AFRICA UNIVERSITY

(A United Methodist-Related Institution)

Investing in Africa's Future

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

1st SEMESTER EXAMINATIONS 2019

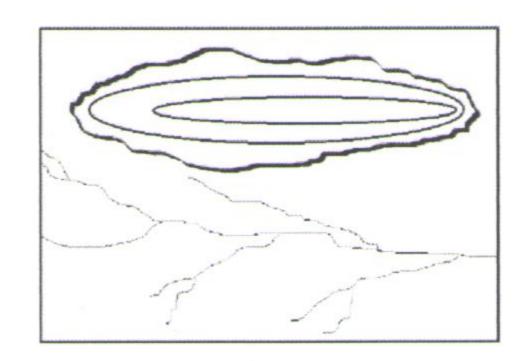|	
COURSE CODE	**NAAS203**
COURSE TITLE	**PRINCIPLES OF WILDLIFE**
DATE OF EXAMINATION	November 2019
TIME	3 Hours

GENERAL INSTRUCTIONS TO CANDIDATES

1. **Do NOT write your name on the answer sheet.**
2. Use answer sheets provided.
3. Answer all questions in Section A, two questions in Section B, and one question in Section C.
4. Read and understand all questions and instructions before you answer.
5. Begin your answer for each question on a new page.
6. Credit is given to neat presentation of answers.

AAS/NAAS 203: Principles and Techniques of Wildlife Management (60 marks total)

Section A: **Answer the following question for 5 marks**.
Copy (roughly) the following sketch-map into your examination booklet. Then please draw three properly oriented transect-lines—and briefly explain why you chose that particular orientation. (The contour lines at the top represent an elongate rocky hill; the lines at the bottom represent a drainage system through flatlands.)   (5 marks)

Section B. Answer either of the two (2) questions in this section. Do not answer both questions.

B.1. Define and give African examples of the following mammalian mating systems: **Territory, harem, dominance hierarchy**.   (10 marks)

B.2. Answer the following 4 sub-questions about the use of ratio-methods in population-estimation. (Marks for sub-questions are as indicated.)   (10 marks total)
        The following formulas should help you recall the ratio-strategy for mark-recapture estimation of wildlife population-sizes.

$$\mathbf{M/N \approx m/n, \text{ or}}$$
$$\mathbf{p \approx m/M, \text{ and } N \approx n/p}$$

M is the number of animals caught & Marked during the first capture-event;
N, the quantity you'd like to estimate, is the total population;
m is the number of animals captured in the 2nd event that were marked during the first;
n is the total number of animals captured in the 2nd capture-event;
p is the capture-probability for any given animal in the population.

   B.2.(a) Several assumptions underlie the recapture-model listed above. In practical work, however, one assumption is most often violated—and causes the most serious problems. Which assumption is that, and what sort of problems does the violation typically cause? (4 marks)

   B.2.(b) If some animals lose their marks between captures, does your estimate therefore tend to be too low or too high? Why?   (2 marks)

   B.2.(c) If animals become "trap-happy," does your estimate therefore tend to be too low or too high? Why?   (2 marks)

   B.2.(d) If animals become "trap-shy," does your estimate therefore tend to be too low or too high? Why?   (2 marks)

Section C. Answer the following question for 20 marks.

First, select a country. Your choices are either (a) the country you are from or (b) Zimbabwe or (c) Kenya. Second, discuss the opportunities and challenges associated with the management of elephants in the country you selected. (20 marks)

Hints: You should carefully plan your essay-answer before you start writing. Your work should be well written and logically organized. Your answer should convince me of the following: (1) You are well informed about the basic biology of elephants. (2) You understand the elephant-management issues that apply to the country that you have chosen to discuss. (3) You are capable of planning "your" country's management strategy in such a way that you do not undermine the management plans of other African countries (which have different problems & needs). (4) You are familiar with the history of elephant-management over the last 100 years and are cognizant of the multi-national and political dimensions of that history. (5) You are aware that, especially in developing nations, the futures of people and wildlife are inextricably linked.

If you like, you may pretend that, as a national representative, you are writing a position-paper to be presented before the International Union for the Conservation of Nature (IUCN) at the next quadrennial meeting.

Section D. Answer either of the two (2) questions in this section. Do not answer both questions. (5 marks total)

D.1. Tell me some new, wild, and interesting idea you have for the use of radio telemetry in wildlife management, conservation, etc. (Yes, you'll get one point for writing anything. But to receive more points, your idea must be interesting to the instructor and must appear to have some possibility of being useful.) (5 marks)

D.2. Tell me some new, wild, and interesting idea you have for the conservation of rhinoceroses in Africa. (Yes, you'll get one point for writing anything. But to receive more points, your idea must be interesting to the instructor and must appear to have some possibility of working.) (5 marks)

Section E. Answer two (2) of the following three (3) questions. Do not answer more than two of the questions. (10 marks total)

E.1. What is the relationship between surface-to-volume ratios and minimum mammalian size? (5 marks)

E.2. Carefully explain the following statement: *"The practitioner of radio-telemetry typically confronts tradeoff decisions involving **reception-range**, **package-mass**, and **radio-longevity**."* (5 marks)

E.3. Darwinian theory suggests that under some conditions larger animal species should be long-lived and intelligent. Elephants are large, long-lived, and intelligent. Crocodiles are large and long-lived but not particularly intelligent. Explain briefly, using basic biological principles. Then show how these facts might be of concern to a wildlife manager (5 marks)

Section F. Answer two (2) of the following three (3) questions in this section. Do not answer all three questions. (10 marks total)

F. 1. Most management-oriented conservation biologists believe that ongoing global climate change will adversely impact the biodiversity of the African continent. Some skeptics, however, offer an opposing argument, which is summarized here in italics. *Throughout the Pleistocene Epoch, Africa experienced several episodes of climate-change more extreme in amplitude (of temperature and rainfall variation) than anything predicted by any current climate-model. Throughout these dramatic changes* (the skeptics say), *Africa not only maintained but actually increased continental levels of biodiversity. Thus* (the skeptics say), *we should not be concerned about effects of contemporary climate-change on African biodiversity.* Please write for me a detailed critique of the skeptics' argument. (5 marks)

F.2. Assume that the following statements are correct (though actually they are only very rough approximations):

Humani Ranch is 600km². At Humani, our game drives covered 100km. Together, Dr. Hope and I could count elephants out to a distance of 50m from the road. Together we counted 5 elephants.

Part 1: Use the above approximate information to estimate the total number of elephants at on Humani Ranch. Please show your work. (3 marks)

Part 2: If you worked the problem correctly, your estimate will be approximately one-eighth the size of the actual number of elephants, as counted during an aerial survey. What are some probable reasons for this enormous difference? (2 marks)

F.3. The Class Mammalia includes about 4500 living species. In only five of these species—people, three species of elephants, and two species of whales—do females routinely live far beyond their reproductive years. According to a simplistic expression of Darwinian theory, it seems counter-adaptive that a female should continue living after she can no longer produce offspring: she should die & get out of the way so that her daughters, granddaughters, etc., could have access to the resources that she would otherwise consume. **Offer a more sophisticated discussion that explains female longevity among people and elephants. Explain any management implications.** (You can forget about the whales; if you have the right answer for people & elephants, it works for the whales too.)
(5 marks)