education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

PREPARATORY EXAMINATION

SEPTEMBER 2019

MARKS: 150

TIME: 2 ½ hours

This question paper consists of 16 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, a protractor and a compass where necessary.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A - D) next to the question number (1.1.1 - 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The yellow spot of the human eye contains ...

A cones only.
B more rods than cones.
C no rods and cones.
D rods only.

1.1.2 Which ONE of the following is the consequence when the motor neuron is damaged?

A Sense organs will not be able to interpret impulses
B Receptors will not convert stimulus into an impulse
C Impulses will not be sent to the interneuron
D Impulses will not be sent to the effectors

1.1.3 Which ONE of the following is CORRECT with regards to spermatogenesis?

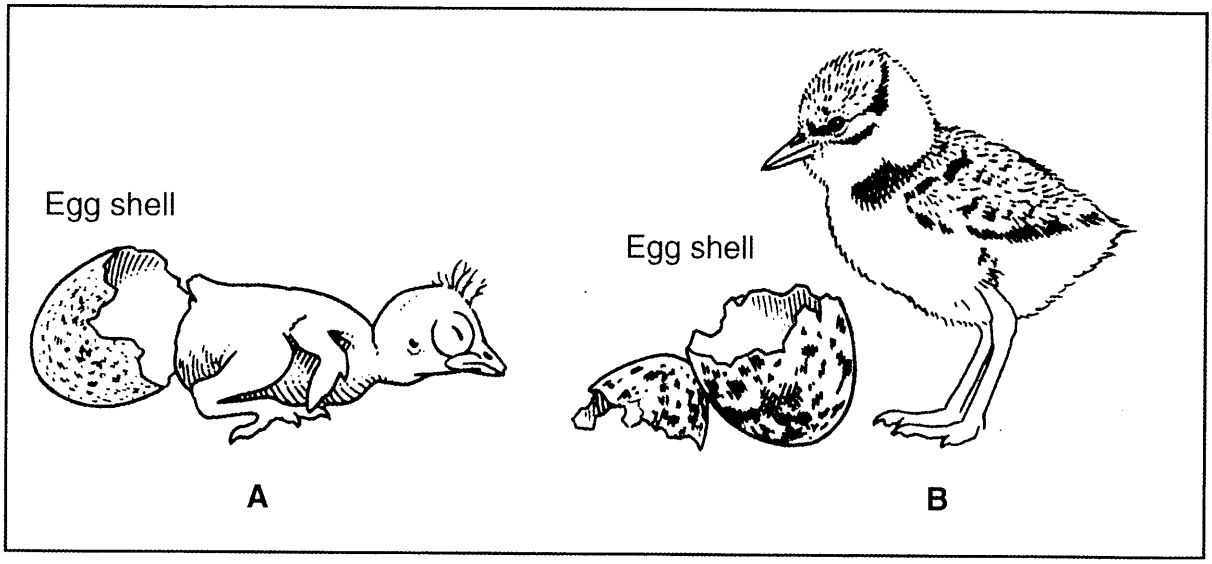
A Mitosis results in the formation of haploid sperms.
B Meiosis leads to the formation of diploid sperms.
C The sperms formed are not genetically identical.
D Of the four cells formed, one develops into a sperm.

1.1.4 DNA replication occurs during ...

A telophase I.
B prophase I.
C interphase.
D prophase II.

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QUESTION 1.1.5 REFERS TO THE DIAGRAM OF ONE-DAY-OLD HATCHLINGS A AND B BELOW.



1.1.5 The following characteristics applies to one or both hatchlings in the diagram:

(i) Egg yolk is larger to support the greater in-egg development
(ii) Parental care is needed
(iii) Hatchlings are born with bigger brain size
(iv) Hatchlings are born blind

Which ONE of the following combinations applies to hatchling in diagram **B** only?

