



education

Department of
Education
FREE STATE PROVINCE

GRADE 12

LIFE SCIENCES P2
JUNE EXAMINATION 2011

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 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. ALL drawings should be done in pencil and labelled in blue or black ink.
7. Only draw diagrams or flow charts when asked to do so.
8. The diagrams in this question paper are NOT all drawn to scale.
9. Do NOT use graph paper.
10. Non-programmable calculators, protractors and compasses may be used.
11. Write neatly and legibly.

SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.6) in your ANSWER BOOK, for example 1.1.8 D.

1.1.1 The growth substances which promote plant cell elongation are ...

- A ethylene and abscisic acid.
- B gibberellins and abscisic acid.
- C abscisic acid and auxin.
- D auxins and gibberellins.

1.1.2 A person is injured in a car accident. He can feel objects touching his right leg but cannot move his leg because ...

- A the sensory nerves in the leg have been damaged.
- B there is damage to the medulla oblongata.
- C the motor nerves in the leg have been damaged.
- D there is extensive damage to the spinal cord.

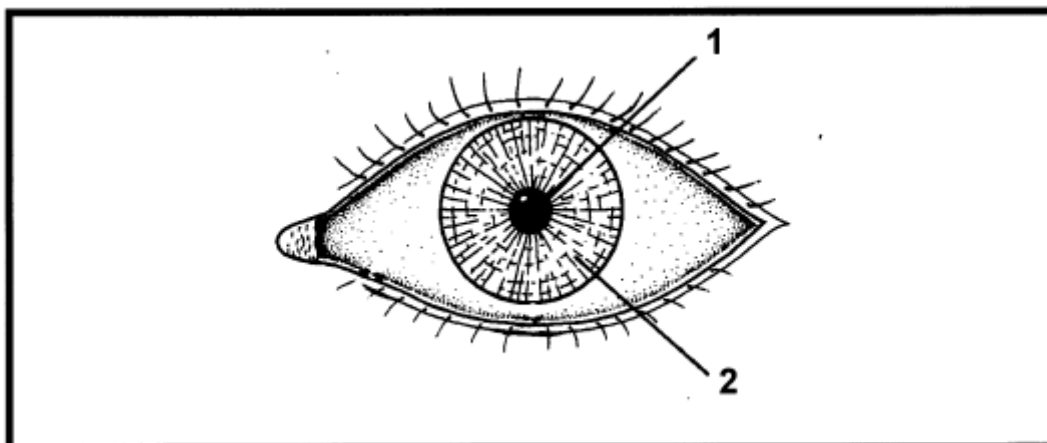
1.1.3 The middle ear is separated from the inner ear by:

- A The oval window.
- B The tympanic membrane.
- C The round window.
- D Both A and C.

1.1.4 Adjustment of the lens to focus on objects close to the viewer is called ...

- A convergence.
- B accommodation.
- C focusing.
- D constriction.

Question 1.1.5 is based on the diagram below.



1.1.5 Numbers 1 and 2 control the following in the eye:

- A Pupillary mechanism
- B Accommodation
- C Co-ordination
- D Converging refraction of light rays

1.1.6 Hormones are transported from one part of the body to another ...

- A along ducts.
- B by lymph.
- C by blood.
- D along nerve fibres.

6 x 2 (12)

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 your ANSWER BOOK.

