



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2011

**LIFE SCIENCES: PAPER II**

Time: 2½ hours

150 marks

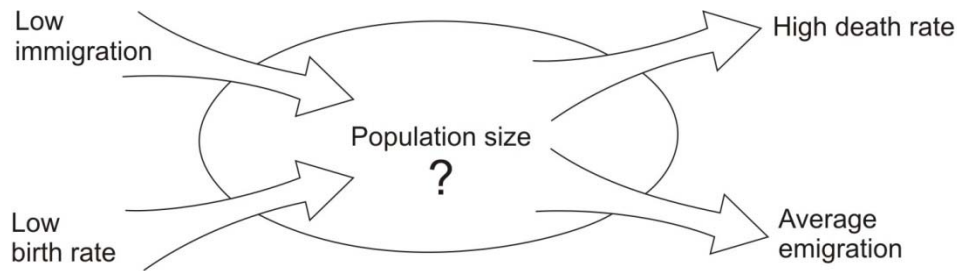
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**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of 11 pages and a yellow Answer Booklet. Please check that your question paper is complete. Detach the Answer Booklet from the middle of your question paper.
  2. This question paper consists of five questions.
  3. Question 1 must be answered in the Answer Booklet. Question 2, 3, 4 and 5 must be answered in your Answer Book.
  4. Read the questions carefully.
  5. Number the answers exactly as the questions are numbered.
  6. Use the total marks, which can be awarded for Questions 1, 2, 3 and 4, as an indication of the amount of detail required.
  7. It is in your own interest to write legibly and to present your work neatly.
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**QUESTION 2**

2.1 With reference to the diagram below answer the following questions.



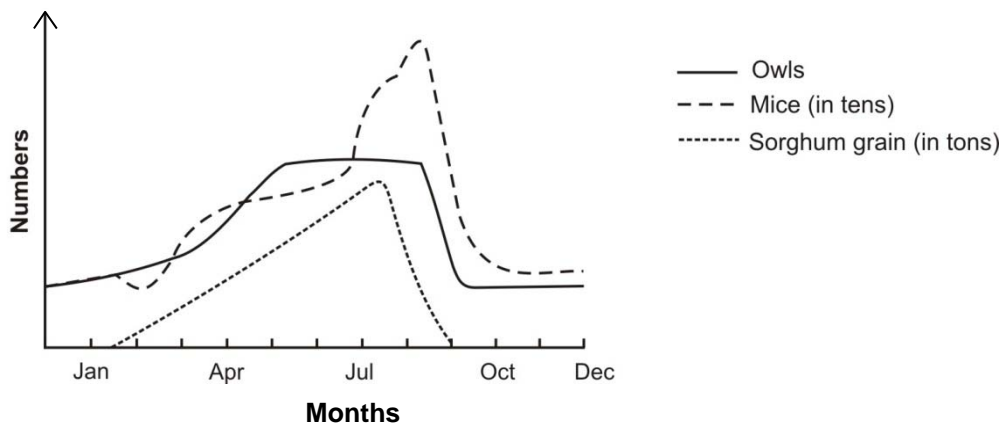
2.1.1 Define the term 'population size'. (1)

2.1.2 (a) Will the population illustrated in the diagram increase or decrease in size? (1)

(b) Give an explanation for your answer in Question 2.1.2 (a). (3)

2.2 A population of nocturnal (active during the night) mice can be found in a sorghum field of a farmer in the Free State. During a mark-recapture determination of the number of mice in the field, 55 mice were caught on the 28 February, marked and returned to the field. A recapture was carried out on the 28 April and of the 40 mice caught 11 were marked.

