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SCHOOL LOGO

**PRELIMINARY EXAMINATION****2024****LIFE SCIENCES PAPER II****Time: 2 Hours****100 Marks****NAME** \_\_\_\_\_**EXAMINER: E. Cluster****MODERATORS: E. Cluster****PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This Question Paper consists of 19 pages and a SOURCE BOOKLET of 20 pages (i-xx). 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.
4. Read the questions carefully.
5. Answer ALL the questions in the spaces provided on this question paper. Should you need more space for your responses, use the last page in this question paper ONLY. No extra paper may be added to this booklet.
6. Use the total marks awarded and space provided for each question 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 17–19) 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.

| QUESTION 1 | QUESTION 2 | QUESTION 3 | TOTAL      |
|------------|------------|------------|------------|
|            |            |            |            |
| <b>30</b>  | <b>30</b>  | <b>40</b>  | <b>100</b> |

**QUESTION 1**

1.1 Refer to **Figure 1** and identify the **LETTER** representing the following structures:

(a) sperm duct: \_\_\_\_\_

(b) epididymis: \_\_\_\_\_

(c) the region where testosterone is secreted: \_\_\_\_\_

(3)

1.2 Refer to information from sources 1-3 and **Figure 3** to answer questions 1.2.1 – 1.2.3.

1.2.1 Spermatocytes which are formed from spermatogonia are diploid.

Name the type of cell division that results in the formation of:

(a) Spermatocytes

\_\_\_\_\_

(b) Spermatozoa

\_\_\_\_\_

(2)

1.2.2 Leydig, Sertoli and germ cells drive spermatogenesis.

State the function of each of the three cells.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(3)

- 1.2.3 Explain how the viral attachment on spermatogonium affects spermatogenesis.

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(2)

- 1.3 Study the information from sources 1 – 3 to complete the following table which consists of a statement in the first column and two items (numbered 1 and 2) in the second column. Decide which item relates to the statement.

Write down your choice (A to D) in the space provided in the "answer" column, making use of the following codes:

- A** only item 1 relates to the statement.  
**B** only item 2 relates to the statement.  
**C** both items 1 and 2 relate to the statement.  
**D** neither item 1 nor 2 relates to the statement.

|       | Statement                            | Item                                                                 | Answer |
|-------|--------------------------------------|----------------------------------------------------------------------|--------|
| 1.3.1 | Found inside the seminiferous tubule | 1. Spermatozoa<br>2. Sertoli cells                                   |        |
| 1.3.2 | Testicular macrophages               | 1. Engulf pathogens<br>2. Exocytosis                                 |        |
| 1.3.3 | Changes in erectile function         | 1. Psychological factors<br>2. Direct illness of reproductive organs |        |

(3)

- 1.4 Using information given in **Figure 2**, and your own knowledge, explain how various hormones are involved in spermatogenesis. In your explanation, include the involvement of negative feedback mechanism.

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(3)

