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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2025

LIFE SCIENCES: PAPER II

EXAMINATION NUMBER

Time: 2 hours 100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 20 pages and a Source Material Booklet of 18 pages (i–xviii). 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. Questions 1 and 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 on the question paper and hand it in at the end of the examination. Remember to write your examination number in the space provided.**
6. Use the total marks that can be awarded for each part of the question and the space provided 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 19 and 20) are included at the end of the question paper. Use these pages if you run out of space for a question. Clearly indicate the number of the question you are answering should you use this additional space.

FOR OFFICE USE ONLY: MARKERS TO ENTER MARKS

	Q1	Q2	Q3	Total
Mark				
Marker Initial				
Moderated Mark				
Moderator Initial				
	30	**30**	**40**	**100**

N12LISC-2-E

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 The development of male secondary sexual characteristics is governed by organic, chemical messengers.

1.1.1 Provide an alternate term for '*organic, chemical messengers*'.

_____

(1)

1.1.2 Refer to Figures 1.1 and 1.2 on page iii to answer the following question. Complete the table below by providing ONE missing function of each organic chemical messenger identified in Figure 1.1 AND state whether it has a stimulating or inhibiting function.

Chemical messenger	ONE Function	Stimulatory or inhibiting
FSH		Stimulating
LH	Causes cells of the testis to produce testosterone	
Testosterone	1.	Stimulating
	2. Stops pituitary gland from further FSH and LH production	

(4)

1.1.3 Identify whether the following cells produced during the process of spermatogenesis are haploid or diploid. (Figure 1.2)

(a) Primary spermatocyte

_____

(1)

(b) Immature sperm cell

_____

(1)

1.2 1.2.1 From the source material, list TWO properties of an effective male or female contraceptive.

(2)

1.2.2 The development of female contraceptives significantly reduced rates of unintended pregnancies and the need for unsafe abortions.

Explain the injustice in reproductive health responsibilities of men and women.

(2)

1.3 1.3.1 Study the labelled diagram of the sperm cell in Figure 1.2 on page iii and describe ONE structural feature of a typical sperm cell that ensures successful fertilisation of a female ovum.

(2)

1.3.2 Refer to Figure 1.3 on page iv to answer the following questions.

(a) List ONE way in which sperm cells would be altered to prevent successful fertilisation.

_____

_____

(1)

(b) (i) What is the function of, '**S**', the scrotum?

_____

(1)

(ii) Why would raising the testes almost inside the body serve as a means of male contraception?

_____

_____

_____

_____

_____

_____

(2)

(c) State ONE similarity and ONE difference between a vasectomy and using 'plugs' as forms of contraception.

Similarity: _____

_____

_____

Difference: _____

_____

_____

(2)

1.3.3 Refer to Figure 1.4 on page v to answer the following questions.

(a) Calculate the percentage change in sperm motility (Figure 1.4 a) between doses of triptonide of 0,1 mg/kg B.W. and 0,4 mg/kg B.W.

Give your answer to ONE decimal place.
Show all working.

(3)

(b) How does sperm motility affect pregnancy rate in mice?

(2)

1.4 Explain why the development of a male contraceptive that decreases testosterone production would disrupt more than just sperm count.

(4)

1.5 Do you believe it is ethically responsible to test human contraceptives on laboratory mammals? Justify your answer.

(2)
[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 Study the table below which consists of a name/term in **COLUMN 1** from the source material and two statements (numbered 1 and 2) in **COLUMN 2**.

Decide which statement(s) from COLUMN 2 relate(s) to the term in COLUMN 1.

Write down your choice in the answer column, making use of the following code:

1 Only statement 1 relates to the term.
2 Only statement 2 relates to the term.
1 & 2 Both statements 1 and 2 relate to the term.
None Neither statements 1 and 2 relate to the term.

COLUMN 1	COLUMN 2	ANSWER
Cross-pollination	1. Transfer of pollen from the anther of a flower to the stigma of another flower on the same plant. 2. Transfer of pollen from the anther of a flower on one plant to the stigma of a flower on another plant of the same species.	
Seedbank	1. A facility that buys and sells valuable seeds to wealthy farmers. 2. An area on a farm where the previous seasons' seeds are stored.	

(2)

2.2 Marula trees have male and female reproductive organs in separate flowers on separate plants.

2.2.1 State the name of the female reproductive part that gives rise to the following structures after fertilisation.

(a) A seed: _____

(b) A fruit: _____

(2)

2.2.2 The marula tree has a great potential to be a high yielding agricultural cash crop.

(a) Give ONE piece of evidence from the text that highlights the potential of female marula trees to be highly productive.

(1)

(b) The female marula tree flower (Figure 2.3, page vii) has two stigmas, increasing the flower's surface area available for pollination.

Briefly explain how this adaptation would result in female marula trees achieving high agricultural yields.

(2)

2.2.3 Explain ONE reason from the source material why the agricultural production of marula trees from seed for commercial use is less effective than asexual reproductive methods.