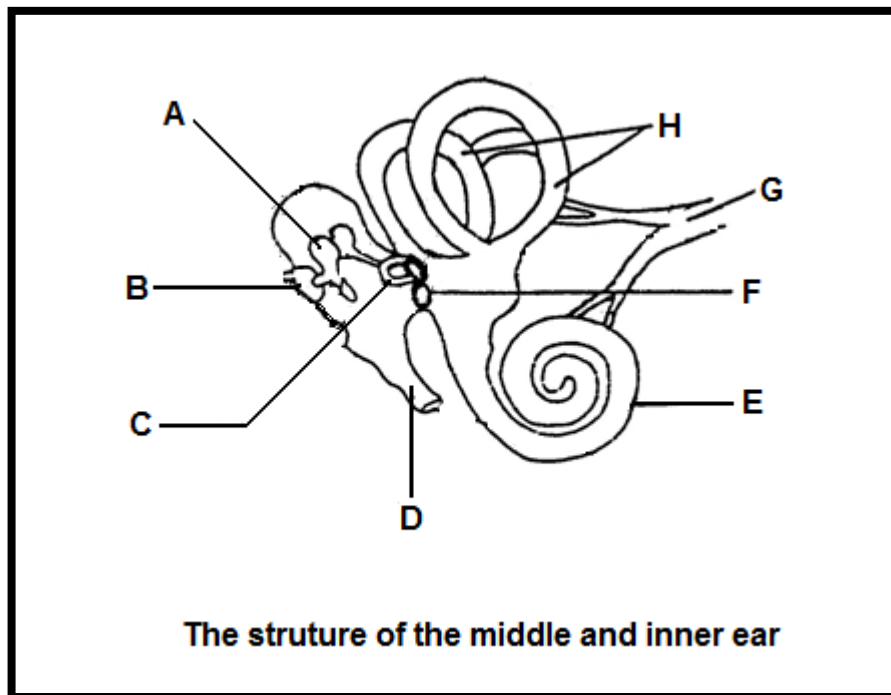
- 1.2.1 A rapid, automatic response to a stimulus.
- 1.2.2 Growth movement in plants that occurs in response to an external directional stimulus.
- 1.2.3 The functional unit of the nervous system.
- 1.2.4 The part of the brain which controls the co-ordination of muscular movements.
- 1.2.5 A group of nerve cell bodies of neurons forming a swelling outside the spinal cord.
- 1.2.6 A functional gap between two consecutive neurons.
- 1.2.7 The part of the eye which prevents reflection of light.
- 1.2.8 The disease caused by an underactive thyroid gland, characterized by sluggishness and weight gain. **(8)**

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 to 1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The hormone preparing the body for emergencies	A: Oestrogen B: Aldosterone
1.3.2 The structure in the retina that contains no cones or rods	A: Blind spot B: Yellow spot
1.3.3 The part of the nervous system that controls the involuntary activities of the body	A: Peripheral system B: Autonomic system
1.3.4 The islets of Langerhans are found here	A: Pancreas B: Thyroid gland
1.3.5 The eye defect that results from the lens being too convex, allowing the image to fall in front of the retina	A: Astigmatism B: Short-sightedness

(5 x 2) **(10)**

1.4 Study the diagram below and answer the questions that follow:



- 1.4.1 Supply labels for parts A, B, and C. (3)
- 1.4.2 State TWO ways in which the auditory canal is adapted for its function. (2)
- 1.4.3 Write down only the letter of the part:
- (a) Where the impulse for hearing is generated (1)
 - (b) Which prevent the deflection of sound (1)
 - (c) Which detect changes in the direction of the head (1)
- 1.4.4 The structure D in a skydiver's ear is blocked with mucous because of a severe cold. Explain why it is not advisable for him to jump in this condition. (3)
- (11)**

- 1.5 In an investigation, a comparison was done to determine the effect of meprobamate (a tablet to calm you down) and a placebo on the patellar (knee-jerk) reflex response. The investigation was done on people who abstain/withhold from using heroin since heroin makes the patellar/knee reflex slower than usual.

The reflex response was graded as follows:

Absent (0), Very sluggish (1), Sluggish (2), Normal (3), Rapid (4), Very rapid (5)