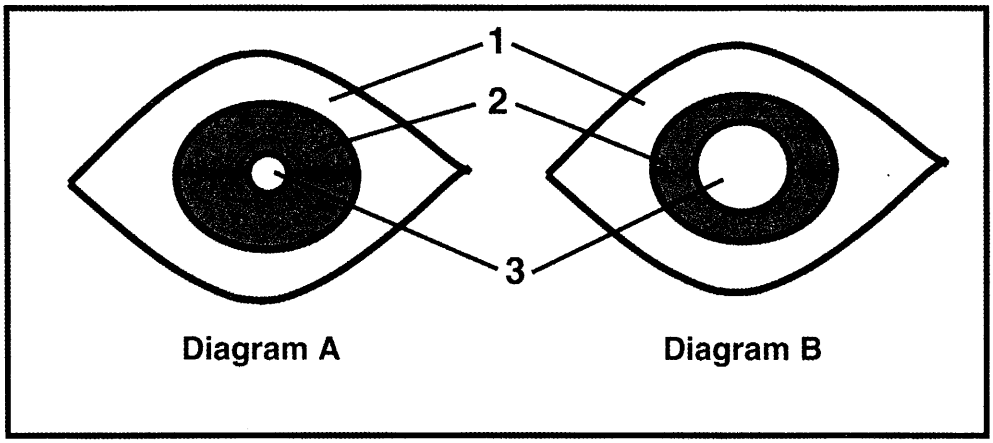
A (i), (ii), (iii) and (iv)
B (i) and (iii) only
C (ii) and (iv) only
D (i), (iii) and (iv) only

1.1.6 Which ONE of the following combination of gases are the main cause of global warming?

A Carbon dioxide and ozone
B CFCs and carbon dioxide
C Methane and carbon dioxide
D CFCs and methane

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QUESTIONS 1.1.7 AND 1.1.8 ARE BASED ON THE DIAGRAM BELOW



1.1.7 Which ONE of the following statements is CORRECT regarding the eyes shown in the diagram below?

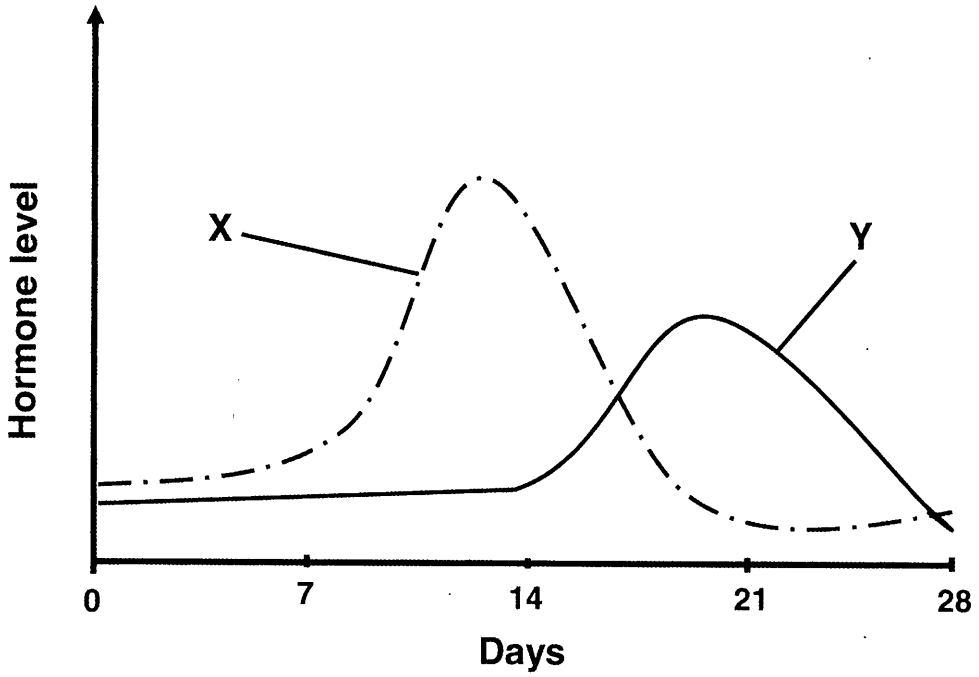
A Diagram **A** has the cilliary muscles contracted and is looking at a nearby object
B Diagram **B** is looking at a distant object and has circular muscles contracted
C Diagram **A** is in bright light and has radial muscles contracted
D Diagram **B** is in dim light and has circular muscles relaxed

1.1.8 Which ONE of the following is the correct part and its function?

	Part	Function
A	**1**	Holds the lens in position
B	**2**	Controls the amount of light entering the eye
C	**3**	Supplies nutrients to the eye
D	**1 and 3**	Converts a stimulus into an impulse

QUESTIONS 1.1.9 AND 1.1.10 ARE BASED ON THE DIAGRAM BELOW

The graph below shows the different levels of two hormones secreted by the ovaries involved in menstrual cycle.



