



LIFE SCIENCES: PAPER II

Time: 2 hours

100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 6 pages and a Source Material Booklet of 16 pages (i–xvi). 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. Read the sources provided in the Source Material Booklet and use this information and your own 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 own knowledge to first plan and then write your response.
 4. All questions must be answered in the Answer Book provided.
 5. Read the questions carefully.
 6. Please start **each question** on a **new** page and leave lines open between all sub-questions (e.g. 1.1 and 1.2).
 7. Number the answers exactly as the questions are numbered in the question paper.
 8. Use the total marks that can be awarded for each part of the questions in Question 1 and 2 as an indication of the detail required.
 9. It is in your own interest to write legibly and to present your work neatly.
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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 Contraception (2)
- 1.1.2 Semen (2)
- 1.2 Answer the following questions on natural family planning methods.
- 1.2.1 From your knowledge of the menstrual cycle, explain how the rhythm method can be used as a form of contraception. (2)
- 1.2.2 Refer to Figure 3 on page iv of the Source Material Booklet. Use it and your own knowledge to provide the name of the hormone that increases the most after ovulation and causes a rise in body temperature. (1)
- 1.2.3 State TWO reasons why the *temperature method* may not be a very reliable form of birth control. (2)
- 1.2.4 Explain ONE way in which CycleBeads could assist women to practise the rhythm method more effectively. (2)
- 1.2.5 Study the CycleBeads diagram in Figure 2 on page iii of the Source Material Booklet which has letters A–D corresponding to days of the menstrual cycle. These letters appear in Column 1 in the table below. Use Figure 2 and the graph in Figure 3 on page iv of the Source Material Booklet to assist you in answering the following question.
- Match the description of the hormone levels in Column 2 with the correct letter from Column 1.
 - Write only the letters A–D in your Answer Book and the matching number of the correct description in Column 2 next to it (e.g. A 1).
 - Each letter may only be used once.

Column 1	Column 2
A	1. Decreasing levels of progesterone
B	2. Surge in LH levels
C	3. FSH levels start rising
D	4. Increasing oestrogen levels

(4)

1.3 Study the following table containing four labels taken from the diagram in Figure 8 on page v of the Source Material Booklet. The labels are in Column 1 and two descriptions / terms are in Column 2. **Decide how the description / term relates to the label.**

Make use of the following codes:

- A** only description / term 1 relates to the label
- B** only description / term 2 relates to the label
- C** both descriptions / terms 1 and 2 relate to the label

Write the question number (1.3.1–1.3.4) and the LETTER of the correct choice (A, B or C) in your Answer Book.

Column 1	Column 2
1.3.1 Fallopian tube	1. Condom 2. Fertilisation
1.3.2 Ovary	1. Ovulation 2. Tubal ligation
1.3.3 Uterus	1. Pregnancy 2. Placement of IUD
1.3.4 Cervix	1. Diaphragm 2. Vasectomy

(4)

1.4 Refer to Figure 3 on page iv of the Source Material Booklet and explain how a pregnancy will change the level of hormone X from that shown in the graph. In your answer include the reason for this change.

(3)

1.5 The Mirena may prevent pregnancy in a few ways.

1.5.1 Explain clearly how it prevents ovulation.

(3)

1.5.2 Using information in the source, calculate the number of days the Mirena would be effective before it needs to be replaced. Show all working.

(2)

1.6 Have female contraceptive methods lead to the improvement of equal rights for women? Provide ONE well explained reason for your answer.

(3)

[30]

QUESTION 2

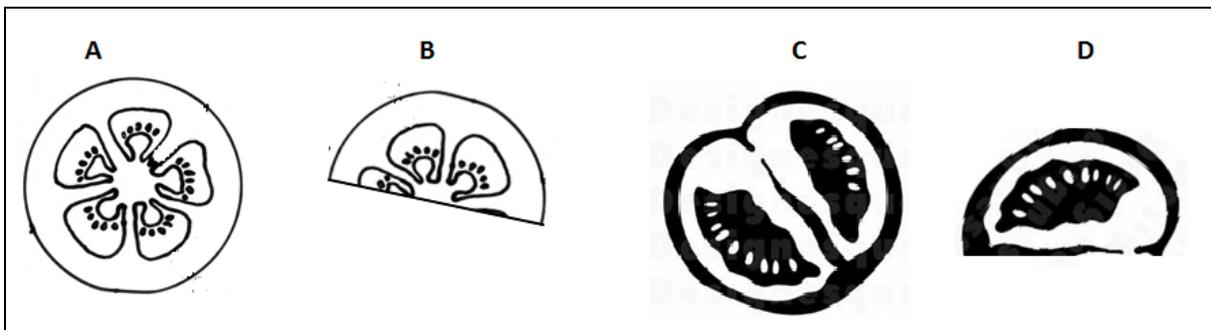
Refer to pages vi–ix of the Source Material Booklet. Use this information as well as your own knowledge to answer the questions that follow.

- 2.1 Provide a word from the text that means the same as the following statements.
 - 2.1.1 Structure containing the embryonic plant
 - 2.1.2 Chemical messenger in plants
 - 2.1.3 Reproductive structures made by anthers that germinate on the stigma (3)

- 2.2 Explain why heirloom varieties of tomatoes have a lower genetic diversity compared to their original wild relatives. (3)

- 2.3 2.3.1 Briefly describe how fertilisation occurs in flowering plants. (2)
 - 2.3.2 What is the reason for placing a bag over the tomato flowers as seen in Figure 12 on page viii of the Source Material Booklet? (1)

- 2.4 2.4.1 Why is the tomato regarded as a *fruit*? (2)
 - 2.4.2 Study the following drawings of sections through a tomato. Which one of the drawings shows the correct view of a cross section along the line AB in Figure 11 on page vii of the Source Material Booklet? (2)



[Adapted: <<https://www.researchgate.net>>; Adapted: <<https://www.cdn.shopify.com>>]

- 2.5 What is the importance of seed banks for ensuring food security? (2)

- 2.6 Consider the drawing of the tomato flower in Figure 11, on page vii of the Source Material Booklet.
 - 2.6.1 Provide the functions of the following:
 - (a) Stamen
 - (b) Petals (2)

 - 2.6.2 Examine the male and female reproductive parts of the flower and suggest why self-pollination may easily occur in tomatoes. (2)

- 2.7 2.7.1 Name the hormone in humans that has a similar role to plant auxins. (1)
- 2.7.2 Provide ONE symptom of over-secretion of the hormone you mentioned in 2.7.1 in adult humans. (1)
- 2.8 Israeli scientists have discovered polyploid tomatoes.
- 2.8.1 Name ONE advantage in growing the polyploid tomatoes. (1)
- 2.8.2 Explain the role auxins play in asexual reproduction to produce many polyploid plants. (3)
- 2.9 Refer to the information in the infographics on page viii of the Source Material Booklet and draw a table to describe the following features of modern hybrid tomato varieties compared to heirloom varieties:
- Ability to resist pests / diseases
 - Consistency of fruit size
 - Cost of growing the fruit

(5)
[30]

60 marks

SECTION B

Refer to pages x–xvi of the Source Material Booklet.

QUESTION 3

Consider the following statement:

Women should be able to choose an elective Caesarean Section for the birth of their child.

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 plan will be marked.
- Present a debated argument, using 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 9 different facts from the sources.**

40 marks

Total: 100 marks