(1)

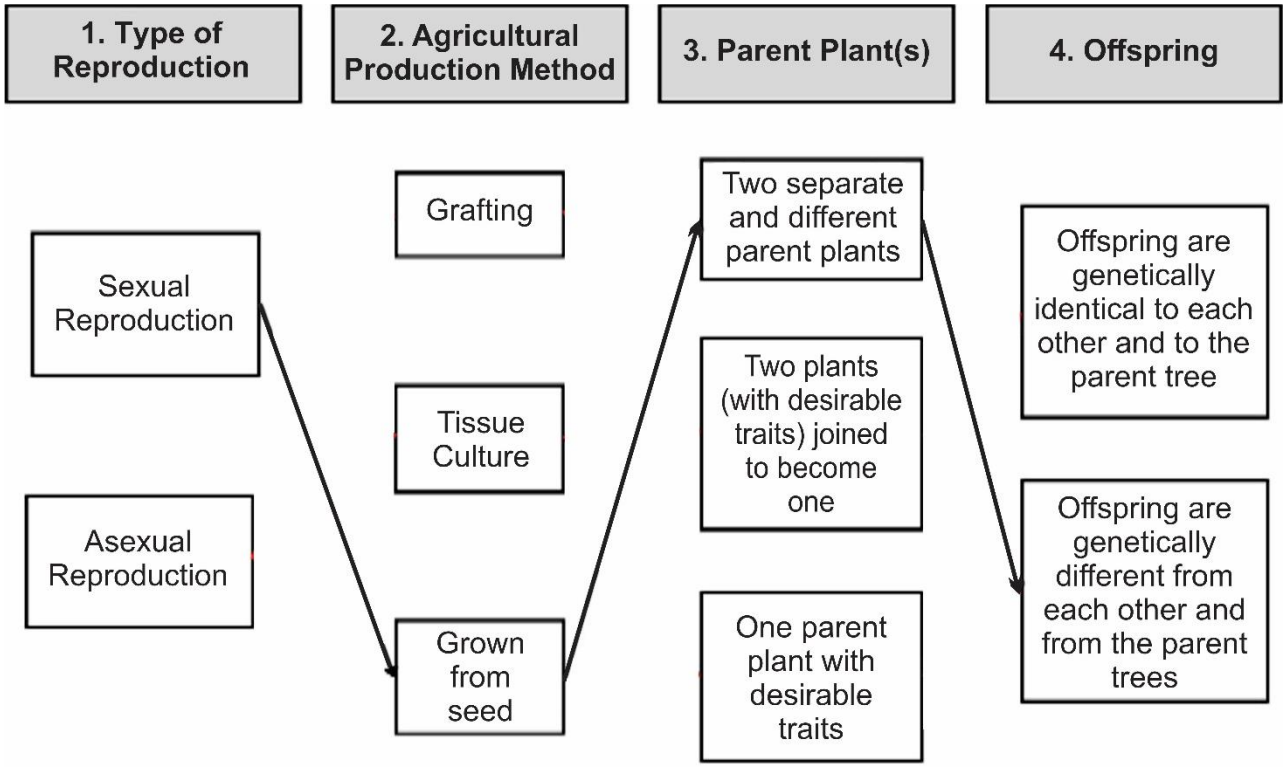
2.3 The asexual reproduction of marula trees offers a number of advantages for commercial cultivation.

2.3.1 The different methods of agricultural production of the marula tree yield different offspring outcomes.

The boxes on the left show the different types of marula tree reproduction, the boxes in the second column show methods of agricultural production mentioned in the source material. The boxes in the third column show descriptions of the parent plant(s) and the boxes on the right show the resultant offspring produced through these methods.

Draw SIX straight lines to link each (1) Type of Reproduction with its correct (2) Agricultural Production Method, its (3) Parent Plant(s) and the resultant (4) Offspring.

An example of sexual reproduction has been done for you. More than one line can be drawn from/to a box.



(6)

2.3.2 Describe ONE disadvantage of cleft grafting from the source material that could reduce the viability of this asexual reproduction method for mass marula fruit production.

_____

_____

_____

(2)

2.3.3 Refer to Figure 2.6 and the information on Tissue Culture on page ix.

(a) The following statements regarding tissue culture procedures are FALSE. Correct them by replacing the underlined word(s) with the correct term(s). Only write the corrected term(s) underneath each statement.

(i) Marula leaf explants were grown in a <u>natural</u> environment.

_____

(ii) <u>Reproductive</u> cells were used to grow new marula plants.

_____

(iii) Tissues were treated with <u>enzymes</u> to induce cell division.

_____

(3)

(b) Calculate the actual length of the shoot-like structure X–Y (Figure 2.6 B, page ix).

Give your answer to the nearest whole number.
Show all working.

(3)

2.4 Describe how the agricultural production of the marula tree would aid socio-economic upliftment in rural Southern Africa.

(4)

2.5 Marula seeds can be stored in seed banks.

2.5.1 Explain why the marula seed can be considered 'long lasting'.

(2)

2.5.2 Why is it important to ensure that genetic diversity of commercial species, like the marula tree, is preserved by storing seeds in seed banks?

(2)
[30]

60 marks

SECTION B

QUESTION 3

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

Consider the following statement:

'Exposure to endocrine disruptors is the main cause of a decrease in human fertility.'

Using the source material provided as well as your own knowledge, discuss your opinion on this 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 the relevant information from Sources A–G 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

PLAN:

ESSAY:

ADDITIONAL SPACE (ALL QUESTIONS)

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