The table below shows the results obtained in this investigation

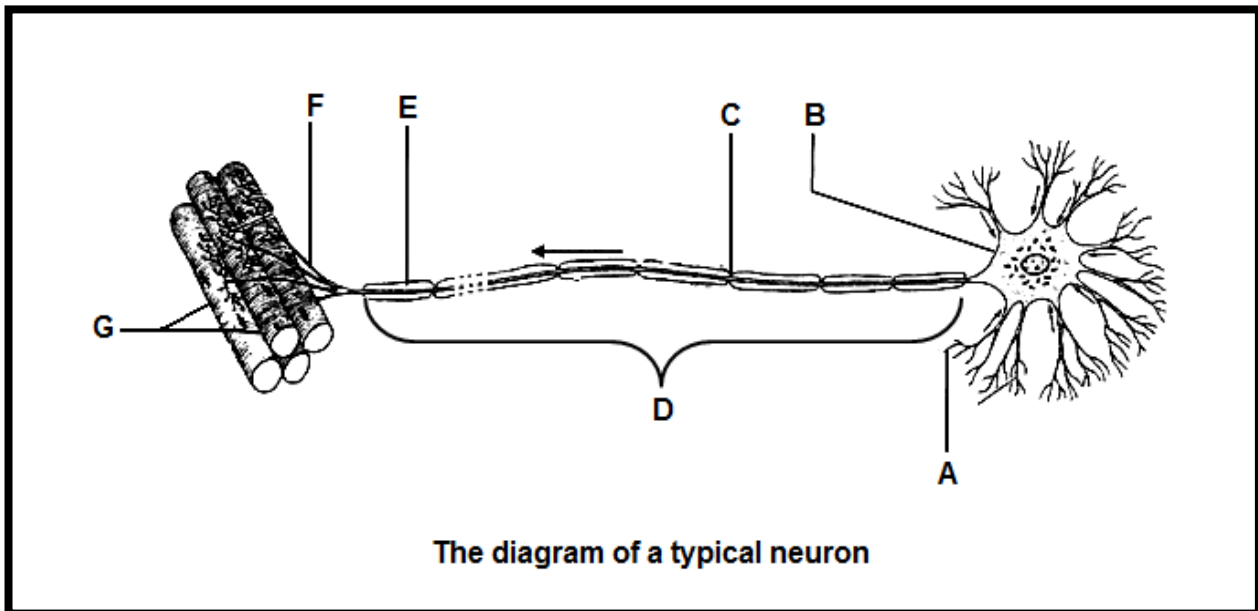
Comparison of the effect of meprobamate and placebo administration					
Days	1	2	3	4	5
Patellar response: meprobamate	0.5	1	0.7	1	1.3
Patellar response: placebo	3.7	3.4	3.3	3.2	3.2

- 1.5.1 Write down a possible hypothesis for this investigation. (3)
- 1.5.2 Identify the:
- (a) Independent variable (1)
- (b) Dependent variable (1)
- 1.5.3 What is a placebo? (2)
- 1.5.4 State TWO negative impacts that drug addiction has on families. (2)
- (9)**

TOTAL QUESTION 1: 50
TOTAL SECTION A: 50

SECTION B**QUESTION 2**

2.1 Study the following diagram of a typical neuron and answer the questions that follow:

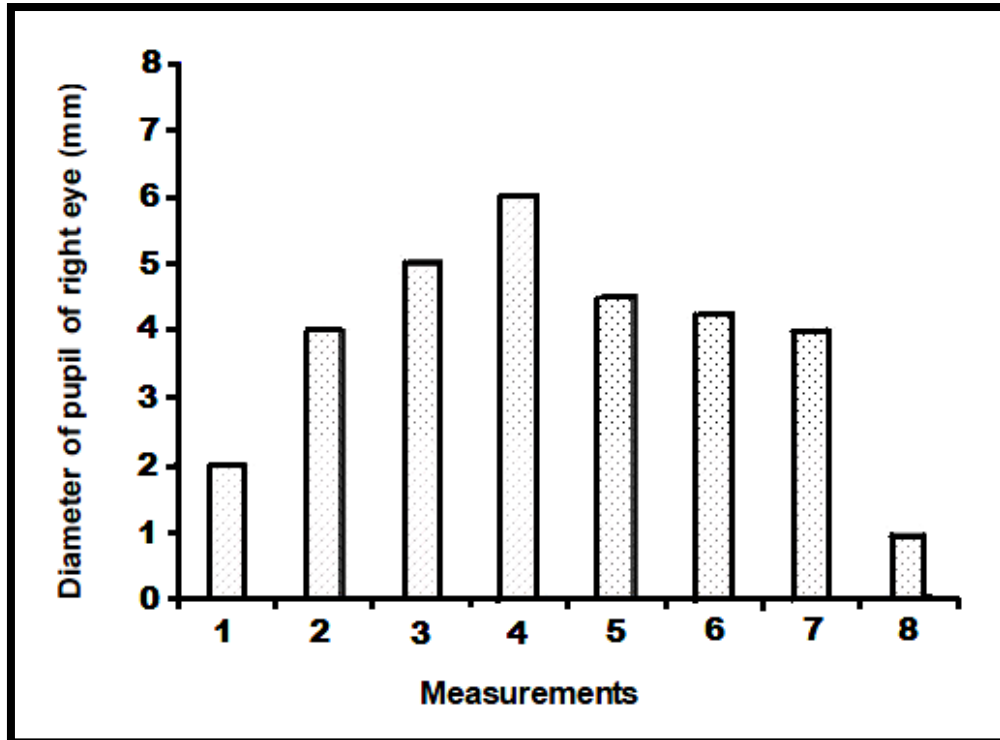


- 2.1.1 What type of neuron is illustrated above? (1)
- 2.1.2 Identify letters A, C, D and F. (4)
- 2.1.3 State TWO differences between parts A and D. (4)
- (9)**

