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St Catherine's Convent

GRADE 12 LIFE SCIENCES

SUPPLEMENTARY PRELIMINARY EXAMINATION – P II

QUESTION PAPER AND ANSWER BOOK

Examiners	Crawford International College	Date:	15 September 2023
Moderators	Mrs D. Kirsten	Time:	2 hours
		Marks:	100

NAME: _____

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 17 pages and a Source Material Booklet of 15 pages (i–xv). Please check that your question paper is complete. Remove the Source Material Booklet from the middle of the question paper.
2. The question paper consists of three questions. Question 1 and Question 2 are case studies and Question 3 is an essay.
3. Read the sources provided in the Source Material Booklet and use this information and your own knowledge to answer all the questions.
4. **Answer ALL the questions on the question paper and hand this in at the end of the examination. Remember to write your name in the space provided.**
5. Read the questions carefully.
6. Use the total marks that can be awarded for each part of the questions in Questions 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. ONE blank page (page 17) is included at the end of the paper. If you run out of space for a question, use this page. Clearly indicate the question number of your answer should you use this extra space.

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QUESTION 1	QUESTION 2	QUESTION 3	TOTAL
30	30	40	100

SECTION A**QUESTION 1**

Refer to pages ii–v of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions that follow.

1.1 Explain the meaning of the following terms:

1.1.1 Biological evolution

(2)

1.1.2 Species

(1)

1.2 The five statements in the table below relate to Source 1 and Figure 1.1 on the Galápagos finch evolution on page iv.

For each statement decide whether the statement is:

- A** supported by the information
B contradicted by the information
C neither supported nor contradicted by the information

	Statement	A, B or C
(a)	Charles Darwin lived in the 18 th century.	
(b)	The Grants focused their study on one of the smaller islands of the Galápagos to determine how species arise.	
(c)	The duration of their study extended much longer than the original planned two years.	
(d)	There is no evidence that suggests that the island finches are more related to each other than they are related to finch species on the mainland.	
(e)	The large tree finch and mangrove finch mainly feed on insects.	

- 1.3 With reference to the following statement from Source 1 “one species arrived on the Galápagos and diversified into 13 species”, name the pattern of evolution demonstrated by the Galápagos finches **AND** briefly explain how this could have happened in the case of the finches.

(3)

- 1.4 Using the theory of evolution that was suggested by Jean-Baptiste Lamarck, describe how he would have explained the changes in the Galápagos finches.

(3)

1.5 Name two factors that the Grants identified that prevented interbreeding of the different species of finches **AND** explain how they investigated these factors to be able to make their conclusion.

[illegible]

(6)

1.6 Source 2 (More in Lonesome George, page v) states that after Darwin visited the Galápagos Islands, he witnessed many physical variations in species that were unique to the different islands. This led him to wonder if species from South America reached Galápagos and then changed as they adapted to new environments.

1.6.1 Which theory of evolution did Darwin's observation lead to?

(1)

1.6.2 By using the example of the Galápagos tortoises, describe in detail how they would have demonstrated Darwin's theory of evolution mentioned in Question 1.6.1.

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(8)

1.6.3 Name the type of vegetation that would likely be most abundant in an environment where the tortoises have a dome-shaped shell.

(1)

[30]

QUESTION 2

Refer to pages vi–ix of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions that follow.

2.1 Why was the *Homo naledi* child called “Leti”?

(2)

2.2 Scientists have been trying to plot the lineage of modern man.

2.2.1 Is it possible that *Homo naledi* is an ancestor of *Homo sapiens*?

(1)

2.2.2 Give a reason, based on evidence from the resources, for your answer.

(1)

2.3 2.3.1 What is the term used to describe organisms that walk upright (on two legs)?

(1)

2.3.2 Scientists are able to determine whether a hominin walked upright or not, by studying the skull of the fossil. How did the Smithsonian National Museum of Natural History determine that *Homo naledi* walked upright?

(2)

2.4 Why were the researchers looking for evidence of another way, other than “The Chute”, into the Dinaledi Chamber?

(2)

2.5 Skull fragments of juvenile *Homo naledi* have been found in the past, but Leti is the first juvenile discovered with a cranium. What is the significance of finding an almost complete cranium?

(2)

2.6 By studying the teeth of Leti, researchers estimate the age of Leti to be between 4 and 6. How did they come to that conclusion?

(2)

2.7 Use the information provided in the sources to calculate the brain volume of an adult *Homo naledi*. Show your working.

(3)

2.8 Which recently found fossil, *H. naledi* or *H. bodoensis* is the oldest?

(1)

2.9 The naming of hominin fossils can be quite controversial. Some scientists think that all the hominin fossils should be classified as the same species, while others agree that they must be classified as different species. Explain why some researchers want to classify *H. sapiens* and *H. neanderthalensis* as:

2.9.1 the same species?

(2)

2.9.2 as different species?

(1)

2.10 2.10.1 Discuss very briefly why scientists found it necessary to create the name

H. bodoensis.

(3)

2.10.2 Which two species of hominins will disappear with the use of the name

H. bodoensis.

(2)

2.11 According to our classification, Neanderthals were more primitive than *Homo sapiens*. Mention one characteristic of Neanderthals, found in the text, that indicates that Neanderthals were more primitive than modern humans.

(1)

2.12 According to some researchers, the breeding between Neanderthals and modern man may have allowed genetic sequences to be passed on to modern humans that helped them to adapt to new environments as they dispersed out of Africa. For example, immune-related genes may have risen to high frequency which may have fended off exposure to new pathogens. Discuss how these useful genes are still prominent in modern man.

(3)

[30]

SECTION B

Refer to pages x-xv of the Source Material Booklet

QUESTION 3

Natural selection and sexual selection are two fundamental mechanisms of evolution.

Natural selection is the process that operates on genetic variation by which individuals with advantageous traits are more likely to survive and reproduce, passing their traits to their offspring. Sexual selection involves the selection of traits that enhances an individual's ability to find and attract a mate.

Consider the following statement:

'Sexual selection is a separate mechanism of evolution and not a sub-category of natural selection.'

Using the source material provided as well as your own knowledge, discuss your opinion on the statement in the form of an essay of 2½–3 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–I 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.
- **In your essay, ensure that you have discussed at least nine different facts from the sources.**

40 marks

Total: 100 marks

PLANNING

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ADDITIONAL SPACE (ALL QUESTIONS)

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

[illegible]