

## **Education and Sport Development**

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Departement van Onderwys en Sportontwikkeling  
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**NORTH WEST PROVINCE**

### **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P1**

**SEPTEMBER 2017**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 14 pages.**

**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, flow charts or tables 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, protractor and a compass, where necessary.
11. Write neatly and legibly.

**SECTION A****QUESTION 1**

- 1.1 Various options are given as possible answers to the following questions. Choose the 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 E.

1.1.1 Which hormone regulates the salt concentration in the body?

- A Aldosterone
- B Adrenalin
- C ADH
- D Insulin

1.1.2 The laying of eggs which hatch outside the body, is known as ...

- A ovovivipary.
- B vivipary.
- C external fertilisation.
- D ovipary.

1.1.3 The corpus luteum is a structure which forms ...

- A during menstruation.
- B after ovulation.
- C only at the onset of puberty.
- D after menstruation.

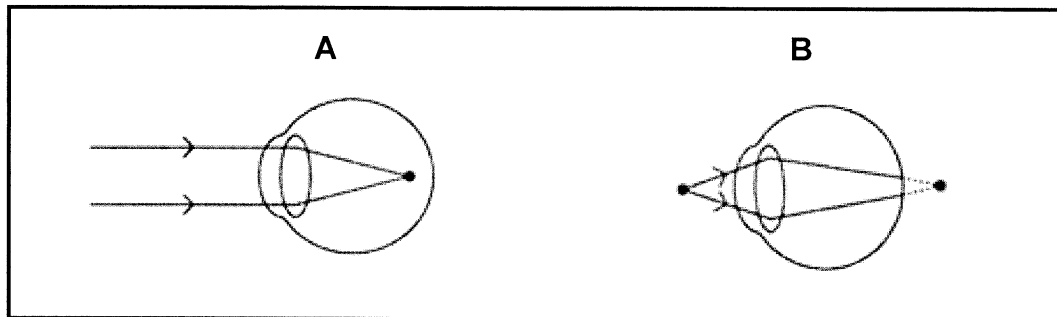
1.1.4 Study the list below:

- (i) Use of indigenous plants for medicinal purposes
- (ii) Use of wood to generate heat energy
- (iii) Poverty and shortage of food

Which of the following may be reasons for the exploitation of natural resources?

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

- 1.1.5 The diagram below shows two visual defects, short-sightedness and long-sightedness.



Which statement below best describes the visual defect in the diagrams?

- A The shape of the eye ball is shorter than usual in diagram A.
  - B The focal point lies behind the retina in diagram A.
  - C The focal point lies in front of the retina in diagram B.
  - D The lens is less convex in diagram B.
- 1.1.6 Images of objects moving towards a person are clearly focused on the retina when the ...
- A ciliary muscles contract.
  - B circular muscles of the iris relax.
  - C lens becomes less convex.
  - D pupil dilates.
- 1.1.7 A cell with 17 chromosomes ...
- A is probably a gamete.
  - B is a diploid cell.
  - C gives rise to four daughter cells after meiosis.
  - D gives rise to two daughter cells after meiosis.
- 1.1.8 Which ONE of the following increases water availability?
- A High population density
  - B Drought
  - C Boreholes
  - D Overgrazing
- 1.1.9 Which of the following bring/s about the onset of flowering in plants?
- A Auxins
  - B Gibberellins
  - C Auxins and abscisic acid
  - D Gibberellins and auxins

1.1.10 What would happen if thyroxine is injected into a healthy person?

- A More TSH will be secreted.
- B The metabolic rate will increase.
- C Muscular activity will decrease.
- D Glucose will be converted to glycogen.

(10 x 2) (20)

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 1.2.10) in the ANSWER BOOK.

