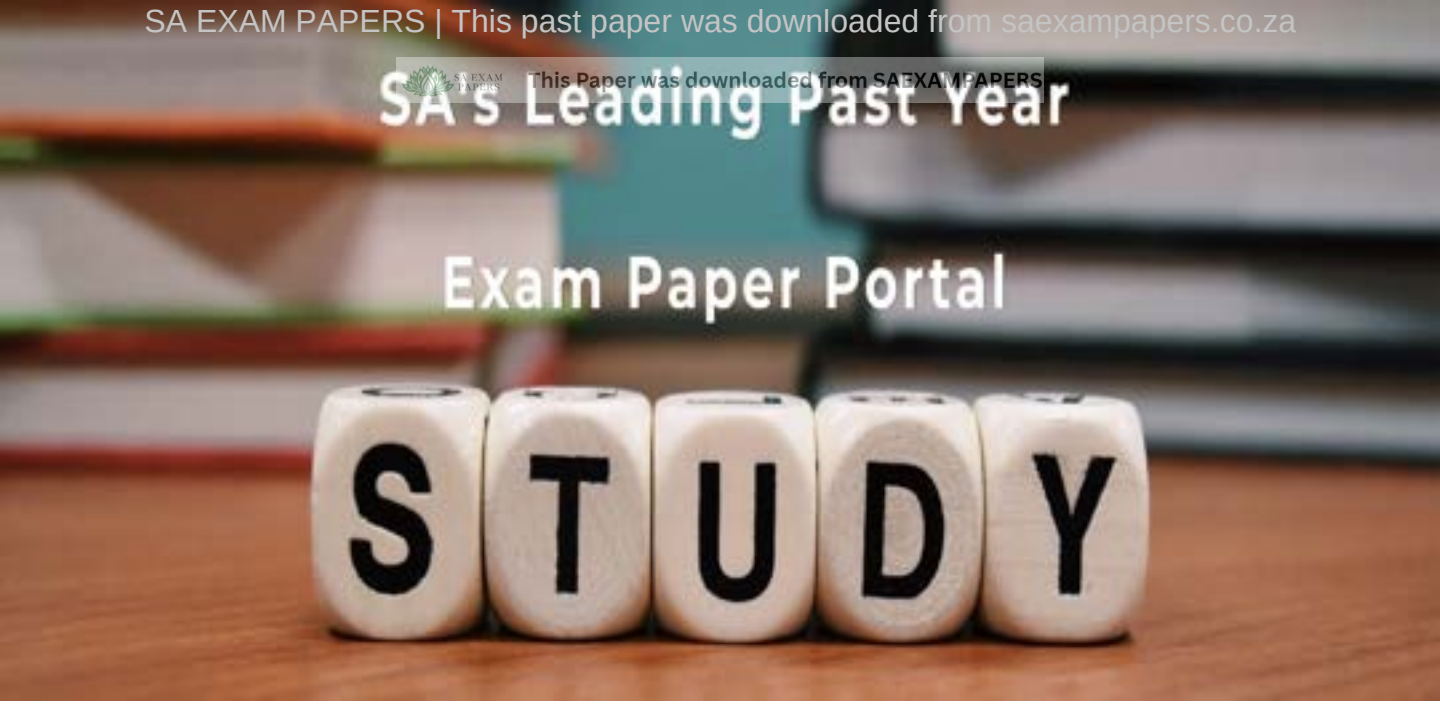


education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

SEPTEMBER 2025

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 the ANSWER BOOK.
3. Start the answer 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, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily all drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.9.) in the ANSWER BOOK, e.g.1.1.10 D.

1.1.1 In bright light …

A the pupil constricts.
B the pupil dilates.
C circular muscles of the iris relax.
D radial muscles of the iris contract.

1.1.2 The nerve cells that transmit impulses to the brain and spinal cord, are called …

A neurons.
B connector neuron.
C sensory neuron.
D motor neuron.

1.1.3 The part of the ear in which the pressure waves are converted into nerve impulses, is the …

A ossicles.
B organ of Corti.
C semi-circular canal.
D middle ear.

