goat become infected.

9- a) One of the two flies (specimen A and B) is Glossina morsitans. State which one is G. morsitans.

b). By means of a concise sketch with proper names, show the most noticeable morphological features of G. morsitans.

10- a) One of the two specimens (A and B) is a cat flea. State which one is it.

b) By means of a concise sketch with proper names, show the morphological characteristics that differentiate it from other fleas.

11- Make a sketch of the head structure of the fly on slide E and site the main structures.

12- Observe thoroughly the general morphology of the three specimens (F,G and H), then fill some blanks of the following rows by the letter F, G or H as appropriate.

WITH EYES				
FEMALE				
MALE				
ENGORGED				
AMBLYOMMA				
BOOPHILUS				
HYALOMMA				
RHIPICEPHALUS				