2.2 The following question is based on a reflex arc.

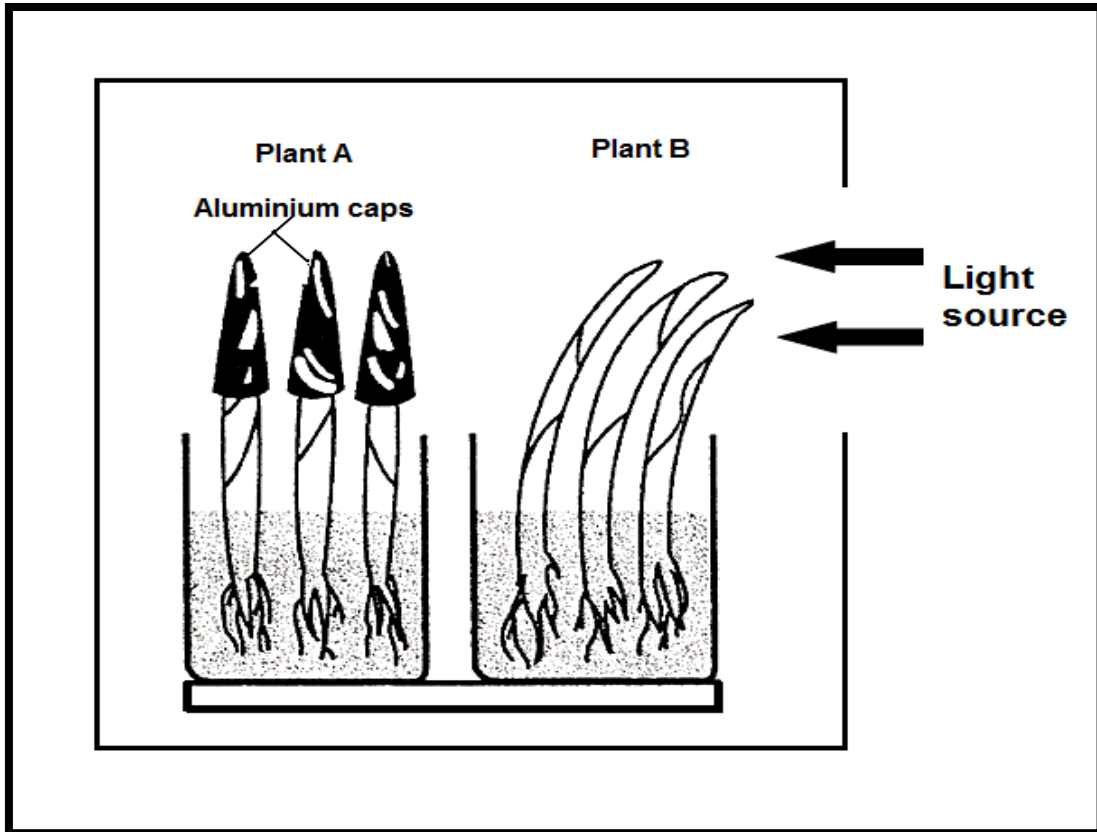
- 2.2.1 A person pricks his finger with a drawing pin.
Describe the pathway an impulse will follow from the receptor until the person pulls his finger away from the drawing pin. (6)

- 2.3 In an investigation, a person was placed in a darkened room and had his left eye covered. A bright torch was switched on for 20 seconds, after which the diameter of the person's right pupil was measured. This procedure was repeated several times at one minute intervals between each measurement and with the distance between the torch and the eye being changed. The results are presented in the bar chart below:



- 2.3.1 Between which two measurements did the following changes in the diameter of the pupil occur:
- Biggest increase? (1)
 - Smallest increase? (1)
- 2.3.2 At which measurement was the torch ...
- furthest away from the eye? (1)
 - nearest to the eye? (1)
- 2.3.3 Suggest a reason why the height of the graph for measurements 2 and 7 is the same? (2)
- 2.3.4 Describe the general relationship that exists between the diameter of the pupil and the distance of the torch from the eye. (3)
- (9)**

2.4 A group of group 12 learners carried out an experiment on phototropism. Growing oat seedlings/plants were placed in a box that allowed light from one side to reach them, as shown in the diagram below. The tips of plant A were covered with aluminium caps and plant B's tips were not covered. Both seedlings/plants were exposed to the sun for few days in the laboratory.



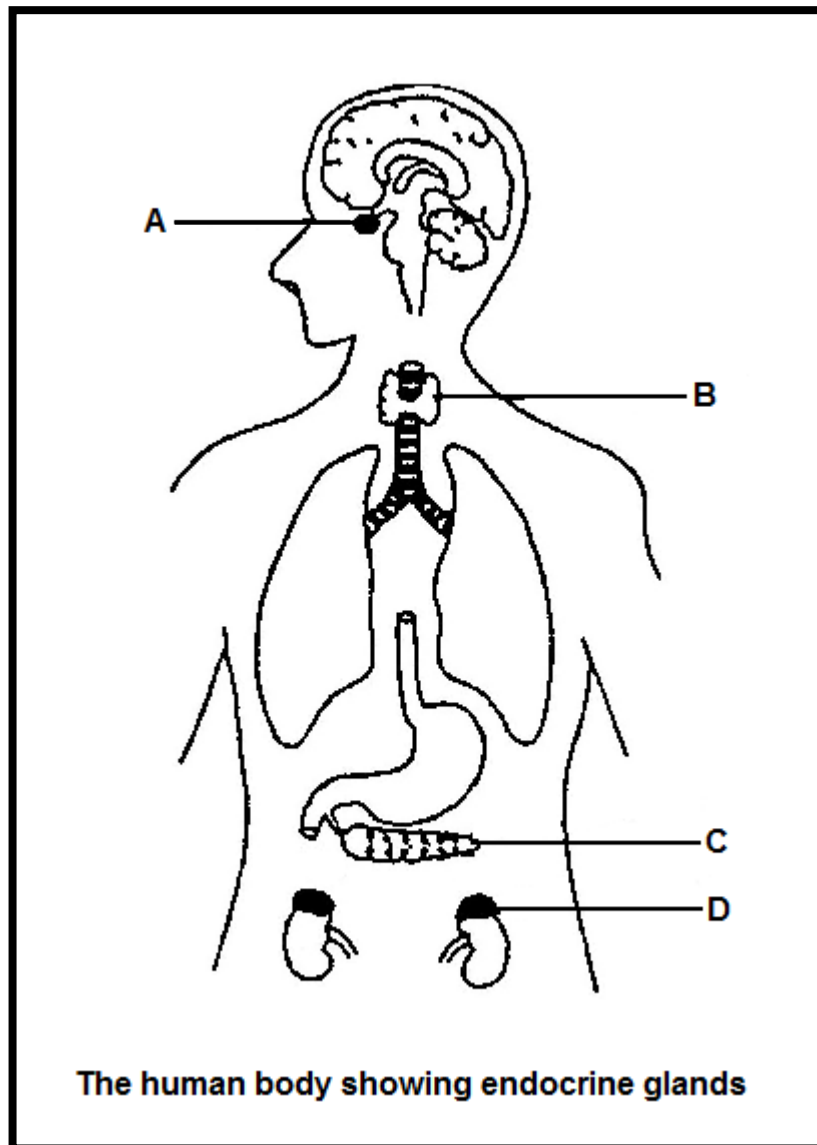
- 2.4.1 Explain what happened to plant B after few days? (2)
- 2.4.2 Describe the effect of auxin on plant B in the diagram above. (2)
- 2.4.3 What conclusion can you draw from the results of the experiment? (2)

(6)