1.1.4 Which part of the brain processes visual impulses?

A Hypothalamus
B Medulla oblongata
C Cerebellum
D Cerebrum

1.1.5 A disease caused by the damage of the myelin sheath of neurons and characterised by physical and mental disabilities is called …

A Alzheimer's disease.
B Parkinson's disease.
C Multiple sclerosis.
D Multiple diagnosis.

1.1.6 The production of secondary metabolites, such as alkaloids and terpenoids, in plants serves primarily to …

A promote photosynthesis.
B attract pollinators.
C deter herbivores and reduce pathogen attacks.
D enhance water retention.

1.1.7 Which ONE of the following structures in an amniotic egg protects the developing embryo from physical injury?

A Allantois
B Shell
C Chorion
D Yolk sac

1.1.8 Internal fertilisation is the fusion of haploid nuclei of …

A male and female gametes in the female reproductive system.
B male and female gametes outside female reproductive system.
C a haploid male and a diploid female gamete in the female reproductive system.
D a diploid male and a diploid female gamete in the female reproductive system.

1.1.9 A reproductive strategy that leads to the loss of many sperm:

A Internal fertilisation
B External fertilisation
C Precocial development
D Altricial development (9 x 2) **(18)**

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

1.2.1 Inhibition of the growth of lateral buds by auxins present in apical buds

1.2.2 A layer inside the eye that absorbs light, thus reducing reflection

1.2.3 The physiological connection between the axon of one neuron and the dendrite of another

1.2.4 The nervous system which consists of cranial and spinal nerves

1.2.5 The plant growth hormone that stimulates seed germination

1.2.6 The visual defect caused by the uneven curvature of the cornea

1.2.7 A disease characterised by the degeneration of brain cells and loss of memory

1.2.8 Corrective lenses for short-sightedness (8 x 1) **(8)**

1.3 Indicate whether each of the descriptions in COLUMN I apply 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 numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I		COLUMN II
1.3.1	The protective membranes that cover the brain and the spinal cord	A: B:	Meninges Germinal epithelial
1.3.2	Eggs incubated in nests	A: B:	Ovovivipary Viviparous
1.3.3	A plant hormone that helps plant seeds to survive unfavourable conditions	A: B:	Auxins Abscisic acid

(3 x 2) **(6)**

1.4 Plant hormones play major roles in plants.

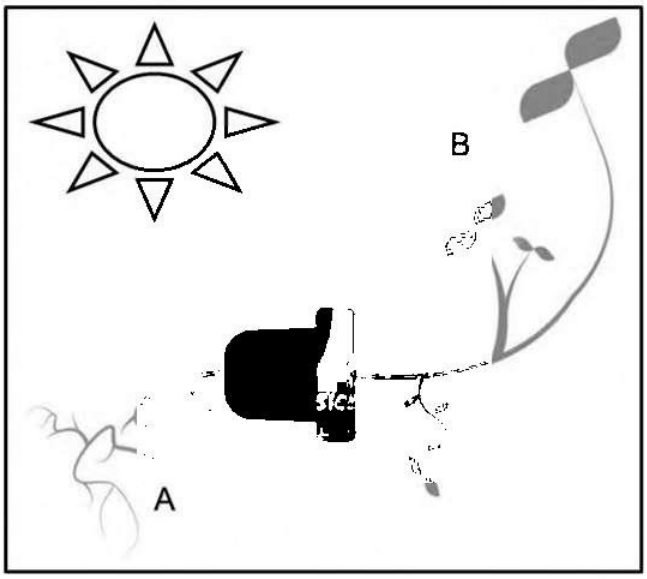
1.4.1 Give the NAME of the plant hormone that:

(a) Is responsible for bringing dormancy in seeds (1)

(b) Causes bending reactions in plant stems and roots (1)

(c) Is responsible for the elongation of internodes in plants (1)

QUESTIONS 1.4.2 AND 1.4.3 ARE BASED ON THE DIAGRAM BELOW.



