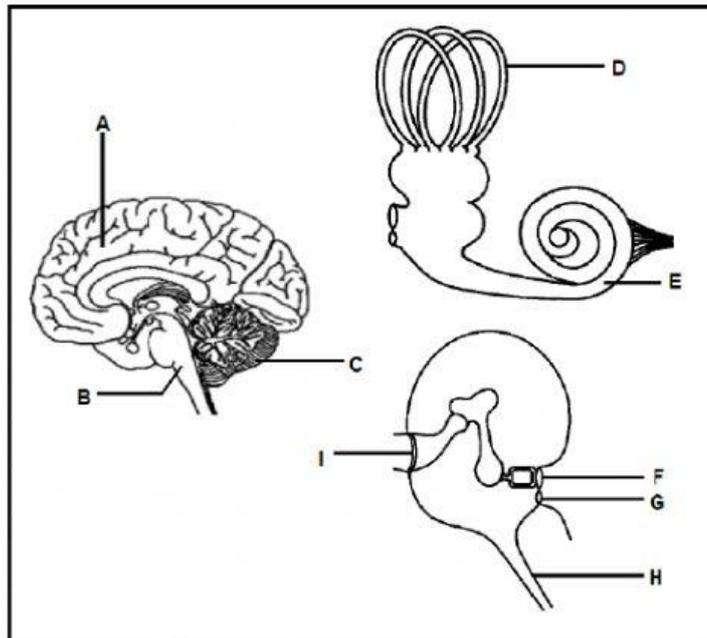


GRADE 12 EXAMINATION

SECTION B

QUESTION 2

2.1 The diagrams below show different parts of the brain and the ear.



2.1.2 Give the LETTER and NAME of the part of the ear that absorbs excess pressure waves from the inner ear. (2)

2.1.3 Name the receptors found at part E. (1)

2.1.4 Explain why damage to part B can lead to instant death. (2)

2.1.5 Describe how part C responds to impulses received from part D. (3)

2.1.6 In older people, part **F** of the ear may harden.

Explain how this condition may lead to hearing loss.

(4)
(15)

2.2 Describe the accommodation of the eye for distant vision.

(5)

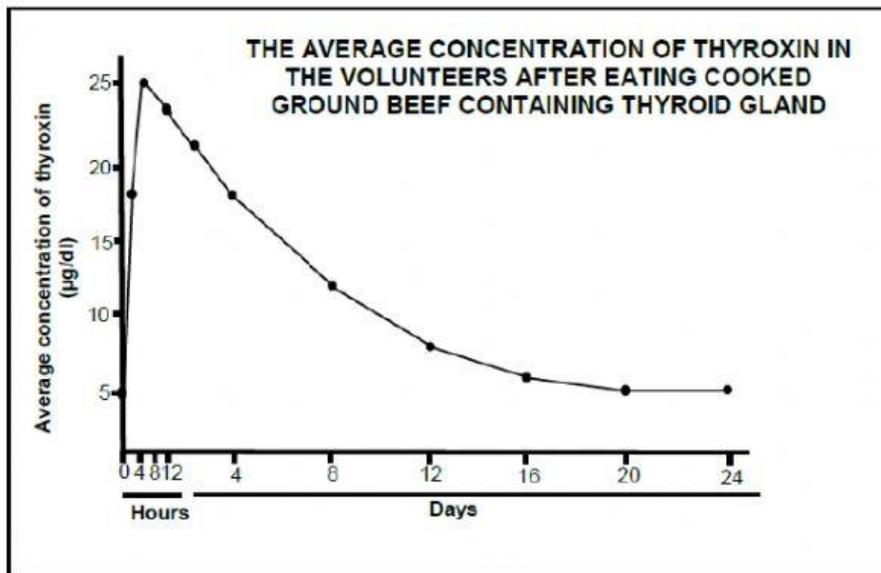
2.3 Read the extract below.

AN OUTBREAK OF THYROTOXICOSIS

Thyrotoxicosis is a medical condition caused by high levels of thyroxin in the blood. There was a sudden increase in the number of reported cases of this condition in one city. They suspected that this was due to people eating ground beef (minced meat) from a local butcher. The butcher added the thyroid glands of cattle when he produced the ground beef. Some people who ate this ground beef showed symptoms of increased heart rate, excessive sweating and weight loss.

Doctors conducted an investigation to determine if the ground beef caused the thyrotoxicosis. The normal thyroxin levels of 5 volunteers were measured. They were then given cooked ground beef from the butchery to eat. Their thyroxin concentration was measured every 4 hours on day 1 and then once a day for the next 23 days. The average thyroxin levels was calculated and recorded.

The results are shown in the graph below.