TOTAL QUESTION 2: 30

QUESTION 3

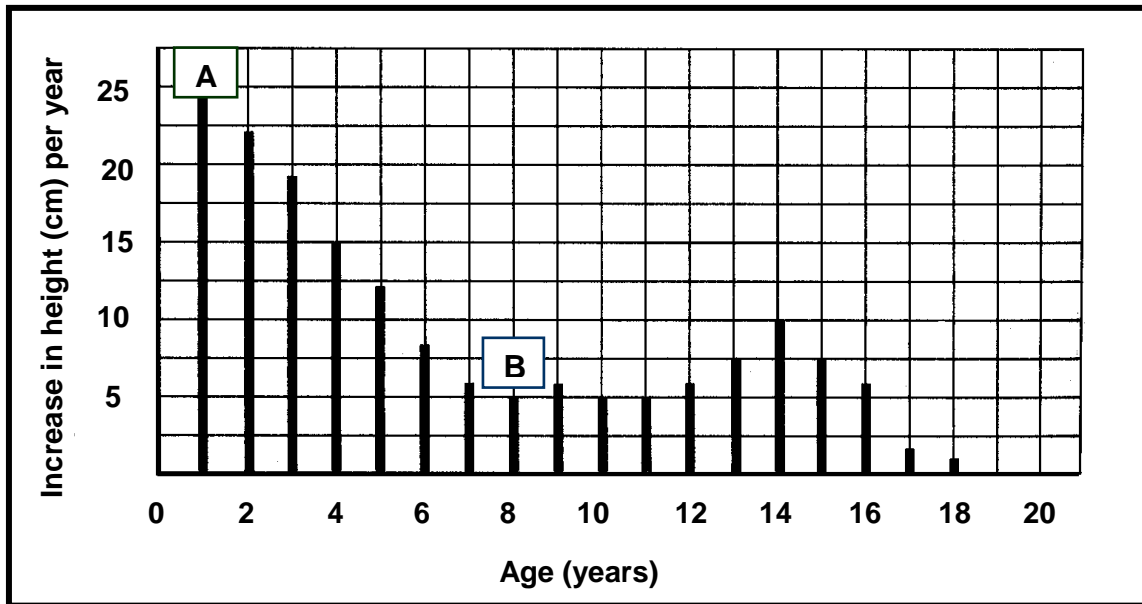
3.1 Study the diagram below and answer the questions that follow:



- 3.1.1 Provide labels for the glands numbered A, B, C and D. (4)
- 3.1.2 List THREE characteristics of hormones. (3)
- 3.1.3 Describe the negative feedback mechanism that operates between gland A and gland B. (4)
- 3.1.4 Why is gland A regarded as an endocrine gland? (1)
- 3.1.5 Explain why the hormones of gland C are said to be involved in a negative feedback mechanism. (2)

(14)

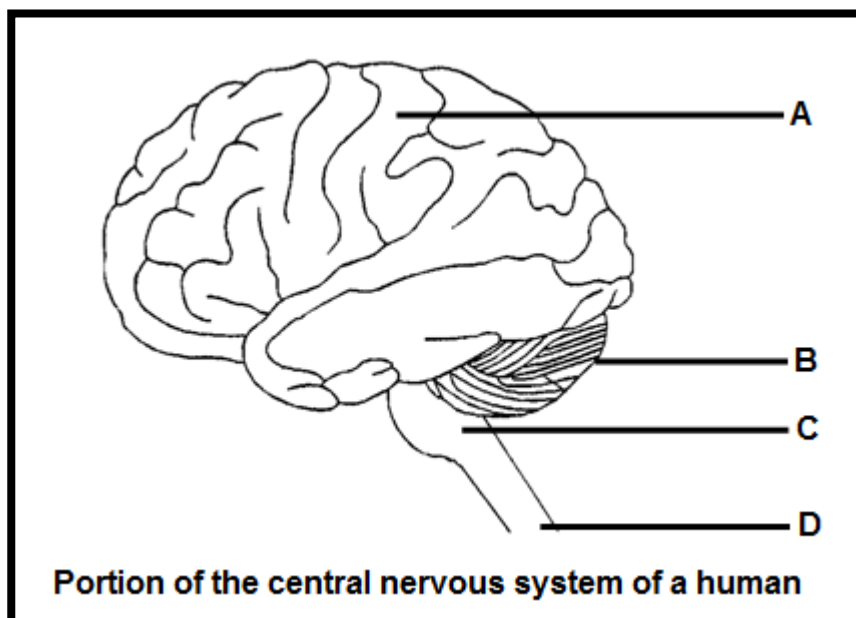
3.2 The bar graph below illustrates the average increase in height per year in humans. Study the graph and answer the questions that follow.