**Graph to show the numbers of owls and mice and sorghum crop over several months**



2.2.1 Suggest a suitable method to catch the mice. (1)

2.2.2 State TWO precautions to be taken when marking the mice. (2)

2.2.3 Calculate the size of the mouse population. Show all workings. (4)

2.2.4 Identify ONE problem with the way in which this mark-recapture was carried out and explain how this problem could be overcome. (3)

2.2.5 Using data in the graph state:

(a) in which month it can be concluded that the owl eggs hatch. (1)

(b) in which month the owls emigrate from the sorghum fields. (1)

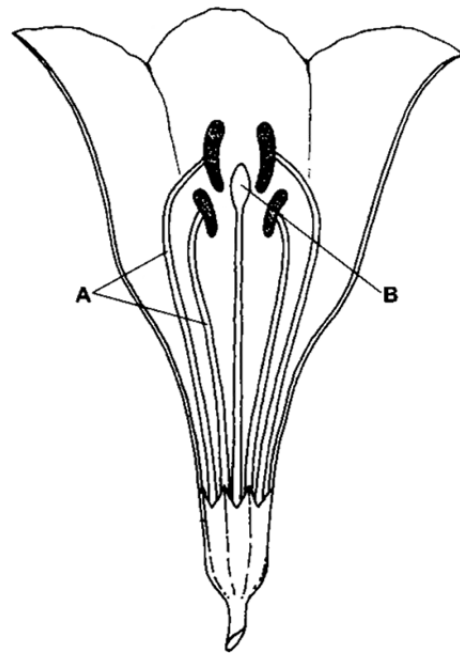
- 2.2.6 The owls and mice live together in a predator-prey relationship.  
Define such a relationship. (2)
- 2.2.7 (a) Sketch the outline of a graph that would show a South African example of the predator-prey relationship you have studied. (4)
- (b) Explain how this relationship operates to regulate the two populations in **your** example. (4)
- 2.2.8 The quelea birds in the area compete with the mice for food.
- (a) Suggest ONE way in which competition is reduced between the species. (2)
- (b) Describe ONE strategy these birds use to avoid predators. (1)
- [30]**

**QUESTION 3**

3.1



Diagram of a potato plant



Drawing of a potato flower

The potato tuber produces 'eyes' which when planted grow into new plants. The plant grows an aerial stem which will give rise to flowers that range in colour from light to dark purple. The plant will also grow underground stems that will develop new tubers. Some varieties of potato flowers are self-pollinating whilst others are cross pollinated by bees. Green, round, poisonous fruits are produced after flowering. Each fruit contains about 300 seeds.

- 3.1.1 Identify the sectional view (type of section) of the potato flower drawing. (1)
- 3.1.2 Identify and state ONE specific function of part A and B. (4)
- 3.1.3 (a) Which part of the flower will produce the green fruit? (1)
- (b) Would you eat the fruit of the potato plant? Justify your answer. (2)

3.1.4 Do you think potato tubers are an important food source for humans? Explain. (2)

3.1.5 Redraw and complete the following table in your Answer Book.

	Potato Flower Seeds	Potato tuber 'eyes'
Type of reproduction		
Description of benefits of this type of reproduction in potato food production	1. 2.	1. 2.

(10)

3.2

### The Olive Baboon

The Olive Baboons live in equatorial Africa and can inhabit the jungles, open woodland and grasslands. They are however most prone to illness during the rainy season of March/April.

The baboons live in groups (troops) of 20 to 50 animals. They look for food, travel and sleep together. Within the group there is a strict hierarchy that is determined among the males through fights. The males with the highest status are more likely to mate with a female. Females indicate their fertility and willingness to mate when the buttocks swell and turn pink. Female will mate with more than one male. Ousted males move from group to group whereas the females stay in the group all their lives.

Olive Baboons eat mostly fruit, leaves, insects and lizards but they will catch small mammals and birds. During the rainy season the Olive Baboons are particularly fond of the black plums of the indigenous trees. This fruit contains a lot of progestogens which have a similar action to progesterone. When the females eat a lot of plums their buttocks do not swell and turn pink. The females are infertile at this time and so the pregnancy rate drops.