- 1.2.1 The enrichment of water by inorganic nutrients such as fertilisers
- 1.2.2 The part containing blood vessels that transport waste and nutrients between the foetus and the placenta
- 1.2.3 A rapid, automatic response to an external stimulus
- 1.2.4 The phase in meiosis in which four cells are formed having half the chromosome complement of the original cell
- 1.2.5 The reproductive strategy whereby young birds are able to fend for themselves at birth
- 1.2.6 A part that receives a stimulus and converts it into an impulse
- 1.2.7 Protective membrane situated over the cornea of the eye
- 1.2.8 A mass of white fibres which connects the two hemispheres of the cerebrum
- 1.2.9 Nervous system containing a sympathetic and parasympathetic section
- 1.2.10 Use of resources in such a way that they are available for future generations

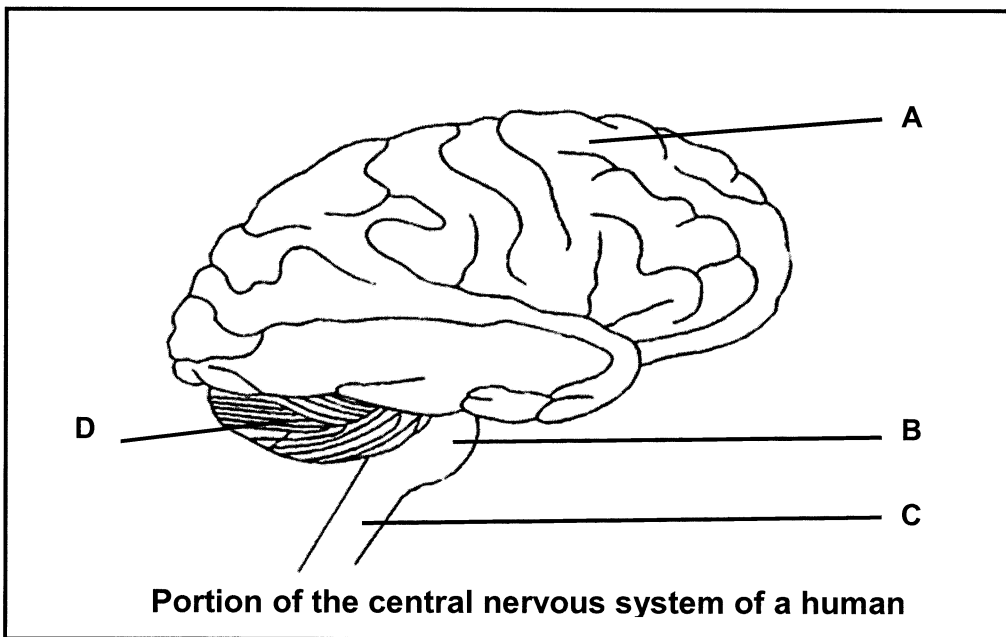
(10 x 1) (10)

- 1.3 Indicate whether each of the statements 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 (1.3.1–1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Allows for the passage of the ovum	A: Urethra B: Ureter
1.3.2 A part of the peripheral nervous system	A: Cranial nerves B: Spinal nerves
1.3.3 Muscles that control the amount of light entering the eye	A: Ciliary muscles in ciliary body B: Radial muscles in iris
1.3.4 Affects growth and functioning of the heart and nervous system	A: Thyroxin B: Testosterone
1.3.5 Hormone causing the development of secondary sexual characteristics	A: Oestrogen B: Testosterone

(5 x 2) (10)

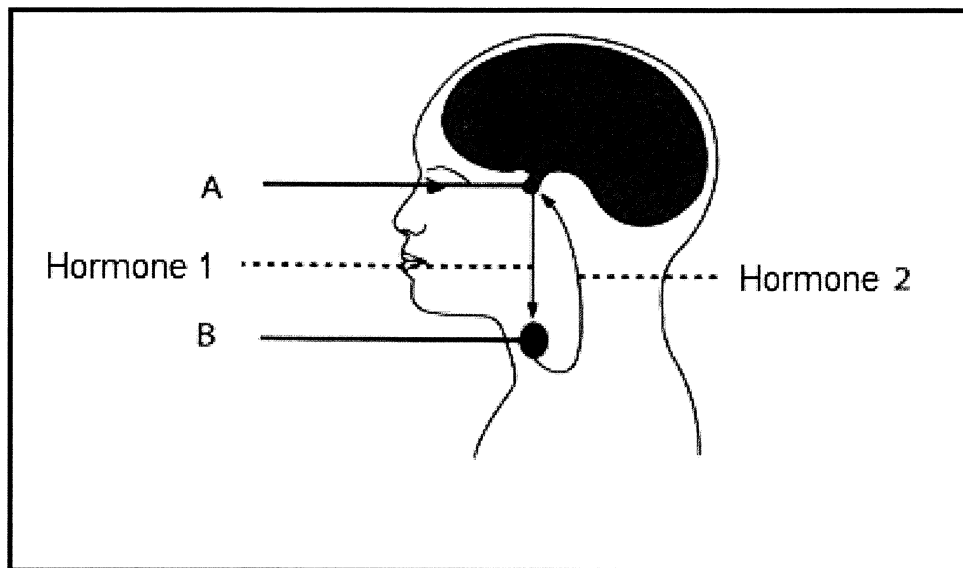
- 1.4 The diagram below represents a portion of the central nervous system of a human.