1.4.2 NAME the type of tropism in:

(a) **A** (1)

(b) **B** (1)

1.4.3 Identify the stimuli which causes bending in:

(a) Part **A** (1)

(b) Part **B** (1)
(7)

1.5 The diagrams below represents the male and female reproductive systems.

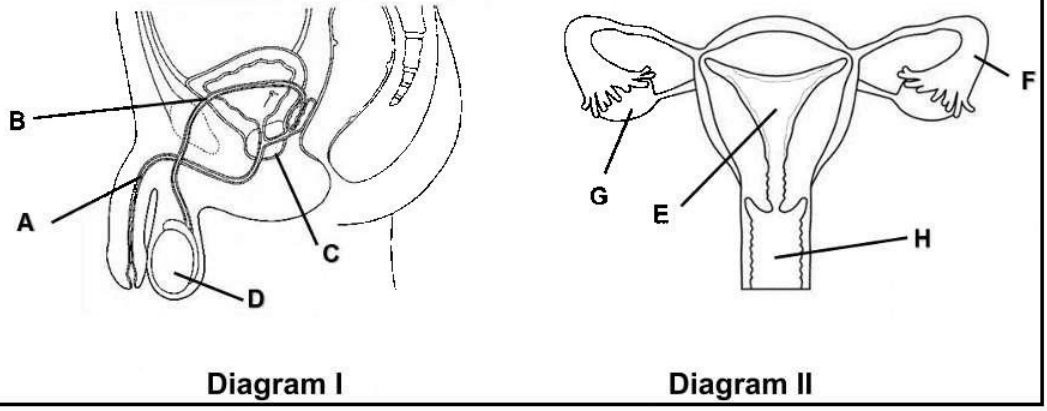


Diagram I **Diagram II**

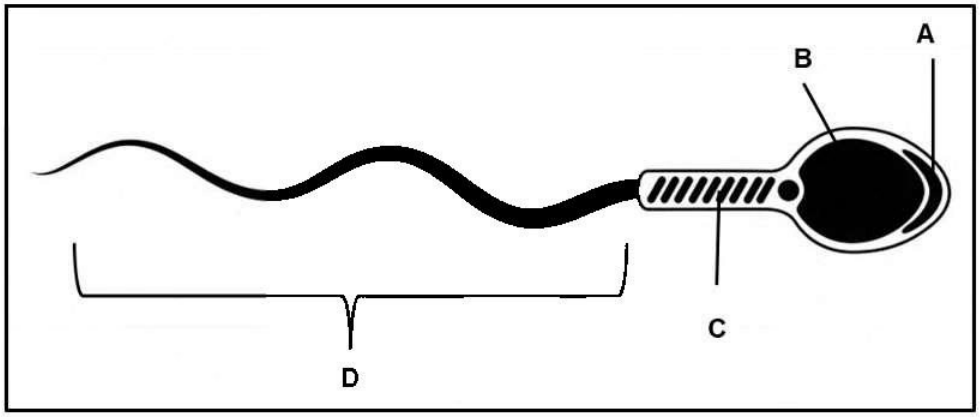
1.5.1	Identify structure **A**.	(1)
1.5.2	List TWO adaptations of part **E**.	(2)
1.5.3	Write down the LETTER and NAME of parts where meiosis takes place:	
	(a) Diagram **I**	(2)
	(b) Diagram **II**	(2)
1.5.4	Give the NAME of a part where:	
	(a) Sperms are stored to mature before release	(1)
	(b) Fertilisation takes place	(1)
	(c) Oestrogen is produced	(1)
	(d) A fluid is secreted for movement and nutrition of a sperm cell	(1) **(11)**