1.1.9 Which ONE of the following statements is correct regarding hormone **X**?

A Hormone **X** is responsible for fertilization
B Hormone **X** is responsible for ovulation
C Hormone **X** is oestrogen
D Hormone **X** is progesterone

1.1.10 Which ONE of the following statements supports the fact that fertilisation did NOT take place during the menstrual cycle represented in the graph?

A Hormone **X** is the highest during day 14
B Hormone **Y** was low before day 14
C Hormone **X** increased just before day 14
D Hormone **Y** decreased towards the end of the cycle

(10 x 2) **(20)**

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1.2 Give the **correct biological** term for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.8) in the ANSWER BOOK.

1.2.1 The total amount of carbon dioxide released to the atmosphere by an individual, a community or a factory per year

1.2.2 A type of egg where the embryo develops inside a fluid-filled sac which is surrounded by a shell

1.2.3 A site where fertilization occurs in human females

1.2.4 The gland in the male reproductive system that secretes an alkaline substance to neutralise the vaginal acidity

1.2.5 The plant growth movement in response to light

1.2.6 A collective name for the membranes that protect the brain and spinal cord

1.2.7 The structure that connects the left and right hemispheres of the brain, allowing communication between them

1.2.8 A condition in which the cell contain two sets of chromosomes

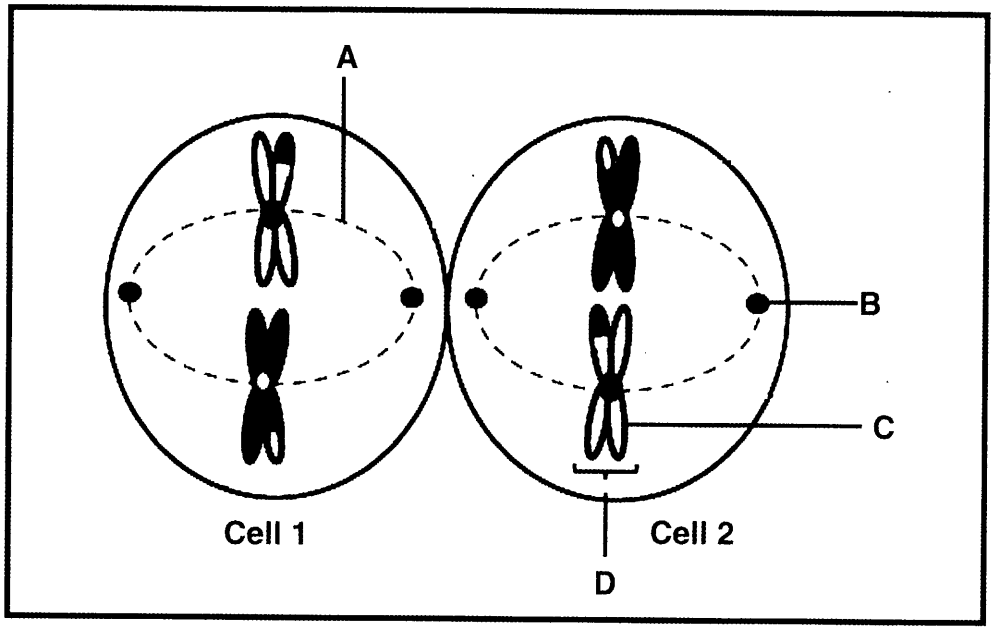
(8 x 1) **(8)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

COLUMN I		**COLUMN II**
1.3.1	A part of the brain that receive impulses from the sense organs	A: Cerebrum B: Cerebellum
1.3.2	A structure in the neuron that insulates the axon	A: Cell body B: Myelin sheath
1.3.3	A disadvantage of external fertilisation	A: Needs copulation to occur B: More energy used to produce millions of gametes
1.3.4	A hormone that stimulates the production of milk	A: Oestrogen B: Prolactin

