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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2024

LIFE SCIENCES: PAPER II

EXAMINATION NUMBER

Time: 2 hours 100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 22 pages and a Source Material Booklet of 20 pages (i–xx). 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. Four blank pages (pages 19–22) 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.

FOR MARKERS TO ENTER MARKS

QUESTION 1	QUESTION 2	QUESTION 3	TOTAL
30	**30**	**40**	**100**

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SECTION A

QUESTION 1

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

1.1 From the Source Material give the scientific term for the following descriptions:

1.1.1 The process by which a plant grows from a seed into a seedling.

_____

(1)

1.1.2 When the pollen from the anther is deposited on the stigma of the same flower or another flower on the same plant.

_____

(1)

1.1.3 A cell with two complete sets of chromosomes.

_____

(1)

1.2 Many species of daisies are able to occur in large numbers in the environment because they use a combination of sexual and asexual reproduction.

1.2.1 Differentiate between pollination and fertilisation in flowering plants.

_____

_____

_____

_____

_____

_____

(2)

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1.2.2 Tabulate ONE difference between sexual reproduction and asexual reproduction of these daisy plants. No heading is required.

(3)

1.2.3 Explain why the asexual production of daisy family food crops, such as lettuce and artichokes, would be economically beneficial.

(2)

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1.3 Consider Figures 1.3, 1.4 and 1.5 on pages iii and iv of the Source Material Booklet showing angiosperm and daisy floral structures.

1.3.1 Identify the type of section shown of the daisy flower in Figure 1.4.

_____

(1)

1.3.2 State the LETTERS and NAMES of the following parts of the angiosperm flower in Figure 1.3.

(a) The structure responsible for the production and release of male gametes.

_____

(2)

(b) The female reproductive structure that receives the pollen grains.

_____

(2)

1.3.3 Calculate the magnification of the daisy pictured in Figure 1.4.

Show all working.

(3)

1.3.4 Examine the male and female parts of the floret (Figure 1.5) and suggest why self-pollination is unlikely to occur in daisies.

_____

_____

_____

_____

_____

_____

_____

_____

(2)

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1.4 Polyploid daisy species are better able to cope with environmental change.

1.4.1 Explain what is meant by 'polyploidy' in plants.

(1)

1.4.2 (a) Name ONE **reproductive** advantage of polyploidy in daisies.

(1)

(b) Explain how this reproductive advantage would help the daisy to survive changing climatic conditions in the Succulent Karoo.

(2)

1.5 Succulent Karoo daisy species retain (hold back) their seeds for extended periods until climatic conditions are favourable for germination.

1.5.1 (a) State whether these daisies use an 'r-' or 'K-' reproductive strategy.

(1)

(b) Give ONE piece of evidence from the text to support your answer.

(1)

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1.5.2 Name the part of the flower from which the daisy seed develops.

(1)

1.5.3 Describe ONE benefit for a daisy plant of retaining seeds in an 'aerial' seed bank.

(1)

1.5.4 Suggest and explain ONE way in which tourism could benefit from storing indigenous daisy seeds in seed banks.

(2)
[30]

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QUESTION 2

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

2.1 Explain why elephants are considered to be a 'problem' in South Africa.

(2)

2.2 The African elephant employs a number of different reproductive strategies to increase their reproductive success.

2.2.1 Various terms relating to reproductive strategies are provided below. In each option (A to C) circle ONLY the **term** which applies to elephants.

A 'r-' reproductive strategy; 'K-' reproductive strategy

B ovipary; ovovivipary; vivipary

C external fertilisation; internal fertilisation (3)

2.2.2 Identify ONE courtship stimulus employed by the African elephant and describe how this stimulus can assist in successful mating.

(2)

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2.2.3 Provide ONE piece of evidence from the Source Material to suggest that elephant mothers engage in long periods of parental care.

(1)

2.3 Elephant females experience a unique type of menstrual cycle.

2.3.1 Describe ONE hormonal difference between the menstrual cycle of an elephant and a human.

(1)

2.3.2 (a) Name the hormone responsible for the maintenance of pregnancy.

(1)

(b) Describe how this hormone maintains pregnancy.

(1)

2.4 The use of immunocontraception in wild mammal populations is growing in popularity.

Examine Figure 2.4 illustrating the negative feedback mechanism controlling the menstrual cycle and the effect of immunocontraception on these hormones.

2.4.1 What is meant by the term 'negative feedback'?

(1)

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2.4.2 Match the hormone (from Figure 2.4) in Column A with the appropriate function in Column B. Write the letter of the function in the space provided between the brackets.

	Column A	Column B	
[ ]	FSH	A	Stimulates the development of secondary sexual characteristics
[ ]	Oestrogen	B	Stimulates ovulation
		C	Stimulates the development of a follicle in the ovary

(2)

2.4.3 Describe how the immunocontraceptive vaccine prevents pregnancy from occurring.

(3)

2.5 Immunocontraception has been successfully applied in a number of South African elephant populations.

2.5.1 Calculate the calving percentage, indicated by an (A), for year 3 of the vaccine programme described in Table 2.1. Show all working.

(2)

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2.5.2 How many years did it take for 100% sterilisation of vaccinated cows to be achieved?

_____

(1)

2.5.3 Identify ONE of the desired requirements for elephant contraceptives achieved by immunocontraception.

_____

(1)

2.6 Surgical vasectomies have been successfully performed on large, dominant male elephants in several South African game reserves.

2.6.1 What is a vasectomy?

_____

_____

_____

(1)

2.6.2 Why would a vasectomy leave a male sterile?

_____

_____

_____

(1)

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2.7 Research has shown that elephant vasectomies do result in behavioural changes.

2.7.1 Suggest why sterilised males will still be able to engage in courtship behaviour.

(3)

2.7.2 Provide ONE explained reason why 'inbreeding' would negatively impact the ability of elephant populations to adapt to changing climatic conditions.

(2)

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2.8 Do you think the use of contraceptives to control elephant population growth is ethical? Provide reasons from the Source Material to support your answer.

(2)
[30]

60 marks

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SECTION B

QUESTION 3

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

Consider the following statement:

'Pregnancy at advanced maternal age causes more health risks for mother and child.'

*(*Advanced maternal age has been defined as women who are 35 years or older at date of delivery/giving birth.)*

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–F 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

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PLAN:

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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.

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