1.5 The diagram below is similar to **Figure 4** on page vii of the Source Booklet.

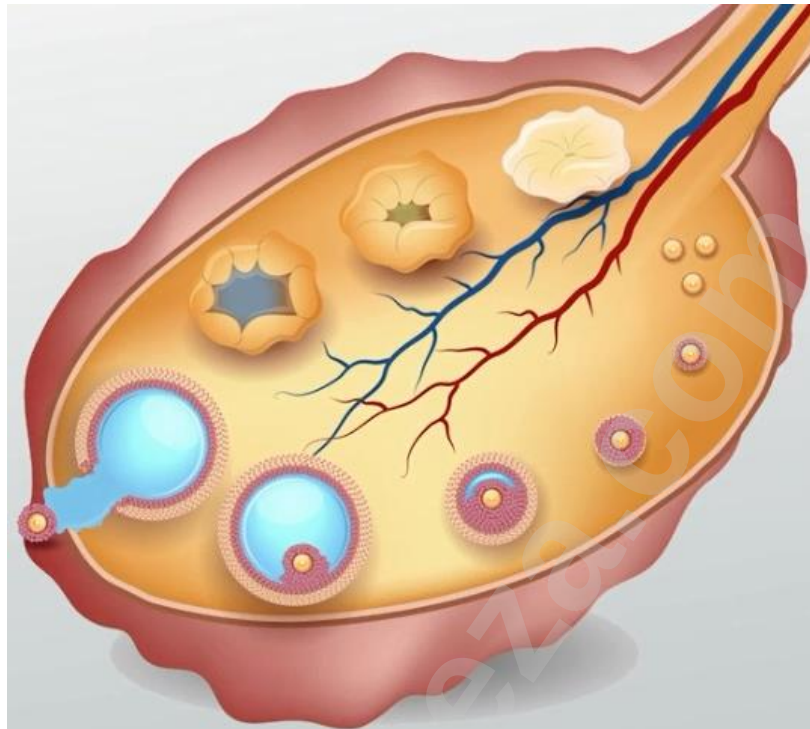


Image taken from: <https://study.com/academy/lesson/what-are-ovaries-definition-functions-size.html>

Add labels to the diagram above to show a **mature**:

- (a) Graafian Follicle
- (b) corpus luteum.

(2)

1.6 Explain the **effects** of all the activities that occur between the follicular and luteal phases shown on **Figure 4**.

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(3)

1.7 Study the information in **source 5** and answer Questions 1.7 – 1.11.

State the aim of the pilot investigation.

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1.8 Tabulate all the mentioned results of the pilot study.

(2)

1.9 State the phase of the menstrual cycle when oocytes were harvested.

(3)

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(1)

1.10 Analyse the results of the oocytes collected versus the zygotes harvested.

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1.11 Explain **ONE** way in which this study can be improved.

(2)

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(1)

[30]

**QUESTION 2**

2.1 Refer to **Figure 5 and 6** and text in Source 4 to answer questions 2.1.1 – 2.1.5.

2.1.1 Identify the structure **Z** on figure 6:

\_\_\_\_\_ (1)

2.1.2 Differentiate between:

(a) Sexual and asexual reproduction

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

(b) Zygote and an embryo

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

2.1.3 A few cowpea pods are shown in Figure 5. State the biological term used for a pod.

\_\_\_\_\_ (1)

2.1.4 Immature pods such as pod X are eaten as a vegetable. How many mature pulses are likely to be harvested from pod X?

\_\_\_\_\_ (1)

- Calculate the estimated percentage of collected species. Show your working.

Downloaded from <https://www.cambridge.org/core>. University of Cambridge, on 02 Jun 2020 at 10:00:00, subject to the Cambridge Core terms of use, available at <https://www.cambridge.org/core/terms>. <https://doi.org/10.1017/S0022292420000509>

2.2 The existence and importance of biodiversity biobanks is not well known or recognised. Use information from sources and your own knowledge to write a well explained **motivation** to the government of South Africa to promote funding of **seed banks**. Your motivation must include at least **FOUR** numbered ideas.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. A large, faint watermark reading "eduresource" is oriented diagonally from the bottom-left towards the top-right, spanning across the center of the page.