3.2.1 What happened to the growth rate between A and B? (1)

3.2.2 The average height of children is 154 cm at the end of 13 years. Use the information given on the graph and calculate the average height of children at the end of 14 years. Show all calculations. (4)
(5)

3.3 Study the diagram and answer the following questions.

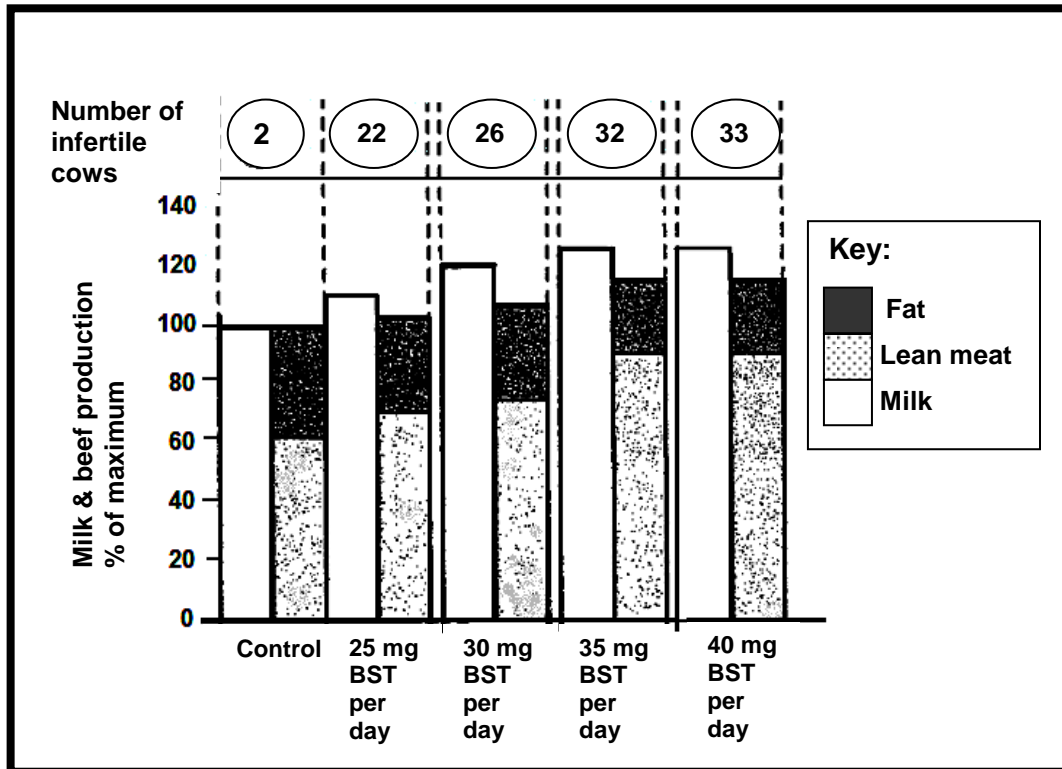


3.3.1 Identify the parts labelled A, B, C and D. (4)

3.3.2 State TWO functions of D. (2)
(6)

3.4 Bovine somatotrophin (BST) is a natural growth hormone. This hormone can also be produced by genetic engineering and is valuable because it can affect meat and milk production in cattle. The hormone can be injected into the bloodstream of cattle or supplied in a gelatin coat (tablet) so that it can be given in cattle food.

The bar chart below shows the results of some experiments carried out at a cattle research institute.