(4 x 2) **(8)**

1.4 The diagram below represents a phase during meiosis in an animal cell.



1.4.1 Identify the phase represented in the diagram. (1)

1.4.2 Name the process that led to the chromosomes having different shadings. (1)

1.4.3 Identify part:

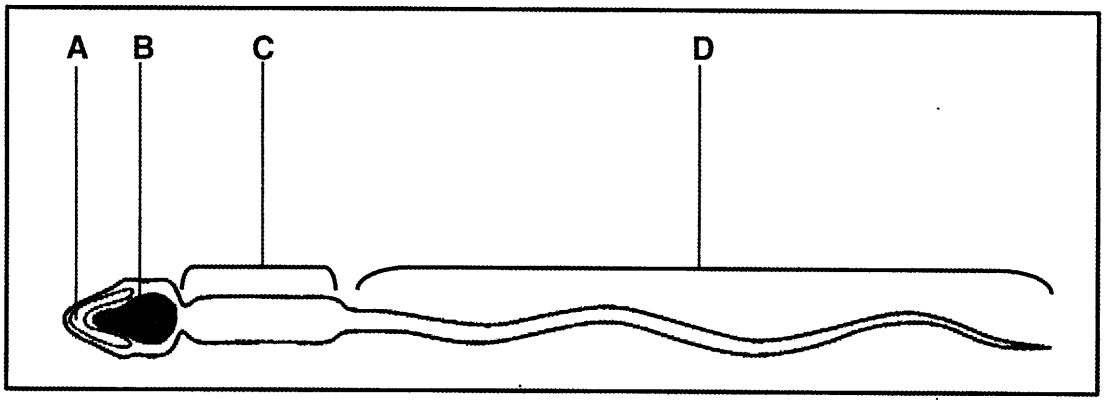
(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

(d) **D** (1)
(6)

1.5 The diagram below represents a human sperm cell.



1.5.1 Identify parts:

(a) **A** (1)

(b) **B** (1)

1.5.2 Give the LETTER of the part that contains genetic material. (1)

1.5.3 Give the LETTER and NAME of the part that is damaged in the sperm cell, if it is unable to:

(a) Penetrate the ovum (2)

(b) Move because it lacks energy (2)

1.5.4 A sperm cell is found in cats with 19 chromosomes.

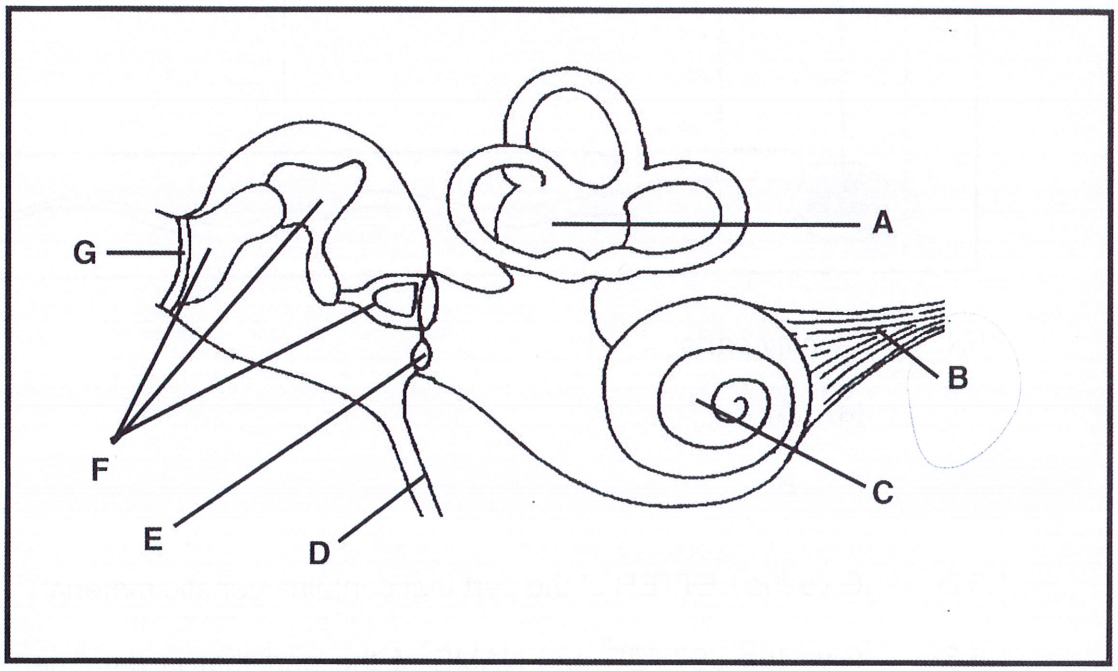
How many chromosomes will be found in the skin cell of a cat? (1)
(8)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below shows a part of human ear.