TOTAL SECTION A: 50

SECTION B

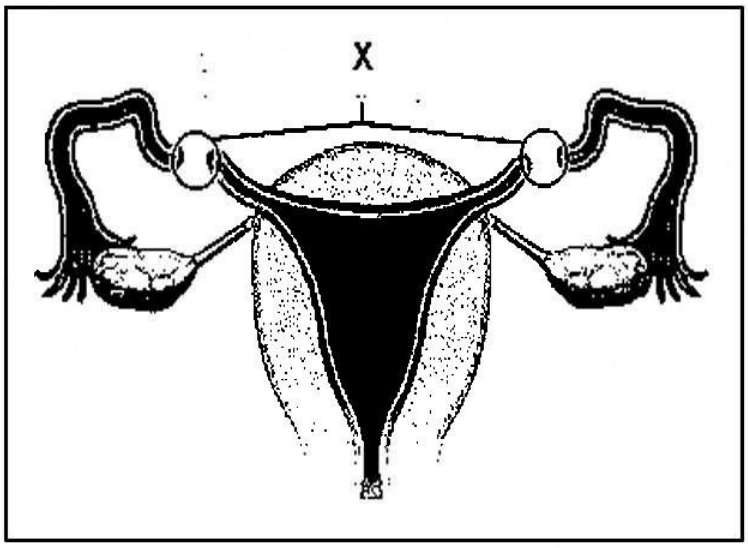
QUESTION 2

2.1 The diagram below shows a sperm.



2.1.1	Identify part **A**.	(1)
2.1.2	Is a sperm cell haploid or diploid?	(1)
2.1.3	Give a reason for your answer to QUESTION 2.1.2.	(2)
2.1.4	State the function of part **D**.	(1)
2.1.5	Describe spermatogenesis.	(5)
		(10)

2.2 The diagram below shows tubal ligation.



2.2.1 Name the procedure labelled **X.** (1)

2.2.2 Explain the effect of the procedure named in QUESTION 2.2.1 on fertility. (3)
(4)

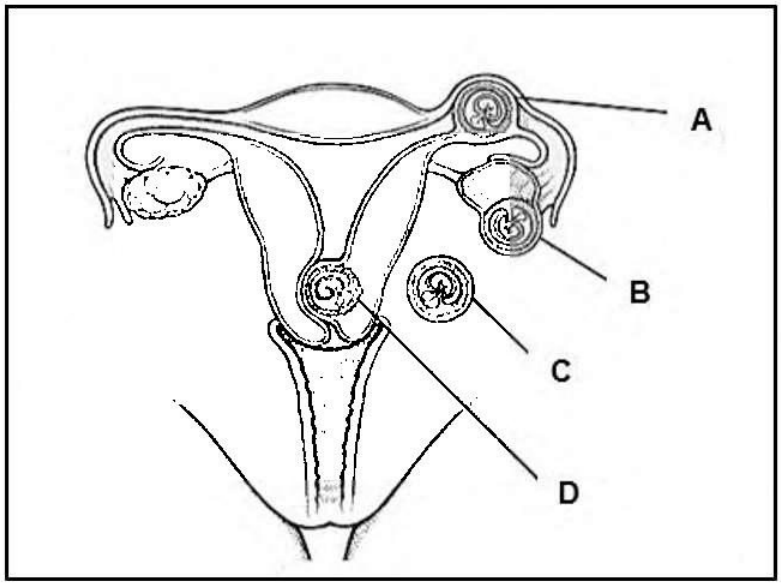
2.3 Describe the thermoregulation process during low environmental temperatures by the following parts of the human body:

(a) Blood vessels in the skin (3)

(b) Sweat glands (3)
(6)

2.4 A fertilised egg is the beginning of a pregnancy. Normally, the fertilised egg attaches to the uterine lining. When a fertilised egg implants and grows outside of the uterus' main cavity, it is called an ectopic pregnancy.

Fallopian tubes carry eggs from the ovaries to the uterus, which is where ectopic pregnancy occurs most often. This type of ectopic pregnancy is called a tubal pregnancy. Ectopic pregnancy may also occur in other parts of the body, such as the ovary, the abdominal cavity, or the lower part of the uterus (cervix).