Olive Baboon

3.2.1 Write TRUE or FALSE for each of the following statements.

- (a) The Olive Baboon breeding strategy is the same as the wild dog. (1)
- (b) Internal fertilisation takes place with the baboons. (1)
- (c) Baboons are viviparous. (1)

3.2.2 Give an explanation for the baboon population benefiting from a drop in the pregnancy rate in the rainy season. (2)

3.2.3 Black plums act as a natural contraceptive to baboons. Which contraceptive method used by humans is likely to have the same effect? (1)

3.2.4 Sketch the outline of a graph to illustrate the generalised survivorship curve of the baboons. (3)

3.2.5 Give ONE way in which the social organisation of the baboons ensure the survival of the group. (1)

[30]

**QUESTION 4**

- 4.1 Draw a diagram of a sperm showing the three regions. Label any **THREE** structures on the diagram. Annotate **TWO** of these labels with the function of that part. (8)
- 4.2 Explain **ONE** complication of natural birth which encourages women to choose a caesarean delivery. (3)
- 4.3 Distinguish between fertilisation and implantation. (2)
- 4.4 Read the following article and then answer the questions below using the information provided and your own knowledge.

**Pregnancy Problems**

Fertility problems are very common – as many as one in five women under the age of 35 will fail to become pregnant if they have regular unprotected sex. Infertility may be due to problems such as failure to ovulate and/or poor sperm counts.

A doctor can refer a couple to clinical tests. These may include a detailed sperm analysis or ultrasound and X-ray examination of the woman's reproductive organs.

Fertility treatment will depend on the cause of the problem but may include hormonal drugs or microsurgery. The success rate using this method is low and sometimes a couple might decide to rely on a surrogate mother.

Surrogate mothers are found when a man has fertile sperm but the woman cannot produce eggs or has a faulty or no uterus. The surrogate provides the eggs and/or uterus in which the baby develops.

Many women have no difficulty in conceiving but do not carry the baby to term. One in four pregnancies ends in miscarriage – usually in the first three months. Miscarriage can be due to abnormality in the foetus, infections and a lack of certain hormones.

[Adapted: *First Aid & Family Health*]

- 4.4.1 The article refers to 'unprotected sex'. If a couple do not wish to conceive a baby, name the possible contraceptive they would use to prevent:
- (a) production of the ovum (1)
  - (b) the sperm reaching the egg (1)
  - (c) implantation of the embryo (1)
- 4.4.2 State **TWO** possible tests a doctor would use with an infertile couple. (2)
- 4.4.3 Various fertility treatments have been listed. Suggest a type of hormone treatment that might be given and what it can be expected to do. (3)
- 4.4.4
- (a) Define 'miscarriage'. (2)
  - (b) When is the most common time for a miscarriage? (1)
  - (c) State **TWO** possible causes of a miscarriage. (2)
- 4.4.5 From your understanding of the use of a surrogate mother, what legal or ethical problems could arise? (4)

**[30]**

**QUESTION 5**

**Do you think humans have the right to hunt? Nowadays humans commonly hunt to obtain a trophy; to support indigenous medicinal beliefs or as an indicator of manhood.**

**Present a debated argument to support your decision.**

To answer this question you are expected to:

- read the source material (A – F) in order to help you **add to your knowledge** and respond to the question.
- select **only** the facts from the information given that will assist your answer; **do not** attempt to use all the material.
- integrate authentic biological knowledge from the source material. Do **not** write a response based entirely on your own knowledge.
- provide a clear written response of not more than two pages explaining your decision and the reasons/motivation for it.