Give the LETTER and the NAME of the part responsible for each of the following:

- 1.4.1 Regulation of breathing (2)
- 1.4.2 Origin of voluntary actions (2)
- 1.4.3 Maintenance of balance and equilibrium (2)
- (6)**

1.5 The diagram below represents the location of TWO endocrine glands.



1.5.1 Identify glands **A** and **B**. (2)

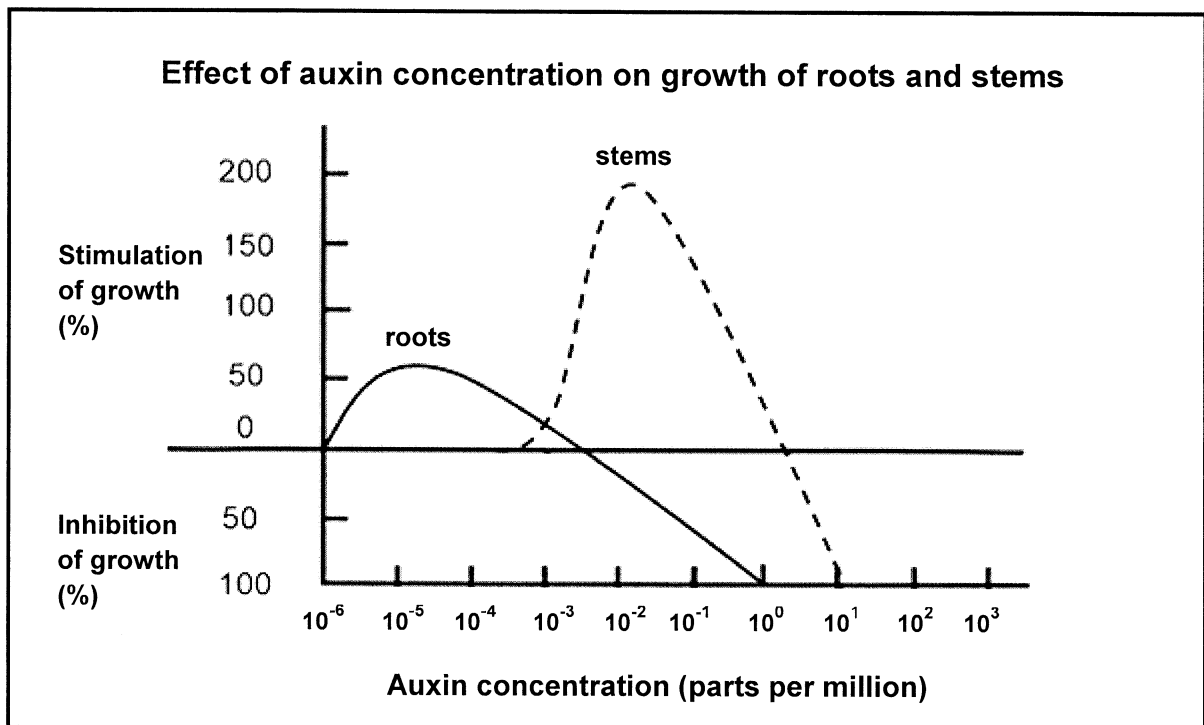
1.5.2 Negative feedback regulates the levels of the hormones secreted by the glands mentioned in QUESTION 1.5.1.

Identify hormones **1** and **2**. (2)  
(4)

**TOTAL SECTION A: 50**

**SECTION B****QUESTION 2**

- 2.1 The graph below indicates the growth response of roots and stems to auxins applied at different concentrations.