2.1.1 State the function for part **D**. (1)

2.1.2 Write down the LETTER and the NAME of the part that:

(a) Contain sound receptors (2)

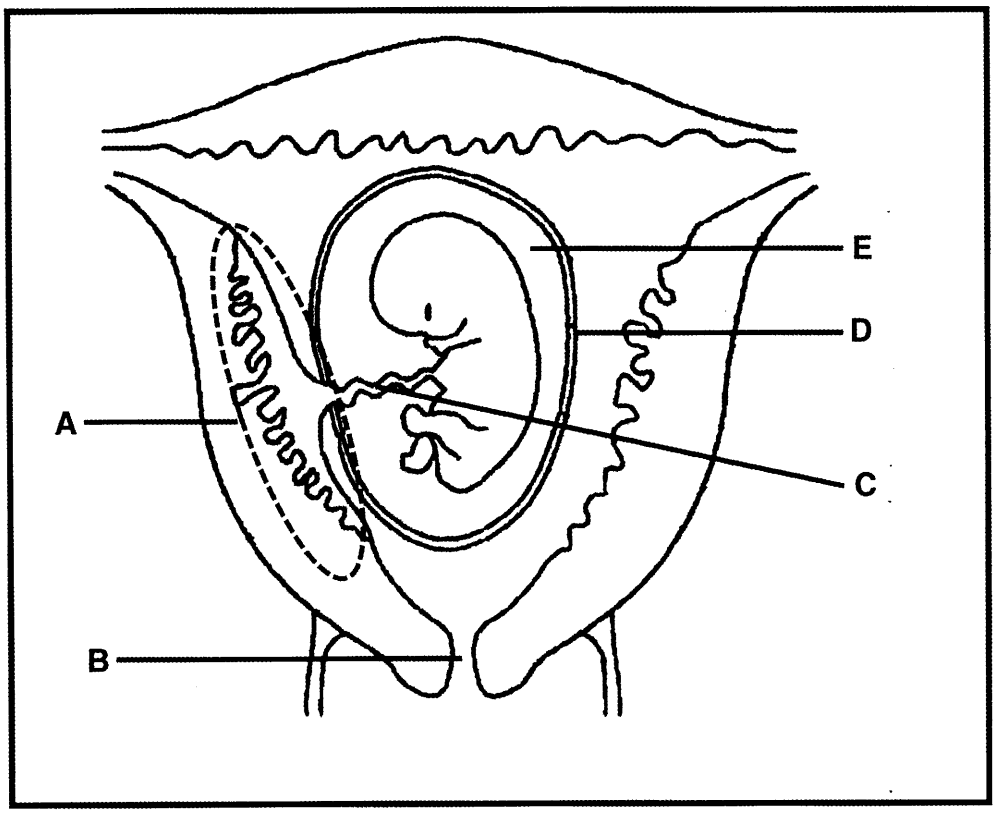
(b) Absorb pressure waves set up in the inner ear (2)

(c) Transmit impulses to the brain (2)

2.1.3 Explain the consequence to hearing process if part **C** is damaged. (2)

2.1.4 Describe the role of part **A** in maintaining balance when the position of the head changes. (5)
(14)

2.2 The diagram below represents a developing foetus in the body of a female.



2.2.1 Identify the following parts and give function of each:

(a) **B** (2)

(b) **D** (2)

2.2.2 State TWO functions of the fluid **E**. (2)

2.2.3 Explain the consequence to pregnancy if part **A** fails to secrete progesterone. (2)

2.2.4 If part **C** is blocked, explain how this will affect the development of the foetus. (4)
(12)

2.3 Describe the development of the fertilised ovum until implantation occurs. **(5)**

2.4 Read the extract below

EFFECTS OF ALCOHOL ON THE BODY

Alcohol is often wrongly classified as a stimulant, whilst it is a depressant. It slows down chemicals and pathways that brain cells use to send messages. This slows down reflexes and throws you off balance. You can't think straight and struggle to store things in long-term memory. It also makes it harder to keep a constant body temperature and affects vision.