2.3.1 Give the average normal thyroxin concentration ($\mu\text{g/dl}$) in the blood of the volunteers. (1)

2.3.2 Calculate the percentage increase of the average thyroxin concentration in the first 8 hours after eating the ground beef. Show ALL working. (3)

2.3.3 Explain why thyrotoxicosis causes weight loss. (3)

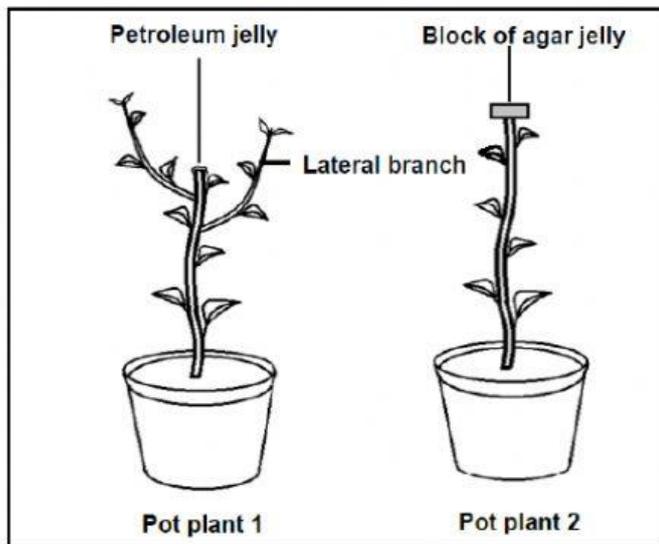
- 2.3.4 Explain the expected concentration of TSH in the blood 8 hours after eating the ground beef. (4)
(11)

2.4 An investigation was done to determine the effect of a plant hormone on plant growth:

The procedure was as follows:

- Two pot plants (1 and 2) of the same species and age were used.
- The apical buds of both plants were cut at the same length along the stem.
- The cut surface of plant 1 was sealed with **petroleum jelly**.
- The cut apical bud of pot plant 2 was placed on a **block of agar jelly** for 2 hours.
- The block of agar jelly was then placed on the cut surface of plant 2.
- The plants were exposed to the same environmental conditions for 2 weeks.
- The growth of both plants was observed at the end of this period.

The diagrams below show the **results** obtained.



- 2.4.1 State why the apical bud was placed on a block of agar jelly for 2 hours. (2)

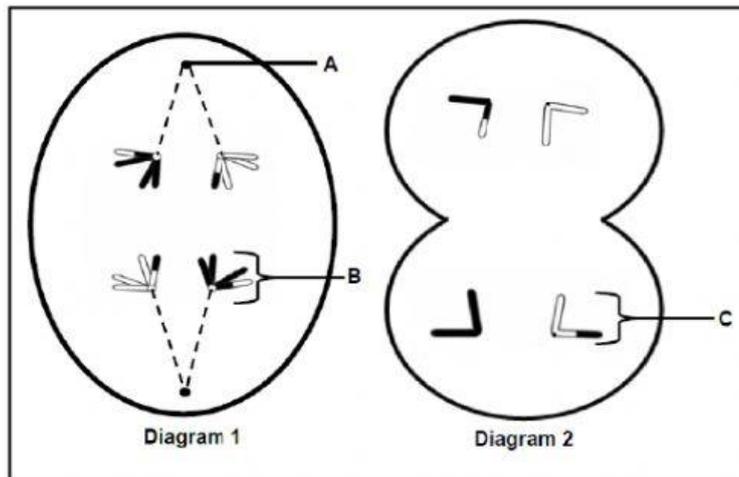
- 2.4.2 Describe the results obtained for plant 1. (2)

2.4.3 Explain how fruit farmers can use the knowledge from the results in QUESTION 2.4.2 to their benefit. (2)

2.4.4 Explain why the stem in pot plant 2 grew upwards. (3)
(9)

QUESTION 3

3.1 The diagrams below represent two phases of meiosis.



3.1.1 Identify part A. (1)

3.1.2 Identify the phase represented by diagram 1. (1)

3.1.3 Describe the events that took place in the phase before the one represented in diagram 2. (2)

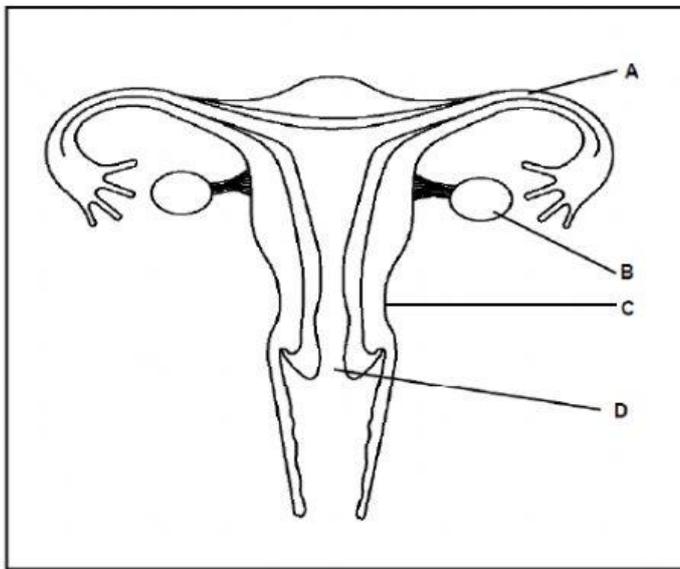
3.1.4 Name the process that causes the chromosomes to have a combination of genes as shown in the diagrams. (1)