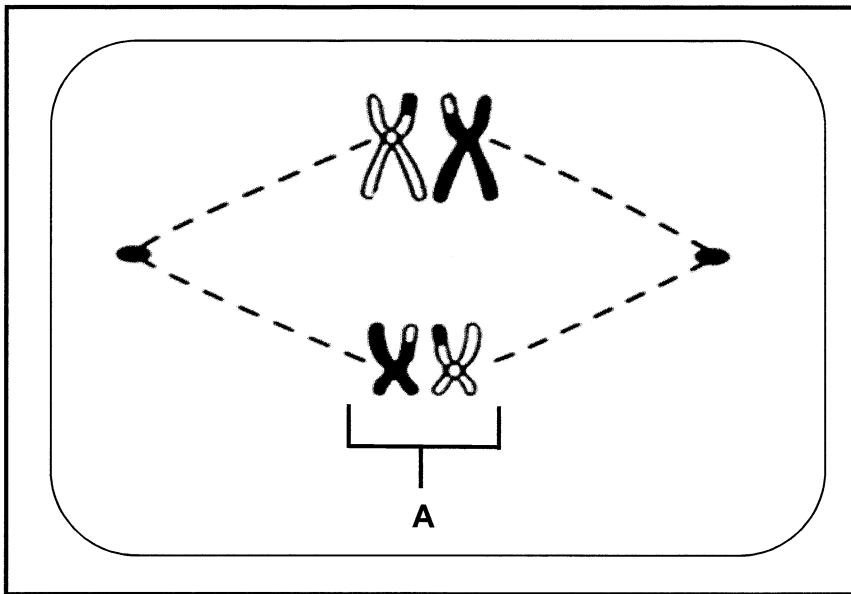
- 2.1.1 At what concentration did the auxins have the same effect on the growth of the roots and the stems? (2)
- 2.1.2 Describe the trend of the effect of auxin concentration on stem growth. (3)
- 2.1.3 Explain why an auxin concentration of  $10^0$  parts per million will be most effective as a weed killer. (3)
- (8)**

- 2.2 Some animals share the same reproductive strategy.

Explain TWO adaptations of the amniotic egg for reproduction. (4)



2.3 The diagram below represents a phase of meiosis.



2.3.1 Identify part **A**. (1)

2.3.2 How many chromosomes will there be in each cell at the end of meiosis? (1)

2.3.3 Describe TWO ways in which meiosis contributes to genetic variation. (7)  
(9)

2.4 An investigation was conducted to determine the presence of metals in the river near a village. The table below shows the results of four different metal readings obtained 6 months before, as well as the current readings at the same place.

Metals	Concentration ( $\times 10^{-2}$ mg/l)			
	Reading 6 months before	Current reading	Limit for fresh-water life	Limit for humans
<b>Arsenic</b>	0,03	0,01	44	5
<b>Cadmium</b>	0,02	0,01	0,15	1
<b>Lead</b>	2,10	0,3	7,4	5
<b>Mercury</b>	0,04	0,23	0,41	5

2.4.1 Identify the metal that has increased in concentration over the last 6 months. (1)

2.4.2 List TWO strategies which could prevent pollution of the river with these metals. (2)

2.4.3 Explain why the current concentration of lead may be harmful to humans, even though it is below the limit for humans. (3)  
(6)

- 2.5 The photograph shown below was taken while a person was walking along the road and then unexpectedly chased by a hippopotamus.

Study the photograph and answer the questions below.



- 2.5.1 Name the hormone released by the person in dealing with the dangerous situation he experienced. (1)

- 2.5.2 State where in the body the hormone mentioned in QUESTION 2.5.1 is produced and how it reaches various parts of the body. (2)

- 2.5.3 Which part of the autonomic nervous system increases the heartbeat in this dangerous situation? (1)

- 2.5.4 Describe the role of the liver during dangerous situations. (3)  
(7)

- 2.6 Human activities have an impact on the environment in many ways.

- 2.6.1 Alien plants are species that are introduced into an area and which compete with the natural plants in the area.