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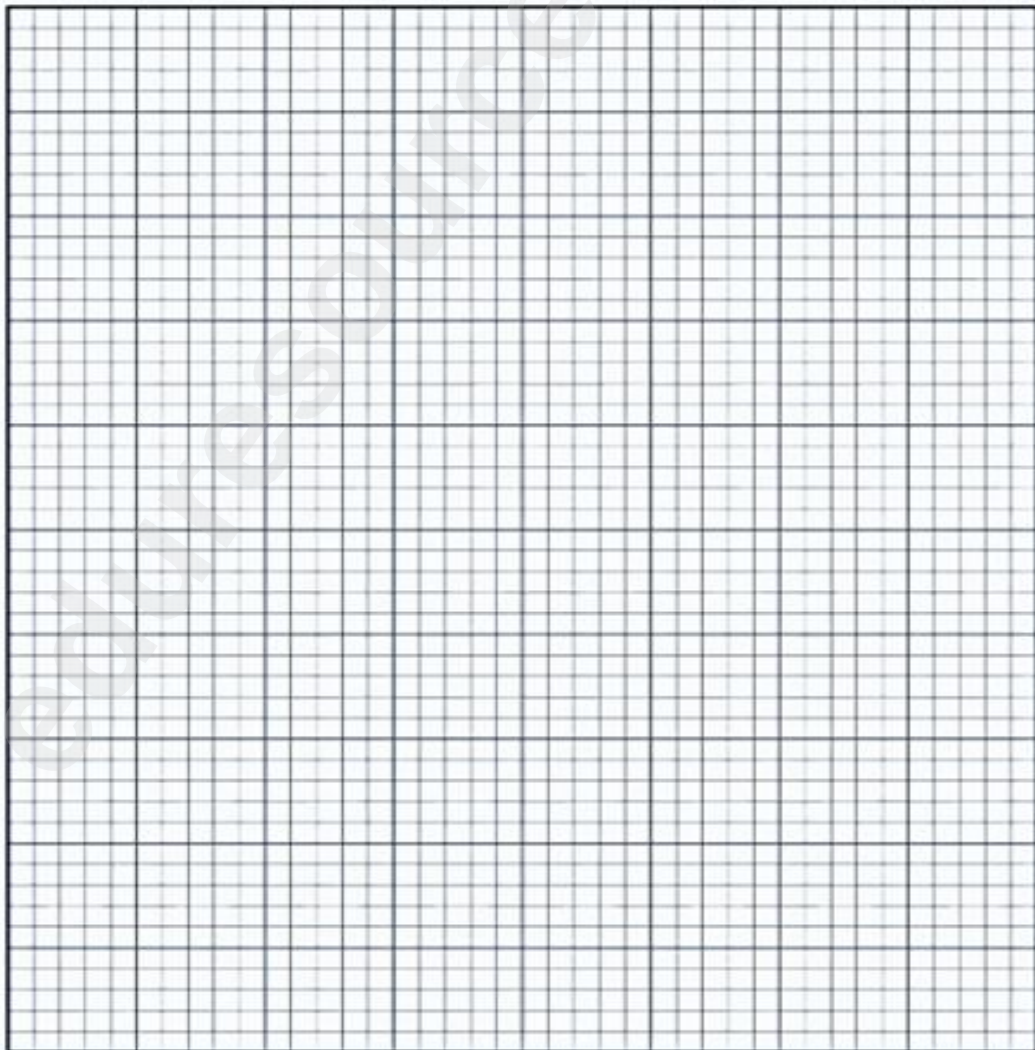
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(4)

- 2.3 Study the table of results on a pilot study on the cow peas in Source 5.
- 2.3.1 Use the space below to plot an appropriate graph to represent the data from the pilot study in Source 5.



(5)

- 2.3.2. Study the images taken over a period of 42 hours on page 6 of the source booklet and describe the observations of the germinating seed.

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(3)

- 2.3.3 Calculate the actual size of the radicle marked A-B on the seed shown in page xii of the source booklet.



(3)

- 2.4 Using your own knowledge and information from various sources, construct a flow diagram explaining the life cycle of a cow pea plant from the flowering phase to the formation of a seed. No diagrams required.

(5)

- 2.5 Suggest any **ONE** ethical issue that may arise from the establishment of large seedbanks.

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(1)

[30]

[60]

## SECTION B

Refer to pages xiii - xx of the Source Material Booklet.

### QUESTION 3

Consider the following statement:

**‘South African legislators should allow surrogate mothers to keep the baby after birth, if they choose to’.**

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 (pages xiii - xx) 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

















