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NICHE SCHOOLS

GRADE 12 LIFE SCIENCES PAPER 2**PRELIM EXAMINATION 2024****TIME: 2 HOURS****MARKS: 100****STUDENT NAME AND SURNAME:** _____**THIS PAPER CONSISTS OF 18 PAGES****PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY:**

1. This question paper consists of 18 pages and a Source Material Booklet of 13 pages. 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.
3. Read the sources provided in the Source Material Booklet and use this information and your own knowledge to answer all the questions. All the sources are cited in the Source Material Booklet.
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. THREE blank pages (pages 16–18) are included at the end of the paper. If you run out of space for a question, use these pages. Clearly indicate the 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 2 - 5 of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions that follow.

1.1 Review the provided source material on ruffed lemur reproduction and answer the following questions about lemurs.

1.1.1 Provide the appropriate biological term for:

- (a) Animals that give birth to live offspring

_____ (1)

- (b) Offspring that are helpless at birth and need significant parental care

_____ (1)

1.1.2 Describe ONE benefit for lemurs living in groups with multiple males and females.

_____ (2)

1.1.3 Explain the importance of the following lemur strategies:

- (a) Fission-fusion group dynamics

_____ (1)

- (b) Short gestation periods

_____ (1)

- 1.1.4 Scientists performed a three-year study on a lemur community in an undisturbed forest to examine offspring survival rates. The results are presented in the table below.

Year	Number of reproductive females in the community	Total number of offspring produced in the community	Number of offspring surviving to six months
2007	6	18	10
2008	8	22	12
2009	7	20	11

- (a) Based on the information in the passage, explain why it is expected that baby lemurs would have a high rate of survival.

(2)

- (b) Determine the average percentage of baby lemurs that survived to adulthood throughout the three-year study.

(3)

- (c) Scientists were astonished by the high death rate among baby lemurs. Using the passage, suggest a possible explanation for this unexpectedly high mortality rate.

(2)

1.2 The following questions pertain to the source material about amphibians, reptiles, mammals, and their embryos.

1.2.1 Why was the evolution of the amniotic egg significant for reptiles?

(1)

1.2.2 Identify one other reproductive strategy change that occurred alongside the development of the amniotic egg in reptiles.

(1)

1.2.3 What species-specific courtship behaviours are described in the sources provided?

(1)

1.2.4 Provide an example of an r-strategy species from the extracts, and justify your choice with information from the sources.

(2)

1.2.5 Describe the functions of the following parts in a developing human embryo:

(a) Amnion

(1)

(b) Chorion

(1)

- 1.2.6 Compare the structure of a reptile egg and a mammalian embryo. Discuss two differences between reptilian and mammalian embryos regarding how they obtain essential substances and eliminate waste.

(4)

1.3 The following questions relate to the sources discussing reptile hatching.

- 1.3.1 Explain a potential benefit of each of the following environmentally triggered hatching types:

(a) Early hatching

(b) Delayed hatching

(c) Synchronous hatching

(3)

- 1.3.2 Based on the source material, analyse how global warming could impact turtle populations.

(3)

[Total: 30]

QUESTION 2

Refer to pages 6 - 8 of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions that follow.

2.1 Refer to the information and graphs on growth hormone secretion to answer the following questions.

2.1.1 What are the causes and symptoms of acromegaly?

(2)

2.1.2 According to the graph, at what times were the highest growth hormone levels observed in a normal subject?

(2)

2.1.3 Identify two differences between the growth hormone graph of an average person and someone with acromegaly.

(2)

2.1.4 Based on the information, explain how a lack of sleep can affect a teenager's performance at school.

(2)

2.1.5 What is the relationship between lack of sleep and obesity?

(2)

2.2 Refer to the information about metabolic syndrome.

2.2.1 Design a flowchart illustrating how the mentioned hormones (and any other relevant hormones) regulate blood sugar levels when they are too high or too low.

(5)

2.2.2 What potential issue could arise from the excessive secretion of cortisol and adrenaline stress hormones?

(1)

2.2.3 A friend is experiencing reactive hypoglycemia and may have insulin resistance. Describe what steps they should take to address this issue.

(2)

2.3 Refer to the details about the structures involved in sperm production.

2.3.1 Describe the function of each of the following parts of the male reproductive system:

(a) Epididymis

(b) Sertoli cell

(c) Seminiferous tubules

(3)

2.3.2 Explain how each of the following procedures or medications impacts sperm production and fertility:

(a) A man having a vasectomy

(2)

(b) An antiretroviral drug containing a mitochondrial toxin

(2)

(c) Chemotherapy, which damages the germinal epithelial cells

(2)

2.3.3 Luteinizing hormone (LH) is crucial in supporting sperm production in men.

(a) Which endocrine gland secretes LH?

(1)

(b) Identify the target cells of LH.

(1)

(c) What effect does LH have on these target cells?

(1)

[30 marks]

[Total:60]

SECTION B

QUESTION 3

Refer to pages 9 - 13 of the Source Material Booklet.

This question refers to Sources A to H of Question 3 in the Source Material Booklet.

Consider the following statement:

The rapid advancement of reproductive technologies like IVF and AI has outpaced existing legislation, potentially allowing their use without adequate oversight, potentially disregarding children's rights, and adding strain on state resources and medical assistance programs.

“Until clear guidelines are established, reproductive technology ought to be prohibited.”

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–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.
- **In your essay, ensure that you have discussed at least nine different facts from the sources.**

40 marks

TOTAL: 100 marks

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

This image shows a blank sheet of white paper with horizontal ruling lines. A diagonal watermark, "eduresourceza.com", is visible across the page. The watermark is light gray and slanted from the bottom-left towards the top-right. There are approximately 20 horizontal lines spaced evenly down the page.