[20]

**Total: 150 marks**

**SOURCE A**

[The Citizen, 17 January 2011]

**SOURCE B RHINO HORN USE: FACT VS FICTION**

In the Middle Eastern country of Yemen, the banned rhino horn is used for the handles of curved daggers called 'jambiya' which are presented to Yemeni boys at the age of twelve. Jambiya are considered to be a sign of manhood. In China the use of rhino horn for cups, buttons, buckles, hairpins dates back to the 7<sup>th</sup> Century AD. Rhino horn is used in the traditional medicine systems of many Asian countries. The Chinese grind it to a powder, dissolve it in boiling water and drink it to reduce fever, gout, rheumatism, headaches and other things. Contrary to popular belief rhino horn is not prescribed for a lagging libido. Scientific researchers at the Chinese University in Hong Kong in 1990 found no evidence to support medical claims of traditional medicine in terms of rhino horn.

[Adapted: <[www.pbs.org/Nature](http://www.pbs.org/Nature) 9 February 2011>]

[\$1 = R6.66]

Hunting Price List South Africa 2010 & 2011		
Daily Rate per night	2010	2011
Two hunters + professional	\$295	\$315
One hunter + professional	\$395	\$415
Trophy Fees		
Black Wildebeest	\$990	\$1 070
Cape Buffalo from	\$16 000	\$16 000
Hippopotamus	\$9 360	\$9 800
Impala	\$455	\$495
Jackal	\$200	\$200
Lioness	\$9 000	On application
Lion from	\$32 000	On application
White Rhino	On application	On application

[Extract: <[www.africanskyhunting.co.za/pricelist](http://www.africanskyhunting.co.za/pricelist)>]**In 2010** Rhino horn sold at R400 000 per kg**In 2010** Gold sold at R300 000 per kg**Average Rhino horn weighs 7 kg**

African rhino horns for illegal trade, 2000 – 2009

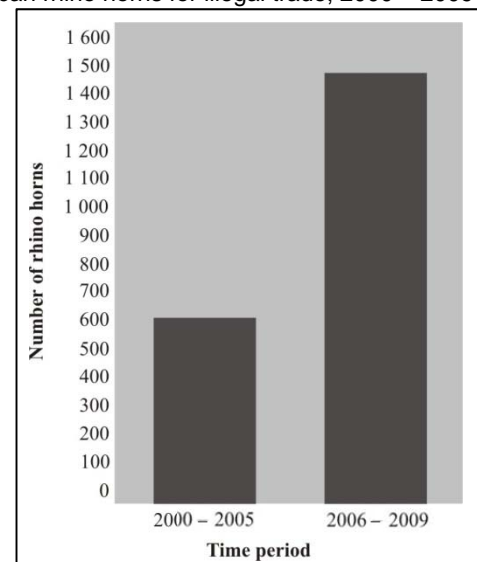


Table: Saving Rhinos LLC  
 Data: Milliken, T., Emslie, R.H., Talukdar, B. (2009). *African and Asian Rhinoceroses – Status, Conservation and Trade*. CoP15. CITES Secretariat, Geneva, Switzerland.



## SOURCE C CANNED HUNTING MYTHS

4 July 2002

By the Wildlife Sanctuary Community of South Africa.

### MYTH 1

The captive lion breeders call themselves conservationists. They profess to be preserving lions for posterity on the basis 'if it pays it stays' and they say that giving protection to lions by placing it on CITES 1 could well mean the end of the African Lion. They want to do the same thing with leopards and cheetahs.

Answer: 'Raping' our genetically diverse wild lion population in order to incarcerate the victims in brutal captive breeding facilities where they become genetically weakened and depressed is not only anti-conservation but also a violation of our international obligations under the Biodiversity Convention and our new Biodiversity Act.

### MYTH 2

Dr. Felthus Brandt of the Limpopo Province, one of the many Nature Conservation officials who have fostered hunting, says that the industry benefits South Africa financially and that it generates 150 million Rands annually in Limpopo alone.

Answer: Where does all this money go? It is not going into conservation. There are no bold conservation ventures being funded by the captive lion breeders. Nor does it go to the surrounding communities, as does money generated by ecotourism. Nor does it provide better jobs for poor South Africans.