Explain ONE advantage and ONE disadvantage of using biological control to regulate populations of alien plants. (4)

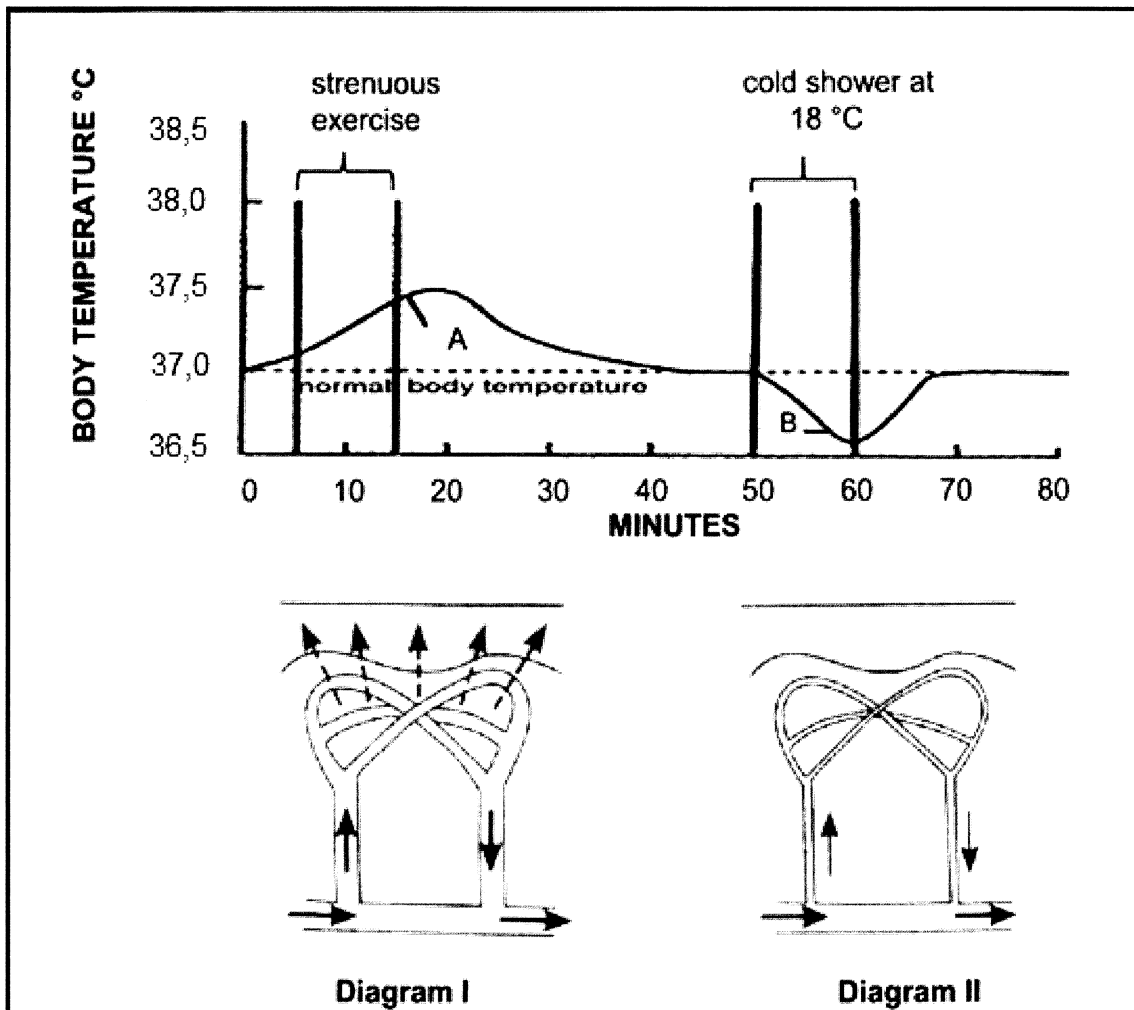
- 2.6.2 Besides recycling, state TWO other ways in which we can manage solid waste. (2)

(6)

[40]

**QUESTION 3**

3.1 The graph and diagrams below indicate the effect of strenuous exercise, followed by a cold shower, on the body temperature of an athlete.



