



education

Department of
Education
FREE STATE PROVINCE

GRADE 12

LIFE SCIENCES P1

JUNE 2022

MARKS: 150

TIME: 2½ HOURS

This question paper consists of 17 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. ALL drawings should be done in pencil and labelled 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 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 to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

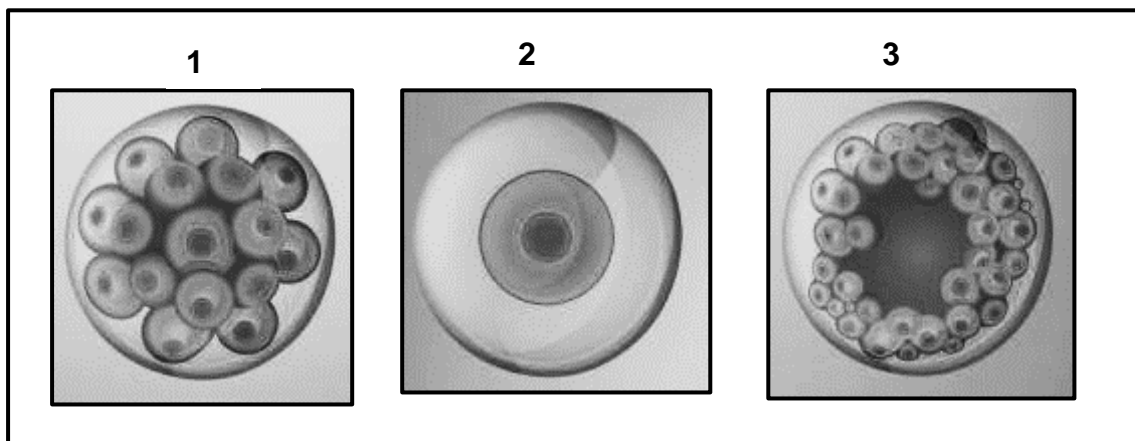
1.1.1 The part of the brain that receives nerve impulses from the semi-circular canals is the

- A cerebrum.
- B cerebellum.
- C hypothalamus.
- D medulla oblongata.

1.1.2 The optic nerve transmits impulses to the ...

- A medulla oblongata.
- B cerebrum.
- C cerebellum.
- D corpus callosum.

QUESTION 1.1.3 IS BASED ON THE DIAGRAMS OF THE DEVELOPMENT OF THE ZYGOTE UP UNTILL IMPLANTATION.



1.1.3 Give the correct sequence of the diagrams above.

- A 1, 2, 3
- B 2, 3, 1
- C 3, 2, 1
- D 2, 1, 3

1.1.4 Study the following factors related to reproduction in females

- (i) When progesterone levels peak, FSH and LH levels are low.
- (ii) Ovulation occurs at around day 14.
- (iii) When fertilization occurs, FSH levels remain high.
- (iv) Oestrogen and progesterone produced by the ovaries during the ovarian cycle influence the uterine cycle.

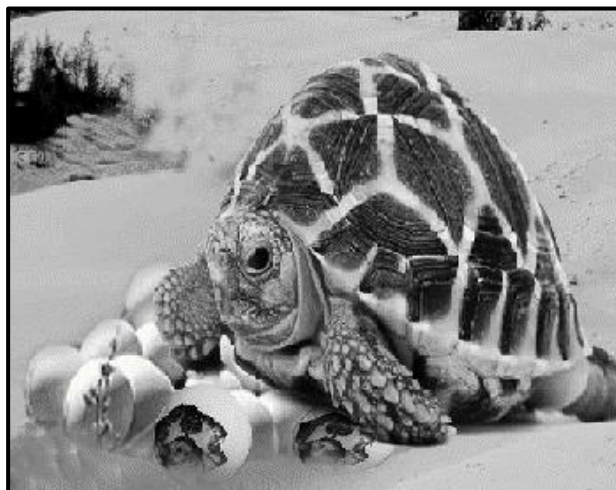
Which of the statements are correct?

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

1.1.5 The part of the male reproductive system that creates an environment for optimum sperm production.

- A Testis
- B Epididymis
- C Scrotum
- D Leydig cells

1.1.6 The diagram below represents a tortoise laying fertilised eggs.



Which of the following reproductive strategies are represented in the diagram?