[Adapted: <[www.animalrightsafrica.org/canned hunting](http://www.animalrightsafrica.org/canned_hunting) 9 February 2011>]

## SOURCE D LION TROPHY HUNTING – THE CANNED LION

### Predator breeders win canned hunting appeal in court

The South African Predator Breeders' Association won a Supreme Court of Appeal case regarding the trophy hunting of captive lions, commonly called 'canned hunting'. The association contested a previous law that stated that lions were to be included in the threatened/protected species regulations and that captive-bred lions must fend for themselves for 24 months before they could be hunted.

[Adapted: *The Citizen*, 30 November 2010]

### South African 'Canned' Lion hunting to resume

The Bloemfontein Supreme Court of Appeal ruled that the hunting of captive-bred lions shortly after their release into the wild should be allowed to resume. The breeders association had pointed out that 5 000 jobs would be lost if they were not allowed to continue. The trophy hunters are foreign tourists who pay \$22 000 to hunt a lion and \$18 000 for the safari and having the lion stuffed for shipment.

[Adapted: *Bloomberg Businessweek*, 2 February 2011]

**SOURCE E            'RITE OF PASSAGE'**

BOOK REVIEW: *Hunting as a Rite of Passage* by Dr Randall Eaton

The reviewer, Larry Moore, says that this author grabbed his attention because he presents facts and conclusions in a fresh manner, affirming the reviewer's values passed on from his ancestors.


Dr Eaton states that 'Hunting is not a sport, hunting is life.' Larry Moore agrees with that statement. The author of the book says that hunting and outdoor activity are fundamental in the maturing process of a male. Historically, societies placed value on the hunter. Men earned manhood by hunting or being a warrior.

Larry Moore is eagerly awaiting Dr Eaton's new book *From boys to Men of Heart: Hunting as Rite of Passage*. The author presents a strong case for why society is failing and becoming increasingly violent as boys no longer experience hunting as part of the maturing process to adulthood.

Dr Eaton is a best-selling author. He has held positions in a number of universities. He is internationally recognised for his work in animal behaviour, wildlife conservation, human evolution and the ethics of hunting.

[Adapted: <[www.buckeyefirearms.org/node/5829](http://www.buckeyefirearms.org/node/5829)>]

**SOURCE F****HUNTING SAFARIS**



## Hunting & Photographic Safaris

*with Todd Lutman*


### ZIMBABWE - TANZANIA - SOUTH AFRICA

- Safari Bound
- Safari Packages
- Natal Specials
- Hunting Areas
- Zimbabwe
- Limpopo
- KwaZulu Natal
- Eastern Cape
- Photographic Safaris
- Dart/Bow Safaris
- Wingshooting
- Trophy Packages
- Adventure Activities
- General Information
- Terms & Conditions
- Firearm Permits
- Contact Details
- Company Profile


### Hunting in Gona Re Zhou & Southern Africa

Todd Lutman would like to invite you on an Southern African hunting safari. Your experienced professional hunter will ensure that your walk and stalk safari will meet your highest expectations.

Prime Big Game Hunting area between Gona Re Zhou National Park (Zimbabwe) and Kruger National Park. We are proud to say that Sengwe safari area undoubtedly produces some of Africa's largest Elephant and Buffalo Trophies.




We offer game hunting packages as well as customised hunting safaris to suit your budget. Whether in Southern Africa, Botswana or Zimbabwe, your hunting safari is sure to be a thrilling experience. We have the experience and infrastructure to make your Big Five or Plains Game Hunting Safari a memorable one.



***Hunting the Big Five in Africa***

Emphasis is placed on fair chase ethical hunting. Except for a number of selected species, hunting is not conducted on high fenced game ranches. Certain species are restricted to a minimum safari duration. Lion and Leopard require 14 days; Buffalo or Rhino 10 days and Elephant 16 days. Certain species are restricted to specific areas and trophy quality can be superior in one or the other, so prior planning is important.



*Gona Re Zhou,  
Zimbabwe –  
Big Game Hunting*