2.4.1 What is an *ectopic pregnancy*? (1)

2.4.2 Name TWO areas in the female reproductive system where an ectopic pregnancy can occur. (2)

2.4.3 Explain ONE consequence of the foetus growing in the fallopian tube. (2)

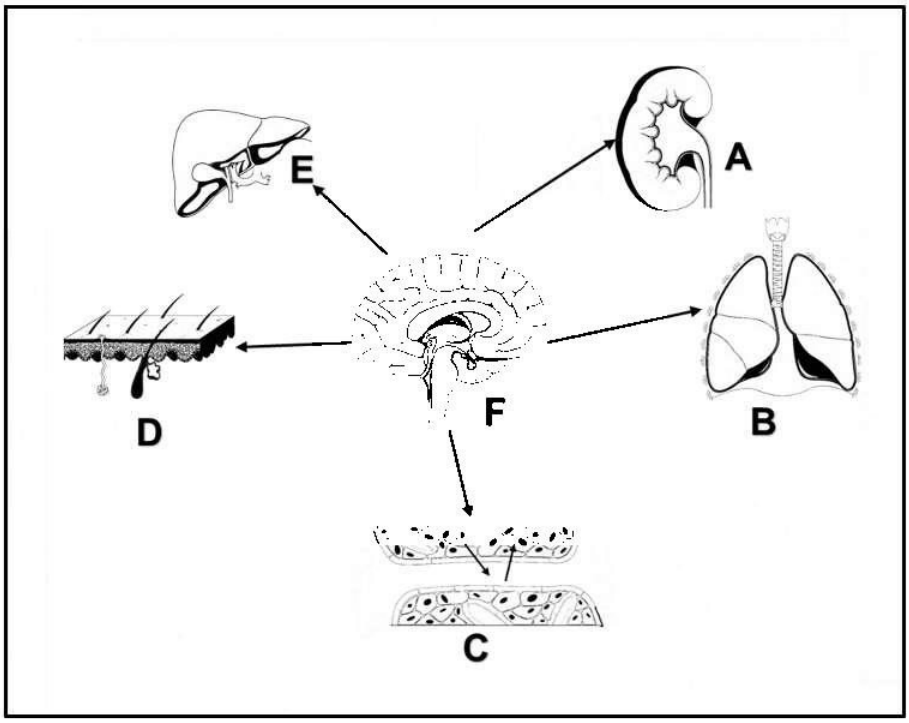
2.4.4 (a) Identify the structure **D**. (1)

(b) Name TWO structures that leads to the formation of structure **D**. (2)

2.4.5 Explain TWO reasons why the amniotic fluid is important during pregnancy. (4)

2.4.6 Describe the developmental steps during gestation of the foetus. (4)
(16)

2.5 The diagram below shows the organs involved in the endocrine system and homeostasis.



2.5.1 Define the term *homeostasis*. (2)

2.5.2 Identify organ **E**. (1)

2.5.3 Name the:

(a) Gland in **F** that secretes prolactin (1)

(b) Organ that plays a role in thermoregulation (1)

(c) Cells where glycogen is converted to glucose (1)

2.5.4 Describe the role of organ **A** to perform its osmoregulation function. (3)

2.5.5 Explain how organ **B** and a part in organ **F** maintain the carbon dioxide levels in the blood. (5)
(14)
[50]

QUESTION 3

3.1 The researchers reported that hearing ability often changes with age, particularly affecting the ability to perceive high-frequency sounds. They aimed to explore how different age groups vary in their ability to hear various frequencies of sound, focusing on the impact of aging on high-frequency hearing.

The investigation aimed to examine the effect of age on the ability to hear higher frequencies of sound.

The procedure was as follows:

- The study involved 64 participants.
- Participants were divided into four groups of 16 participants according to the following age groups: 18–30 years, 31–50 years, 51–70 years, and 71+ years.
- The researchers ensured an equal number of males and females in each age group.
- The testing was conducted in a quiet, soundproof environment.
- The researchers calibrated the hearing equipment before each test.
- They maintained a consistent hearing test protocol for all participants.
- Each participant underwent the hearing test three times.
- Participants were tested using an audiometer to measure their hearing ability at various frequencies (250 Hz, 500 Hz, 1 000 Hz, 2 000 Hz, 4 000 Hz).

The researchers recorded results for each frequency and analysed them.