- A External fertilisation and ovipary
- B Internal fertilisation and ovipary
- C External fertilisation and ovovivipary
- D Internal fertilisation and ovovivipary

- 1.1.7 Which ONE of the following represents the correct transmission of a nerve impulse?
- A Dendrites → cell body → axon
 - B Axon → cell body → dendrites
 - C Dendrites → axon → cell body
 - D Axon → dendrites → cell body
- 1.1.8 Which of the following would be affected by a disease that damage the autonomic nervous system?
- A The ability to move the arms and legs.
 - B The heart rate and breathing.
 - C Hearing and sight.
 - D Higher thought processes.
- 1.1.9 The part of the ear where sound waves are converted into nerve impulses is the ...
- A ossicles.
 - B organ of Corti.
 - C semi-circular canals.
 - D middle ear.
- 1.1.10 If the Eustachian tube is blocked, which ONE of the following is most likely to occur?
- A Membranes in the cochlea would be damaged
 - B Hearing would be impaired
 - C Balance of the body would be upset
 - D Excess sound waves would not be absorbed.

(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 28-day reproductive cycle that human females undergo.

1.2.2 Coiled tubular structure that stores sperm.

1.2.3 The lining of the uterus which is richly supplied with blood vessels

1.2.4 The membrane separating the outer ear from the middle ear

1.2.5 The hormone that causes a decrease in blood sugar level.

1.2.6 The part of the nervous system made up of cranial and spinal nerves

1.2.7 The part of the neuron that protects the axon

1.2.8 A microscopic gap between the end of one neuron and the dendrite of another.

1.2.9 When the eyes form different images of an object, and the brain forms a three-dimensional image.

1.2.10 The collective name for the small bones in the ear that amplifies sound vibrations

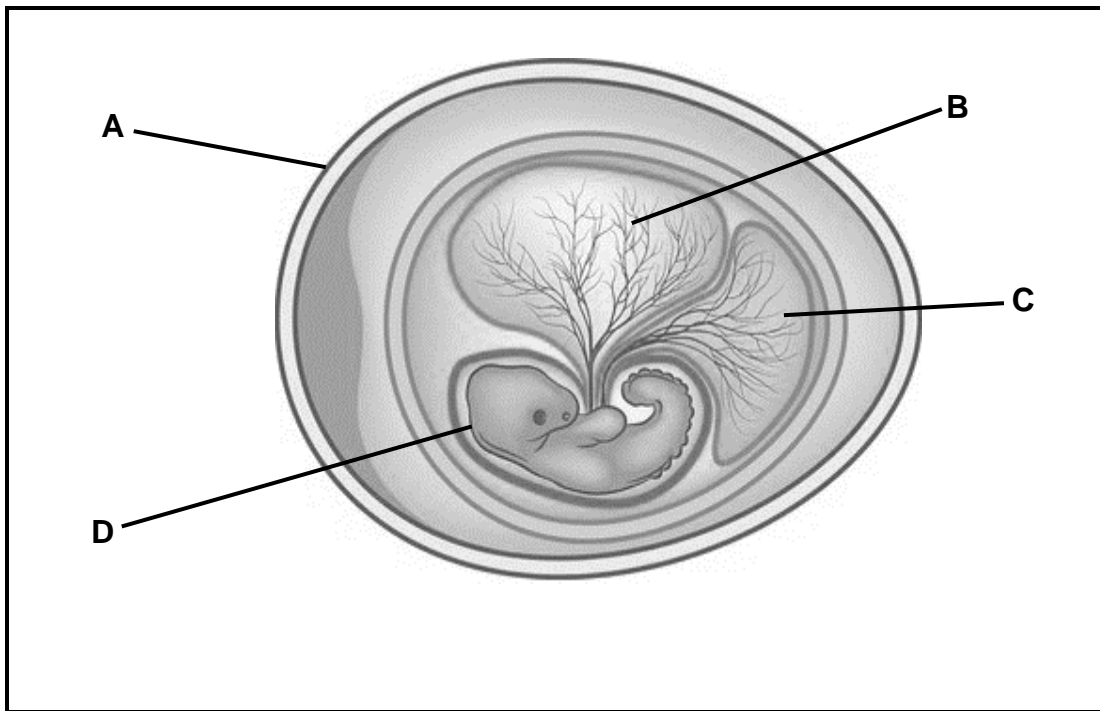
(10)

