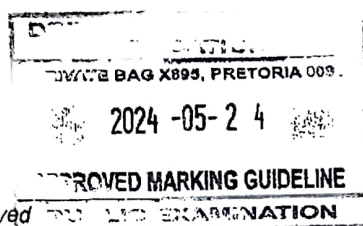3.3   3.3.1   (a) - Insulin✓
                         - Glucagon✓   (2)
                         (Mark first TWO only)

                        (b)   Pancreas✓   (1)

       3.3.2   08:00 and 09:00✓   (1)

       3.3.3   - Blood glucose levels increased✓
                        - to above 7,1✓mmol/L/ to 8,4 mmol/L   (2)

       3.3.4   - Blood glucose levels decreased to below 3,9✓ mmol/L at 14:00
                        - stimulating the Islets of Langerhans✓ /pancreas
                        - to secrete glucagon✓
                        - which stimulates the conversion of glycogen to glucose✓
                        - therefore, increasing blood glucose levels✓ at 15:00   Any   (4)

       3.3.5   - Levels would have remained high✓
                        - for a longer period✓   (2)
                                                                   (12)

3.4   3.4.1   Adrenal✓ gland   (1)

       3.4.2   On top of the kidneys✓   (1)

       3.4.3   - It stimulates the breathing muscles✓
                        - and this increase the rate/depth of breathing✓ so that
                        - more oxygen is inhaled✓
                        - It stimulates the heart✓muscle
                        - causing an increase in heart rate✓/blood pressure so that
                        - oxygen and glucose are transported faster✓   Any   (5)
                                                                (7)

3.5   3.5.1   (a)   Geotropism✓/Gravitropism   (1)

                        (b)   Auxins✓   (1)

       3.5.2   - Due to gravity✓
                        - there is a higher concentration of auxins on the lower side✓ of the root
                        - which inhibits growth✓
                        - Therefore, growth will occur mainly on the upper side✓
                        - causing the root to bend/grow downwards✓   (5)

       3.5.3   - The seedling must be rotated constantly✓
                        - to remove the effect of gravity✓   (2)
                                                         (9)
                                                        [50]

TOTAL SECTION B: **100**
TOTAL: **150**

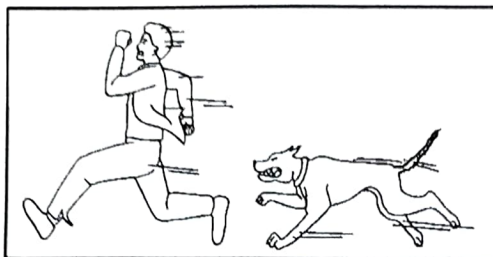3.3   The blood glucose levels in a healthy person, when not eating, is between 3,9 and 7,1 mmol/L of blood.

The table below shows the blood glucose levels in a healthy person who ate only one meal.

TIME (hours)	BLOOD GLUCOSE LEVEL (mmol/L)
07:00	4,2
08:00	4,2
09:00	8,4
10:00	7,6
11:00	7,1
12:00	5,1
13:00	4,8
14:00	3,1
15:00	4,1
16:00	4,3
17:00	4,6

3.3.1   Name the:

(a)   TWO hormones involved in the normal homeostatic control of blood glucose levels   (2)

(b)   Organ in the human body that secretes the hormones named in QUESTION 3.3.1(a)   (1)

3.3.2   Between which hours of the day did the person eat?   (1)

3.3.3   Using evidence from the table, give ONE reason for your answer to QUESTION 3.3.2.   (2)

3.3.4   Explain the change in blood glucose levels between 14:00 and 15:00.   (4)

3.3.5   Describe how blood glucose levels would have been different after 10:00 if the person suffered from diabetes mellitus.   (2)
                                                                              (12)

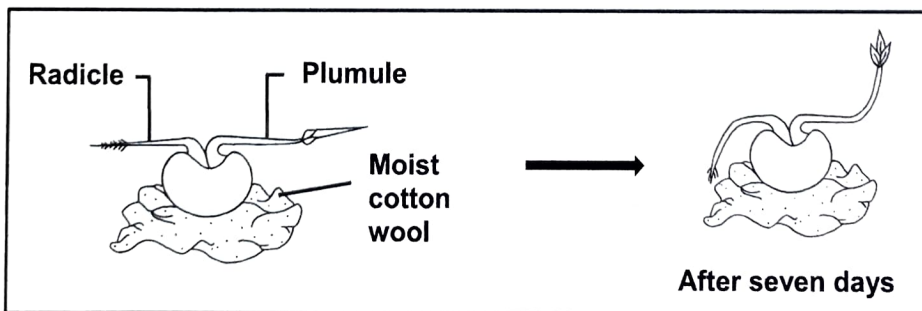3.4   The diagram below represents a 'fight or flight' reaction in humans.

3.4.1   Name the gland that is responsible for this reaction.   (1)

3.4.2   State the location of the gland named in QUESTION 3.4.1 in the human body.   (1)

3.4.3   Explain the effect of adrenalin on the heart and the respiratory system during the situation shown in the diagram above.   (5)
(7)

3.5   An experiment was set up to investigate a plant growth response to a stimulus.

A seedling has a radicle (young root) and a plumule (young stem).

This seedling was placed horizontally in a dark place and a growth response was observed after seven days, as shown in the diagram below.

3.5.1   Name the:

(a)   Growth response observed after seven days   (1)

(b)   Plant hormone responsible for the growth response named in QUESTION 3.5.1(a)   (1)

3.5.2   Explain the growth response observed in the root of the seedling.   (5)

3.5.3   Explain how a control set-up will be different from the above set-up.   (2)
(9)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150