PERCENTAGE HEARING IN DIFFERENT AGE GROUPS	FREQUENCY (Hz)				
	250	500	1 000	2 000	4 000
18–30	95	94	92	91	90
31–50	93	92	89	85	75
51–70	90	88	80	74	65
71+	65	62	55	52	50

3.1.1 Identify:

(a) The aim of the investigation (2)

(b) The independent variables (2)

(c) ONE controlled variable (1)

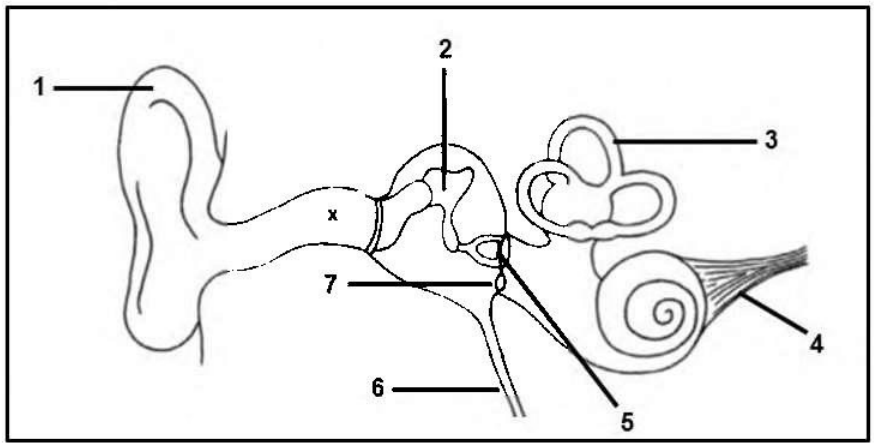
3.1.2 Describe how investigators measured hearing ability. (3)

3.1.3 Describe the relationship between age and hearing ability. (2)

3.1.4 List TWO ways how reliable results were obtained in this investigation. (2)

3.1.5 Draw a line graph to show the effect of increasing sound frequencies on hearing, of the age group 51–70 years. (6)
(18)

3.2. The diagram below represents the human ear.



3.2.1 Identify part **6**. (1)

3.2.2 Give ONE function of part **7** in hearing. (1)

3.2.3 Write down the correct number sequence of the transfer of sound in the human ear. (2)

3.2.4 Describe the process of balance when there is a change in speed and direction of the head. (5)

3.2.5 Explain what would happen to the ability to hear if part **X** is blocked. (4)
(13)

3.3 A person stepped on a thorn with his foot and immediately withdrew it.

Describe the path of the reflex action from the moment he stepped on the thorn until he moved his foot away. (5)
(5)

3.4 Read the extract below on the endocrine system and homeostasis.

THE ENDOCRINE SYSTEM AND HOMEOSTASIS

The endocrine system is a network of glands that produce hormones essential for maintaining homeostasis, or balance, in the body. Two key glands include the thyroid and pituitary glands. Located in the neck, the thyroid gland releases Thyroxin (T4) and Triiodothyronine (T3), which control metabolism, growth, and development. The pituitary gland (hypothalamus), often called the "master gland," regulates other glands by sending signals to activate or deactivate hormone production.

Thyroxin, produced by the thyroid and converted to T3 in cells, helps regulate metabolism, energy production, growth, and nervous system function. To maintain homeostasis, the pituitary gland monitors thyroid hormone levels and adjusts them by releasing Thyroid-Stimulating Hormone (TSH) to increase hormone production or thyroid-inhibiting hormones to decrease it. This feedback system ensures the body has balanced thyroid hormone levels. When imbalances occur, they can lead to conditions such as hypothyroidism, causing fatigue and weight gain, or hyperthyroidism, causing weight loss and anxiety.

3.4.1	What is the *endocrine system*?	(1)
3.4.2	Name TWO disorders caused by imbalances in the thyroid gland.	(2)
3.4.3	Give TWO functions of thyroxin in the human body.	(2)
3.4.4	Describe the homeostatic control when the level of thyroxin in the blood is higher than normal.	(5)
3.4.5	Explain TWO consequences for a person if their thyroxin level remains abnormally low for too long.	(4)
		(14)
		[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150