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 to 1.3.4) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Secreted by the Graafian follicle	A: Progesterone B: Oestrogen
1.3.2	The gland that secretes a milky alkaline fluid in the male reproductive system	A: Seminal vesicle B: Cowper's gland
1.3.3	Extra-embryonic membranes	A: Chorion B: Allantois
1.3.4	Disease(s) of the central nervous system	A: Multiple sclerosis B: Alzheimer's disease

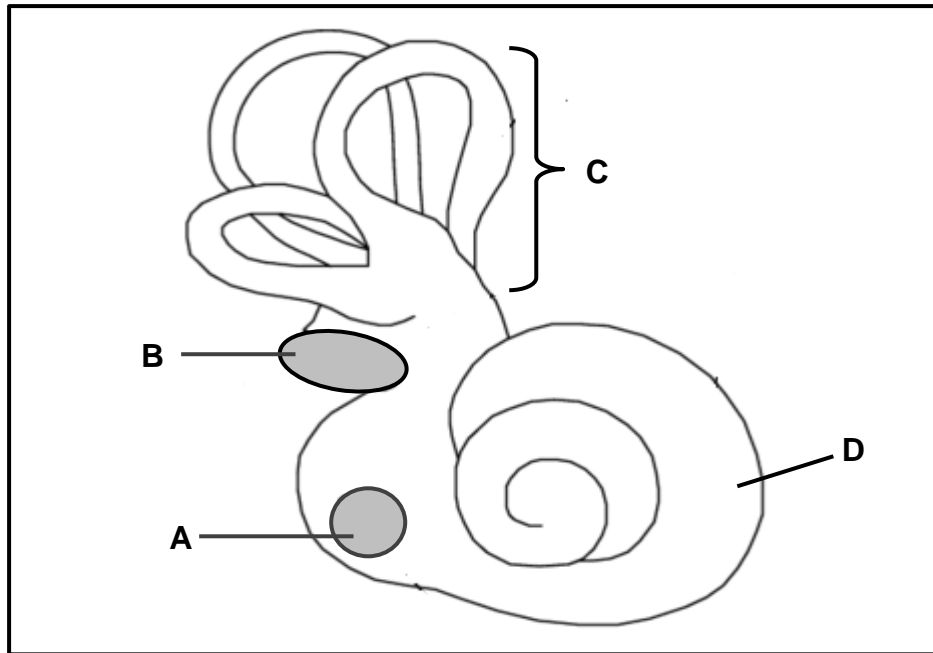
(4 x 2) (8)

1.4 Study the diagram below.



- 1.4.1 Give a suitable heading for the diagram. (1)
- 1.4.2 Give the LETTER and the NAME of the part that:
- (a) Provides nutrition to the embryo (2)
 - (b) Prevents dehydration and gives protection (2)
- (5)

1.5 The diagram below represents a part of the human ear.



1.5.1 Give the:

- (a) Label for **B** (1)
- (b) Function of structure **A** (1)
- (c) Receptors in **C** (2)
- (d) LETTER of the cochlea (1)
- (e) Name of the fluid in **C** (1)