3.4.1 Suggest a possible advantage to a farmer of treating cattle with Bovine somatotrophin (BST). (1)

3.4.2 Explain why enclosing the BST in a gelatin coat is necessary if the hormone is to be given in the cattle food. (2)

3.4.3 State TWO possible reasons why some people might reject the use of BST in milk and beef. (2)

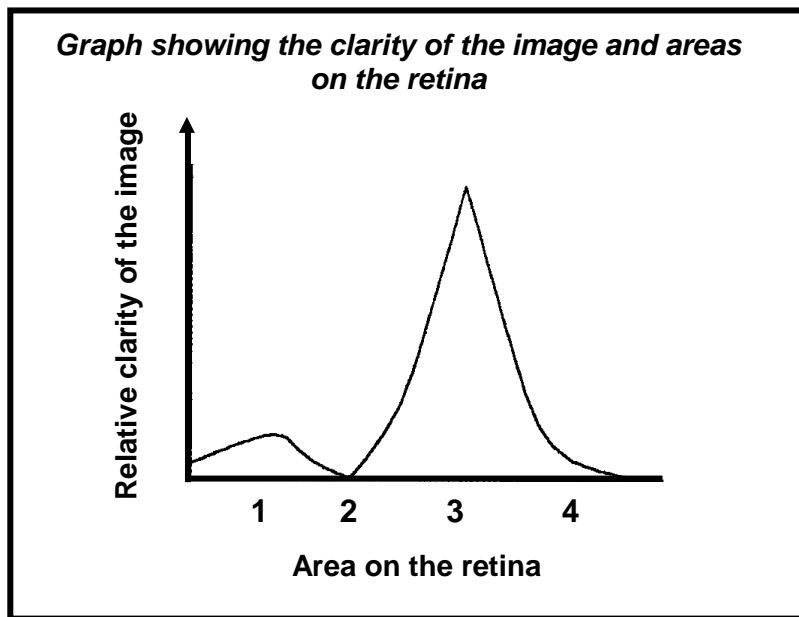
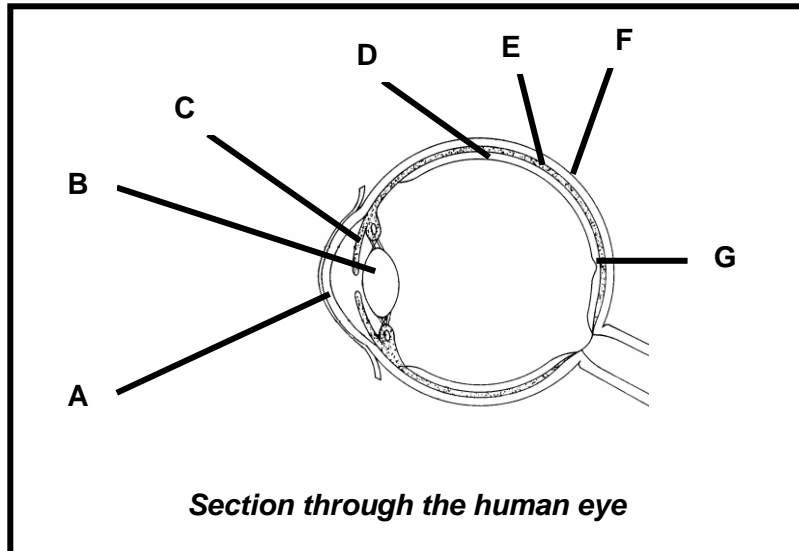
(5)

TOTAL QUESTION 3: 30
TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1 Study the following diagram and graph and answer the questions that follow.



- 4.1.1 Which number on the graph represents G on the diagram? Explain your answer. (3)
 - 4.1.2 Which area of part D on the diagram is shown at number 2 on the graph? Explain your answer. (3)
 - 4.1.3 How will the clarity of the image at number 3 on the graph be influenced if the object is moved further away from the eye, assuming that the eye is functioning normally? Explain your answer. (3)
- (9)**

- 4.2 Alzheimer's disease is an irreversible brain disease that slowly destroys brain cells, causing loss in memory and thinking skills. The table below, presented by the World Health Organization, shows the percentage of people in the general western population affected by Alzheimer's disease in different age groups.

Study the table and answer the questions that follow.

Age group (years)	Number of patients with Alzheimer's disease (%)
65-69	3
70-74	5
75-79	10
80-84	15
85+	25

- 4.2.1 Plot a line graph to show the number of people with Alzheimer's disease using the information given in the table above. (9)
- 4.2.2 Describe the relationship between the Alzheimer's disease and age. (2)
- (11)**
- 4.3 Describe the path of sound waves from when they enter the outer ear until they are interpreted in the brain. Also explain TWO causes and TWO treatments of deafness.
- Content (17)
Synthesis (3)
(20)

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

TOTAL SECTION C: [40]

GRAND TOTAL: 150