3.1.5 Give ONE reason why the process named in QUESTION 3.1.4 is important. (1)

3.1.6 If this was a human cell, how many chromosomes would be present in the cell during the phase represented in diagram 1? (1)

3.1.7 Structure **B** and structure **C** are both chromosomes.
Explain why they are structurally different. (3)
(10)

3.2 The structure below represents a part of the female reproductive system.



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

3.2.2 State ONE function of part **A**. (1)

3.2.3 Describe the process of oogenesis as it occurs in part **B**. (4)

3.2.4 State ONE way in which structure **C** is suited for its function during pregnancy (1)

3.2.5 A person undergoes a surgical operation to remove part **B** on both sides.
Explain why this person will not menstruate. (3)
(10)

- 3.3 Male hormone contraceptive (birth control) pills have been in development for over 50 years. The pills contain a substance called TU, which inhibits the secretion of testosterone. There is, however, no product available on the market yet, mainly due to many side effects associated with the product.

An investigation was done to determine how TU affects male fertility.

The procedure was as follows:

- 308 healthy, male volunteers were selected.
- A sperm count for each volunteer was done initially.
- Each volunteer was given 500 mg of TU monthly over a period of 12 months.
- During the period of the investigation, the volunteers were asked to wear loose-fitting trousers and underwear made of the same light fabric.
- A sperm count was done weekly over a period of 24 months.
- The average sperm count was calculated per volunteer.

NOTE: Sperm count refers to the total number of healthy sperm per ml of semen and is an indication of male fertility.

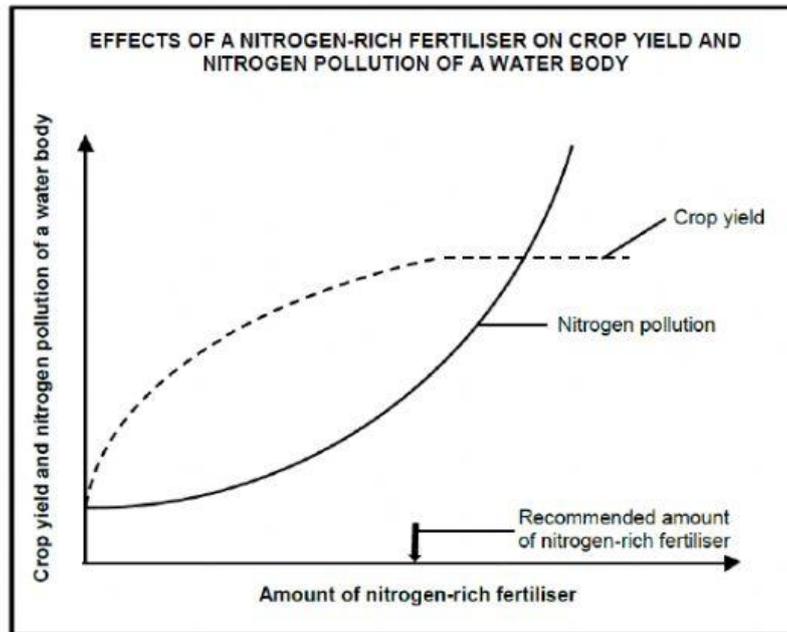
- 3.3.1 Identify the dependent variable in the investigation. (1)
- 3.3.2 State how the dependent variable in QUESTION 3.3.1 was measured. (1)
- 3.3.3 Name TWO other factors that should be considered when selecting volunteers. (2)
- 3.3.4 Explain how TU reduces fertility. (2)
- 3.3.5 Explain why wearing tight-fitting trousers will decrease male fertility. (2)
- 3.3.6 Suggest ONE reason for doing the sperm count for an additional 12 months after stopping the TU treatment. (1)

- 3.3.7 The contraceptive options that are currently available for men are limited to condoms and vasectomy. Vasectomy involves the cutting and tying of both the vas deferens.

Explain how a vasectomy prevents pregnancy.

(2)
(11)

- 3.4 The graph below shows the influence of a nitrogen-rich fertiliser on crop yield and nitrogen pollution of a nearby water body.



- 3.4.1 Name the process whereby excess nutrients accumulate in a water body. (1)
- 3.4.2 Explain why it will not economically benefit the farmer to use more than the recommended amount of fertiliser. (3)
- 3.4.3 Suggest ONE reason why farmers are advised to apply fertilisers to the soil during the dry season of the year. (1)

3.4.4 Explain the effect that an increase in nitrogen pollution will have on the number of bacteria in the water.

(4)
(9)
[40]

TOTAL SECTION B: 80