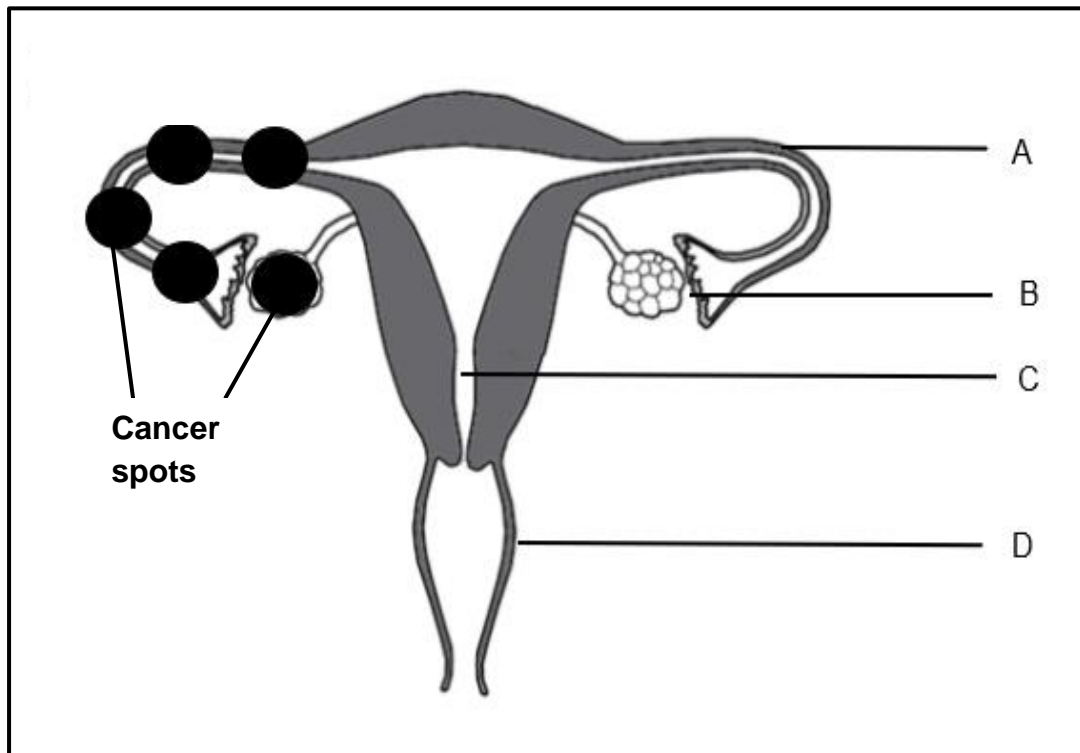
1.5.2 Which part of the ear is represented in this diagram? (1)
(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below represents the female reproductive system.



2.1.1 Give the LETTER of the part where:

- (a) Fertilisation takes place (1)
- (b) Sperms are introduced (1)
- (c) The embryo is implanted (1)

2.1.2 Explain ONE adaptation of part **A** for its function. (2)

2.1.3 Cancer was detected in this female reproductive system as indicated.

- (a) Will it be possible for this female to get pregnant? (1)
- (b) Explain your answer in QUESTION 2.1.3 (a) (3)

2.1.4 Describe the process of oogenesis. (5)

(14)

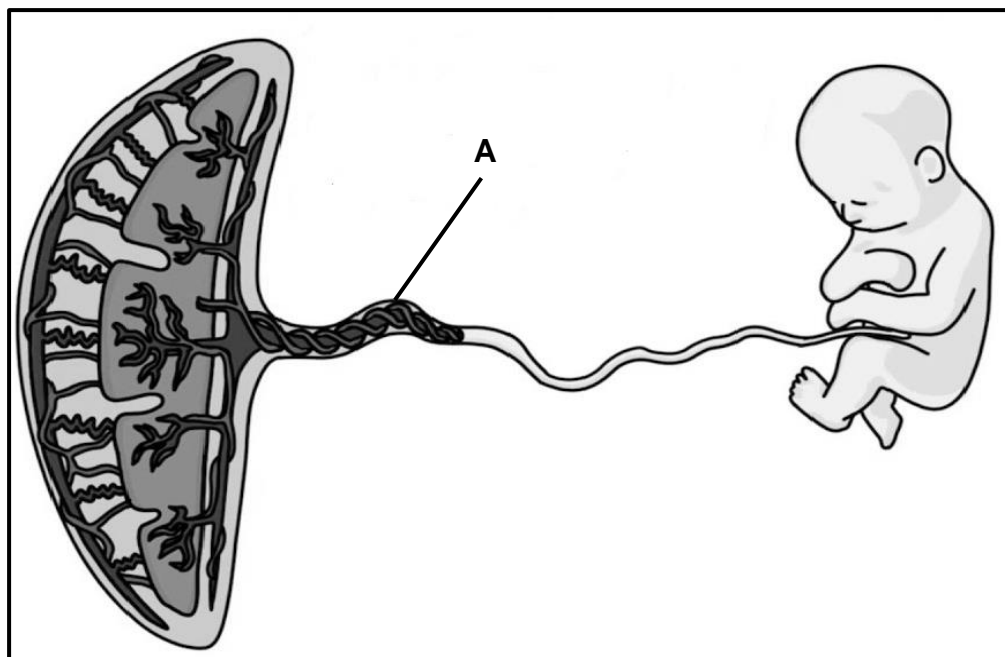
- 2.2 The table below shows the concentration of some sex hormones in the blood of a cow over a period of time. Cows and humans are very similar regarding the role of reproductive hormones.