Alcohol inhibits the hormone that keeps your kidneys from making too much urine. That means you have to urinate more often and it leaves your body dehydrated.

In long term it may damage the pancreas and may cause you to have diabetes mellitus.

Adapted from: www.healthline.com

2.4.1 Which parts of the brain are affected by alcohol if a person:

(a) Is thrown off balance (1)

(b) Has hard time in keeping a constant body temperature (1)

(c) Cannot see clearly (1)

(d) Cannot think straight (1)

2.4.2 Explain why the alcohol causes a person to urinate more often leaving the body dehydrated. (4)

2.4.3 State why a person with damaged pancreas may have diabetes mellitus. (1)

(9)

(40)

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QUESTION 3

3.1 A learner conducted an investigation to determine the effect of auxins and gravity on the direction of growth of stem. He used the following procedure:

- He used 4 pot plants of the same species grown at the same time
- They were all placed **horizontally** on 4 different clinostats
- In Pot plant **1** the stem tip was removed and the clinostat rotating
- In Pot plant **2** the stem tip was not removed and the clinostat rotating
- In Pot plant **3** the stem tip was removed and the clinostat stationary
- In Pot plant **4** the stem tip was not removed and the clinostat stationary
- All the pot plants were exposed to uniform light coming from all directions

A clinostat is a device which has a disc that rotates at a constant speed..

3.1.1 What is the purpose of removing the stem tips in pot plants **1** and **3**? (1)

3.1.2 Explain the direction of the stem growth that would be obtained for pot plant:

(a) **1** (2)

(b) **2** (3)

(c) **4** (4)
(10)

3.2 A rugby coach conducted an investigation to determine the effect of exercise on the body temperature.

The procedure was as follows:

- 20 participating learners were divided into two groups (A and B) of 10 each.
- Group A sat on the grand stands for 10 minutes.
- Group B ran around the rugby field for 10 minutes.
- The body temperature was measured and recorded for each group.

3.2.1 Identify the dependent variable in the investigation. (1)

3.2.2 Explain why it is important to measure the body temperature of participants before the exercise. (2)

3.2.3 Mention TWO ways in which the validity of this investigation could be increased. (2)

3.2.4 Explain why the individuals in group **B** are expected to release more sweat than the individuals in group **A**. (3)
(8)

3.3 The table below shows the top five factors that contribute to the loss of biodiversity.

Factors	Percentage contribution
Habitat loss	45
Alien invasion	32
Overexploitation	13
Diseases	6
Natural	4

3.3.1 Describe how the habitat loss contributes to the loss of biodiversity. (2)

3.3.2 Explain the impact on the ecosystems when a species is wiped out in an area. (3)

3.3.3 Draw a pie chart to represent the information in the table above. (6)
(11)

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3.4 Read the extract below.

SA REAPING BIGGEST MAIZE HARVEST IN 40 YEARS

Farmers will likely harvest 14.7 million tons in 2017. This is almost 50 % more than the country needs in a year. In 2016 the harvest was 7.8 million tons. Good recent rainfalls and a larger area for planting helped boost the harvest.

The increase in harvest is good news for local consumers. However, more than 80 % of the harvest is white maize which is not in demand as yellow maize.

In other Southern African countries such as Zambia, Zimbabwe and Malawi the harvest has also increased. This created more competition in the export market, especially as their crops are not genetically modified.

3.4.1 State what is meant by *genetically modified crops.* (1)

3.4.2 According to the extract, state TWO reasons that contributed to the increased maize harvest in 2017. (2)

3.4.3 Calculate the percentage increase in maize production as compared to 2016. Show ALL working. (3)

3.4.4 Explain why an increase in harvest will be good news to local consumers. (2)

3.4.5 Explain the economic impact for South African farmers who export maize to other countries. (3)

(11)

(40)

TOTAL SECTION B: 80

SECTION C

QUESTION 4

A man accidentally stepped on a thorn whilst he was running in the forest.

Describe the reflex action that occurred when the man accidentally stepped on a thorn. Also describe how the blood glucose levels were maintained at the normal level while running and explain why the levels of TSH would be high during this time.

Content: (17)
Synthesis: (3)
(20)

NOTE: NO marks will be awarded for answers in the form of tables, flow charts or diagrams.

TOTAL SECTION C: 20
GRAND TOTAL: 150

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