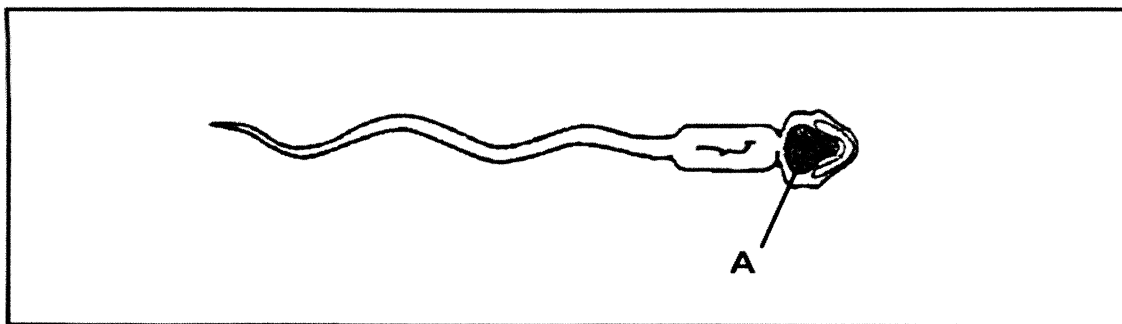
- 3.1.1 Which part of the brain responds to the changes in temperature that occur at **A** and **B**, as seen on the graph? (1)
- 3.1.2 For how long did the person engage in strenuous exercise? (1)
- 3.1.3 Which diagram (**I** or **II**) would represent the condition of the skin after 15 minutes? (1)
- 3.1.4 Explain your answer to QUESTION 3.1.3. (5)
- (8)**

- 3.2 An investigation was conducted to determine the effect of light intensity on the pupil size of the eye. The pupil size of 32 learners were measured at different distances from a lit torch in a dark classroom. The results of the investigation are shown in the table below.

Distance from torch light (m)	Mean diameter of pupil (mm)
1	1,5
3	3,4
5	5,2
7	6,9
9	8,0

- 3.2.1 Explain the relationship between light intensity and the diameter of the pupil. (5)
- 3.2.2 Explain why 32 learners were used in the investigation, instead of 15 learners. (2)
- 3.2.3 Draw a line graph to represent the data given in the table above. (6)
- (13)**

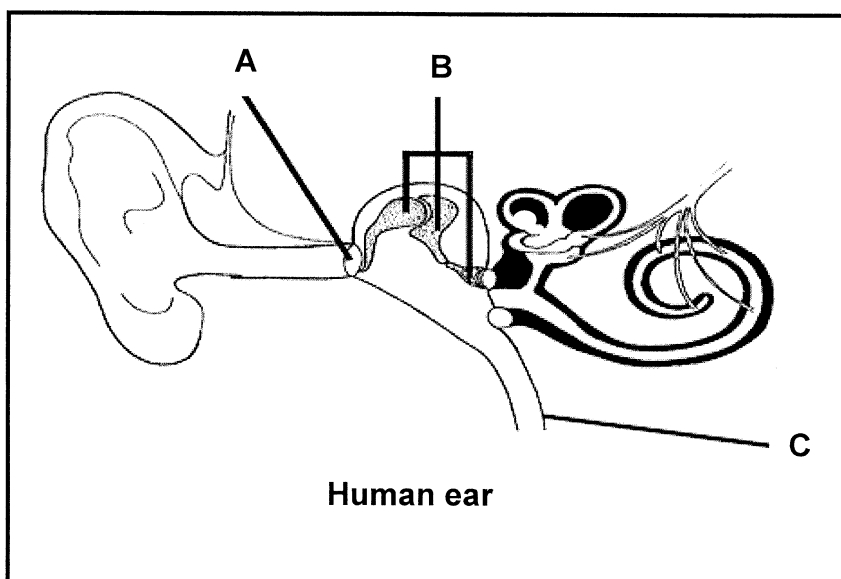
- 3.3 Study the diagram below of a sperm cell and then answer the questions that follow.



- 3.3.1 Identify part A. (1)
- 3.3.2 Explain TWO structural adaptations of sperm cells other than the role of part A. (4)
- (5)**
- 3.4 Food security exists when all people, at all times, are able to get safe and nutritious food. The food must be suitable for their dietary needs.
- 3.4.1 State TWO factors to consider for food to be *suitable* for a person's dietary needs. (2)
- 3.4.2 Suggest FOUR solutions to the problem of food security in South Africa. (4)
- (6)**

- 3.5 The diagram below illustrates parts of the human ear.

3.5 The diagram below illustrates parts of the human ear.



- 3.5.1 State the function of part C. (1)
- 3.5.2 Describe the sequence of events that occur in the hearing process once part B vibrates. (4)
- 3.5.3 Explain the consequence for hearing if a wax plug is formed against part A. (3)
- (8)
- [40]

**TOTAL SECTION B: 80**

**SECTION C**

**QUESTION 4**

Describe the hormonal control of the menstrual cycle.

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

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

**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**