Study the information below.

Hormone concentration in the blood (arbitrary units)			
Time (days)	Progesterone	Oestrogen	LH
0	1	14	1
2	2	8	1
4	4	7	1
6	10	7	1
8	14	7	1
10	18	7	1
12	19	7	1
14	19	7	1
16	18	7	1
18	8	18	1
20	1	14	32
22	1	8	32
24	2	8	1

- 2.2.1 Determine the length of the cow's progesterone cycle and explain your answer. (2)
- 2.2.2 Explain how the high concentration of LH on day 20 will cause an increase in progesterone levels in the days to follow. (3)
- 2.2.3 Progesterone is responsible for the growth of the lining of the uterus and the development of its blood supply.
Explain how the figures for this hormone would differ from those in the table if the cow had become pregnant. (2)
- 2.2.4 The concentration of progesterone in milk can be measured and gives a very early indication if the cow is pregnant or not.
- (a) How does the progesterone end up in the milk? (1)
- (b) If the cow is not pregnant, why does the progesterone levels in its blood drop after a few days? (2)
- (10)**

2.3 The diagram below represents a human foetus and placenta.



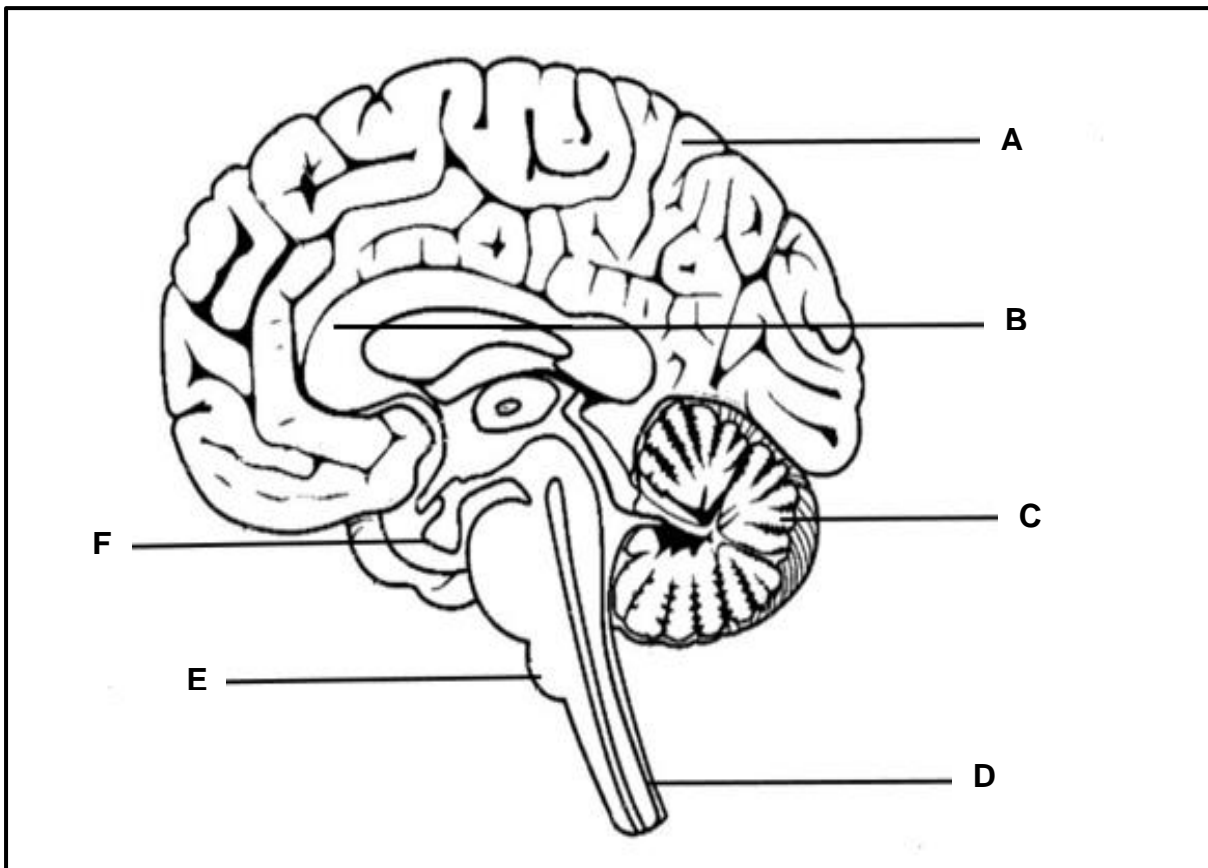
- 2.3.1 Identify part **A**. (1)
- 2.3.2 Tabulate TWO differences between the substances transported in the veins and arteries in structure **A**. (5)
- 2.3.3 State TWO functions of the placenta. (2)
- (8)**

