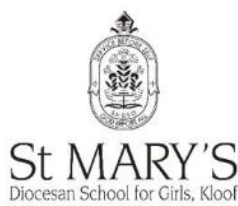




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Life Sciences Preliminary Examination

PAPER II

September 2023

Time: 2 hours

100 marks

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PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 16 pages and a Source Material Booklet of 21 pages (pages i – xxi). Please check that your question paper is complete.
2. The question paper consists of three questions. Question 1 and Question 2 are case studies and Question 3 is an essay. Read the sources provided in the Source Material Booklet. Use the information and your knowledge to answer Questions 1 and 2.
3. Source material is also provided in the Source Material Booklet for the essay. Use this information and your knowledge to first plan and then write your response.
4. Read the questions carefully.
5. **Answer ALL the questions on the question paper** and hand this in at the end of the examination. Write your examination number in the space above.
6. Use the total number of marks that can be awarded for each part of the questions in Question 1 and 2 as an indication of the detail required.
7. It is in your own interest to write legibly and to present your work neatly.
8. TWO blank pages (pages 15 - 16) are included at the end of the paper. If you run out of space for a question use these pages. Clearly indicate the question number of the answer if you need the extra space.

Question 1	Question 2	Question 3	Total
30	30	40	100

SECTION A**QUESTION 1**

Refer to pages i - vi of the Source Material booklet. Use this information as well as your own knowledge to answer the questions that follow.

- 1.1 Each of the following questions consists of a statement in the first column and two items numbered A and B in the second column. Consider which item(s) relate(s) to the statement. Write your choice in the answer column as follows:

A only if only A refers to the statement
 B only if only B refers to the statement
 Both if both A and B refer to the statement
 Neither if neither A nor B refer to the statement

	Statement	Item	Answer
1.1.1	Tusklessness is an	A. acquired trait B. inherited trait	
1.1.2	Evolution of tuskless elephants is an example of	A. microevolution B. macroevolution	
1.1.3	The tusk is a/an	A. vestigial organ B. homologous structure	
1.1.4	The allele for tusklessness is a	A. dominant allele B. recessive allele	
1.1.5	The selective force resulting in tuskless elephants is due to	A. poaching B. civil war	

(5)

- 1.2 Draw a flow diagram to show how tusklessness in the elephants in the Gorongosa National Park evolved by natural selection.



(5)

- 1.3 One of the tests the researchers wanted to check was if the change in the elephant population was caused by chance, instead of by natural selection.

Explain how it might be possible for the change in the elephant population to be caused by chance rather than natural selection.

(3)

- 1.4 In 1972 there were 2542 elephants of which 18.5% were tuskless females. How many females in this population group were tuskless? Show your working.

(3)

- 1.5 Refer to Source C : underline the **correct term** for each of the following statements in brackets.

1.5.1 The evolution of elephants is an example of (convergent/divergent) evolution.

1.5.2 The common ancestor of modern-day elephants dates back to (34mya-23mya/ 23mya-5.3mya).

1.5.3 *Loxodonta cyclotis* is an example of an (extinct/extant) species.

1.5.4 *Loxodonta cyclotis* is (more/less) closely related to *Loxodonta Africana* than *Elephas maximus*. (4)

- 1.6.1 Refer to source D: identify the type of evidence researchers used to determine the types of elephant species found in Africa. Explain how they reached their conclusions.

(2)

- 1.6.2 What type of speciation occurred to form the savanna elephant and the forest elephant in Africa? Give a reason for your answer.

(3)

- 1.7 What reproductive strategies do elephants display to ensure that reproduction is successful? Give TWO strategies from the information given in source E.

(2)

- 1.8 Inbreeding in elephants is normally prevented as the herd is primarily made up of females, with a matriarch female as the head. Males and females only come together when they are ready to mate.

1.8.1 Give one reason why inbreeding would be a disadvantage to the herd.

(1)

1.8.2 Give two advantages of outbreeding.

(2)

[30]

QUESTION 2

Refer to pages vii - x of the Source Material booklet.

Use this information as well as your own knowledge to answer the questions that follow.

- 2.1 Other than fossilised remains, what other form of evidence can be used to accurately classify primates and hominids?
_____ (1)
- 2.2 Suggest a major advantage that opposable thumbs would give a primate, compared to the forelimbs of a different mammal, such as a cat or dog.

_____ (1)
- 2.3 According to the evolutionary tree, which genus is most closely related to the humans (*Homo sapiens*)?
_____ (1)
- 2.4 Which of the skulls in "Hominid Skull Terminology" (A or B) shows a human skull? **Explain two visible** reasons for your answer.

_____ (4)
- 2.5 Which feature, at the base of the skull, is the most obvious indicator of bipedalism?
_____ (1)
- 2.6 Suggest why the lineage shown in "Highlights of our family tree" is labelled as "a current tentative arrangement" of the human lineage.

_____ (2)

2.7 The most recent *Homo* species discovery was made in South Africa in 2013.

2.7.1 What was the full scientific name given to this species?

_____ (1)

2.7.2 Between which two species **given in the family tree** would you place this *Homo* species?

_____ (2)

2.8.1 What is the nickname given to *Homo habilis*?

_____ (1)

2.8.2 What behaviours or skills set *Homo habilis* apart from other hominids of the time, and what advantage/s did these behaviours or skills provide?

_____ (2)

2.9 Explain TWO advantages of being bipedal.

_____ (4)

2.10 Refer to the image "Bipedal adaptations of the foot".

2.10.1 Which foot (A or B) belongs to a primate that is most likely to have lived in the savannah?

_____ (1)

2.10.2 Identify which feature would have given this primate an advantage in the savannah. Give a reason for your answer.

_____ (2)

2.11 Suggest why a narrow pelvis is large disadvantage for a bipedal organism.

_____ (2)

2.12 Name and explain the current **hypotheses** that could explain how modern humans originated in Africa but are found all over the world.

_____ (5)

[30]

SECTION B

Refer to pages xi – xx of the Source Material Booklet.

QUESTION 3

Consider the following statement:

The value of bringing back species that are extinct is worth the effort (time, money etc.)

Using the source material provided, as well as your own knowledge, discuss your opinion on the statement in the form of an essay of 2 ½ - 3 pages

In your response you are expected to:

- Read the source material carefully.
- Take a definite stand on the statement
- Plan your essay before you start writing. Your planning will be marked.
- Present a debated argument. Use relevant information from Sources A-H as well as your own knowledge of Life Sciences to support your point of view.
- Arrange the information to best develop your argument.
- Write in a scientifically appropriate way.

40 marks

Total: 100 marks

[illegible]

REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

[illegible]