- 2.4 Mammals such as giraffe show a high degree of parental care. The young develop in the uterus where they are protected and provided with nutrients and oxygen. Newly born giraffes are fed with milk, taught to walk and are protected against predators until they can function independently.



- 2.4.1 Explain what is meant by *parental care*. (2)
- 2.4.2 Name the type of development strategy shown by giraffes. (1)
- 2.4.3 Give THREE reasons for your answer in QUESTION 2.4.2 (3)
- (6)**

2.5 The diagram below shows a section through the human brain.



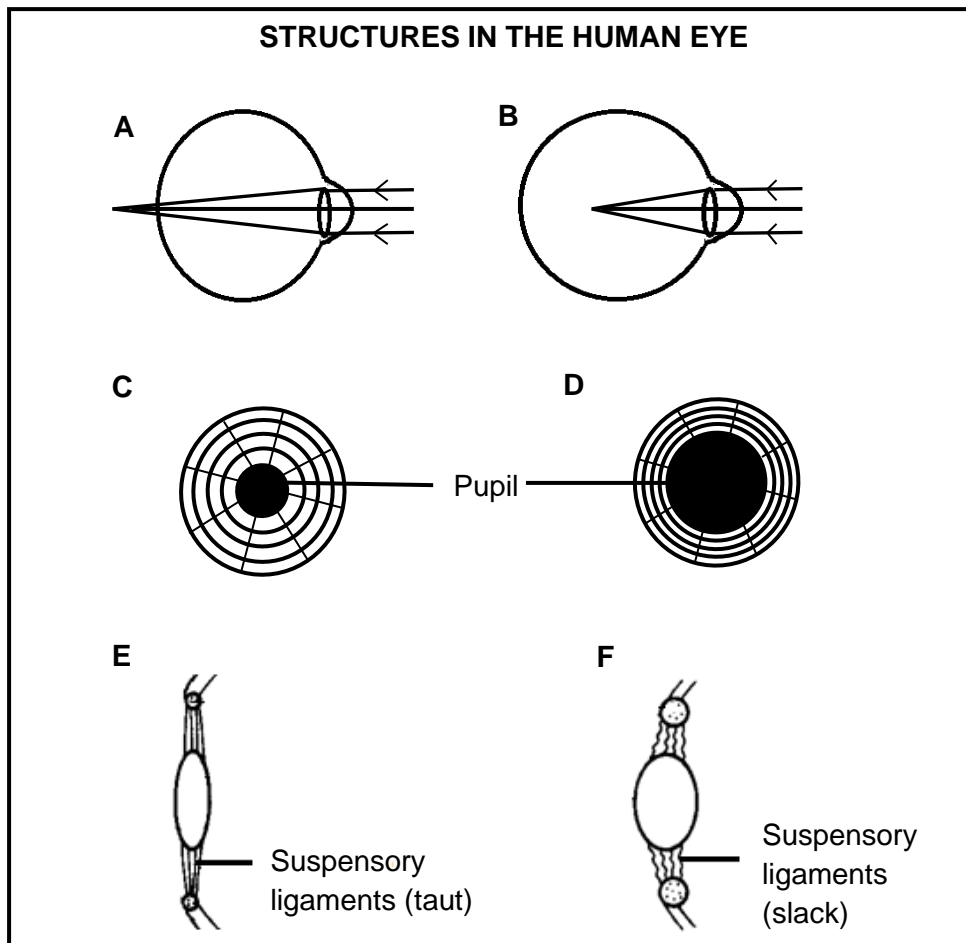
- 2.5.1 Give the collective name of the membranes that protect the brain and the spinal cord. (1)
- 2.5.2 Identify part:
- (a) B (1)
 - (b) D (1)
 - (c) F (1)
- 2.5.3 Give TWO functions of part A. (2)
- 2.5.4 Explain why damage to part E can lead to immediate death. (2)
- 2.5.5 Make a labelled drawing of a neuron that carries the impulses from part A to the muscles. (4)

(12)

TOTAL QUESTION 2: 50

QUESTION 3

3.1 The diagram below shows structures in the human eye.



3.1.1 Identify the visual defect that is represented by diagram:

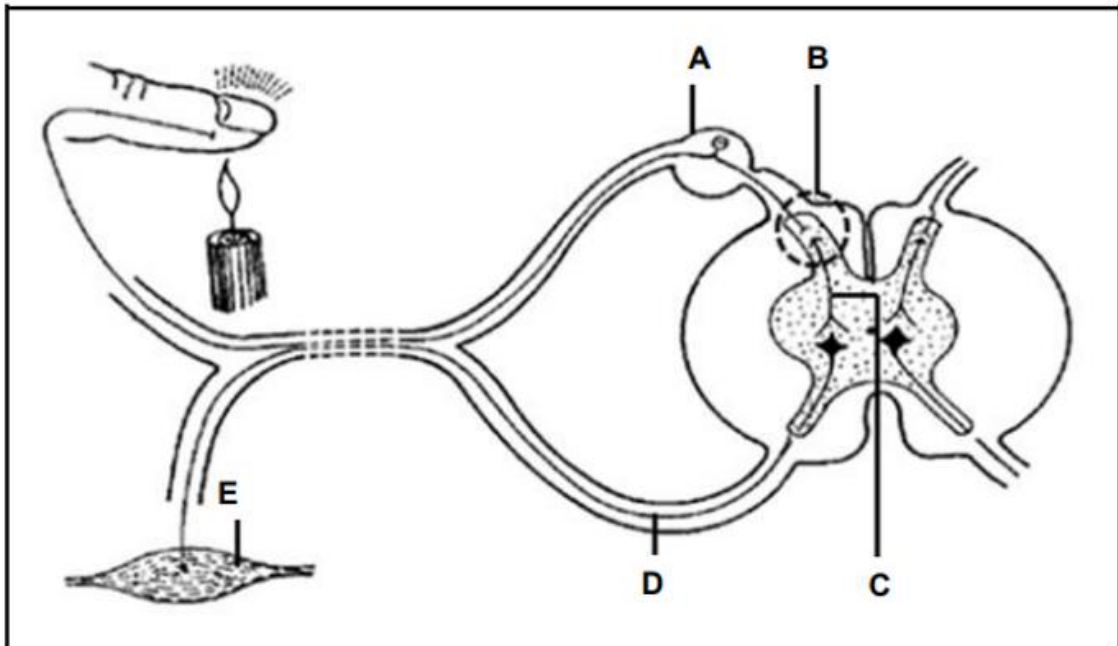
- (a) **A** (1)
- (b) **B** (1)

3.1.2 Give the LETTER only of the diagram that represents the eye:

- (a) In bright light (1)
- (b) When looking at an object less than six metres away (1)
- (c) That can be corrected with a concave lens (1)

3.1.3 Explain the process that is responsible for the eye mentioned in QUESTION 3.1.2 (b) (6)
(11)

3.2 Study the diagram below of a section through the human spinal cord and the neurons involved in a reflex arc.



3.2.1 Identify part:

- (a) **C** (1)
- (b) **E** (1)

3.2.2 State ONE function of:

- (a) **B** (1)
- (b) **C** (1)

3.2.3 Explain why the brain is not involved in the reflex action that will follow the reflex arc above. (3)

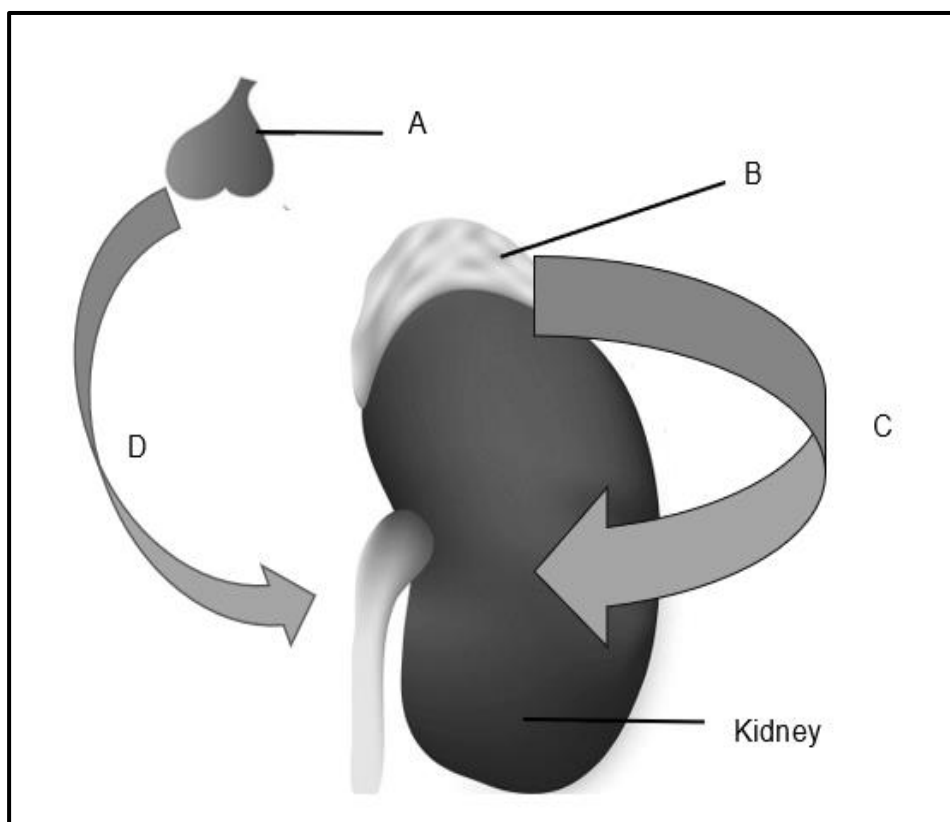
3.2.4 Explain what the effect will be on the reflex arc and reflexes, of a person suffering from multiple sclerosis. (2)
(9)

3.3 The thyroid gland is an endocrine gland situated across the trachea below the larynx. Thyroxin is secreted by the thyroid gland and controls the metabolic rate. The pituitary gland controls the production of thyroxin by means of negative feedback mechanisms.

3.3.1 Give the definition of an *endocrine gland*. (1)

3.3.2 Explain how negative feedback controls the production of thyroxin when its levels are low in the human body. (5)
(6)

3.4 The diagram below illustrates a part of the endocrine system which consists of hormones, secreted by glands, and their target organs.



3.4.1 Identify each of the following:

- (a) Gland **A** (1)
- (b) Hormone **C** (1)
- (c) Hormone **D** (1)
- (d) The substance in the body that is regulated by hormone **C**. (1)

3.4.2 Name THREE characteristics of hormone **D**. (3)

3.4.3 Explain THREE sympathetic reactions of adrenalin on the human body during an emergency. (6)
(13)

3.5 An investigation was done to compare the reflex actions in new-born babies with premature babies (early borned and not carried for the full term). A new born baby's chances of survival is evaluated by a doctor and scored on an Apgar scale. The heart rate, breathing, muscle tone, colour and reflexes are used as criteria for this test.

The following reflexes are tested: the palm grasp, sucking and swallowing, moving the head in the direction of a touch on the cheek and the "walk" reflex (walking movements made by the legs of the baby)

Data from 1500 babies were collected over two years and the results are shown in the table below.

Gestation period (weeks)	Number of babies	Average palm grasp reflex time (seconds)	Average Apgar score (out of 10)
24 - 27	334	4,7	4,0
28 - 31	271	3,8	5,0
32 - 35	304	3,4	5,5
36 - 37	331	2,3	7,5
38 - 40	337	1,9	9,0

- 3.5.1 Identify the independent variable for this investigation. (1)
 - 3.5.2 Explain the significance of a reflection action. (2)
 - 3.5.3 From the data and information above, draw a conclusion about the average palm grasp reflex time. (2)
 - 3.5.4 Draw a histogram to represent the average Apgar score of babies with gestation periods between 28 and 37 weeks. (6)
- (11)**

TOTAL QUESTION 3: 50
TOTAL SECTION B 100
GRAND TOTAL: 150