



DEPARTMENT OF EDUCATION
REPUBLIC OF SOUTH AFRICA

DEPARTEMENT VAN ONDERWYS
REPUBLIEK VAN SUID-AFRIKA

SENIOR CERTIFICATE EXAMINATION - 2005
SENIORSERTIFIKAAT-EKSAMEN - 2005

BIOLOGY P2
BIOLOGIE V2

STANDARD GRADE
STANDAARDGRAAD

FEBRUARY/MARCH 2005
FEBRUARIE/MAART 2005

306-2/2

BIOLOGY SG: Paper 2

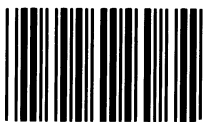
Marks: 150
Punte : 150



2 Hours
2 Ure

This question paper consists of 14 pages.
Hierdie vraestel bestaan uit 14 bladsye.

X05



INSTRUKSIES EN INLIGTING AAN KANDIDATE

Lees die volgende noukeurig deur voordat die vrae beantwoord word:

1. Beantwoord AL die vrae.
2. Skryf AL die antwoorde in die ANTWOORDEBOEK.
3. Begin elke vraag se antwoord bo-aan 'n nuwe bladsy.
4. Nommer die antwoorde presies soos die vrae genummer is.
5. Skryf netjies en leesbaar.
6. Indien antwoorde nie volgens die instruksies van elke vraag aangebied word nie, sal kandidate punte verloor.
7. ALLE tekeninge moet met potlood gemaak word en die byskrifte met ink.
8. Teken slegs diagramme en vloeddiagramme indien dit vereis word.
9. Die diagramme in die vraestel is nie noodwendig volgens skaal geteken nie.
10. Die gebruik van grafiekpapier is NIE toelaatbaar NIE.
11. Nie-programmeerbare sakrekenaars en passers mag gebruik word.

INSTRUCTIONS AND INFORMATION TO CANDIDATES

Read the following 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 exactly as the questions are numbered.
5. Write neatly and legibly.
6. If answers are not presented according to the instructions of each question, candidates will lose marks.
7. ALL drawings should be done in pencil and labelled in ink.
8. Only draw diagrams and flow charts when requested to do so.
9. The diagrams in the question paper may not necessarily be drawn to scale.
10. The use of graph paper is NOT permitted.
11. Non-programmable calculators and compasses may be used.

AFDELING A

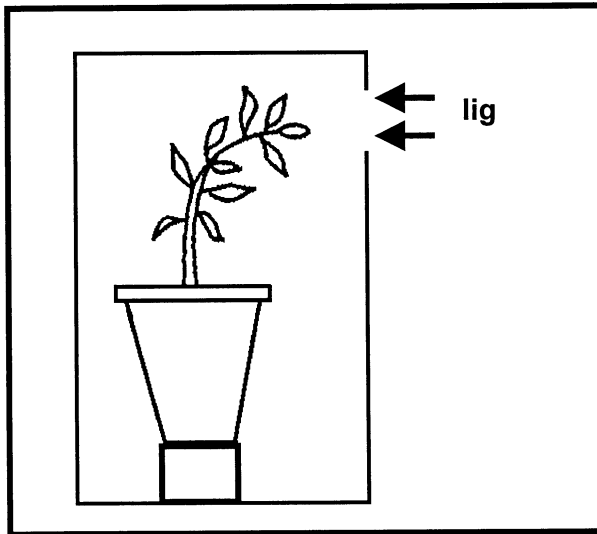
VRAAG 1

1.1 Verskeie moontlike antwoorde word vir elke vraag verskaf. Dui die korrekte antwoord aan deur slegs die **letter** van jou keuse langs die toepaslike vraagnommer te skryf.

1.1.1 'n Potometer word gebruik om ...

- A worteldruk te demonstreer.
- B die tempo van transpirasie te meet.
- C die suigkrag van kapillariteit te demonstreer.
- D osmose te demonstreer.

VRAE 1.1.2 en 1.1.3 verwys na die volgende diagram.



1.1.2 Die buiging van die stingel word veroorsaak deur ...

- (i) selverlenging.
- (ii) oksienverspreiding in die stingel.
- (iii) wind.
- (iv) water.

- A (i) en (iii)
- B (ii) en (iv)
- C (i) en (ii)
- D (iii) en (iv)

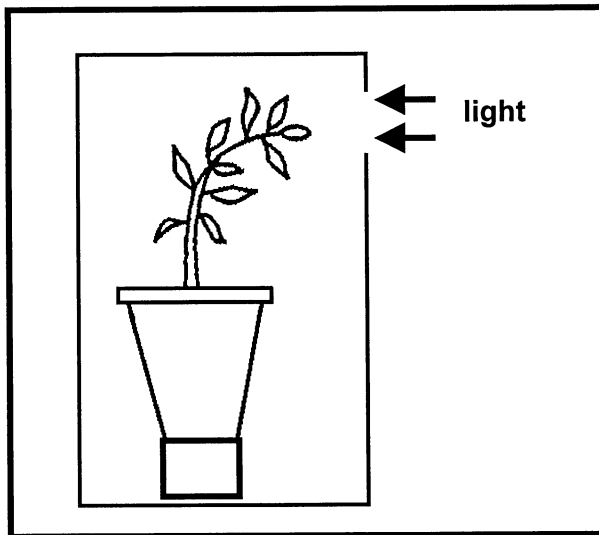
SECTION A**QUESTION 1**

1.1 Various possible answers are provided for each question. Indicate the correct answer by writing only the **letter** of your choice next to the relevant question number.

1.1.1 A potometer is used to ...

- A demonstrate root pressure.
- B measure the rate of transpiration.
- C demonstrate suction force of capillarity.
- D demonstrate osmosis.

QUESTIONS 1.1.2 and 1.1.3 refer to the following diagram.



1.1.2 The bending of the stem is caused by ...

- (i) cell elongation.
- (ii) auxin distribution in the stem.
- (iii) wind.
- (iv) water.

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

- 1.1.3 'n Voordeel van die buiging van die stingel in die rigting van die lig is om ...
- A transpirasie te bevorder.
 - B die blare aan lig bloot te stel vir fotosintese.
 - C transpirasie te beperk.
 - D verlenging van die plant te voorkom.
- 1.1.4 Indien die pH van die bloed te laag word watter stof sal die selle van die nierbuisie uit die bloed onttrek en by die filtraat voeg om die wanbalans te korrigeer?
- A Kaliumione
 - B Karbonaatione
 - C Bikarbonaatione
 - D Waterstofione
- 1.1.5 Ná watter EEN van die volgende aktiwiteite sal 'n persoon die mees gekonsentreerde uriene produseer, as daar aanvaar word dat toestande in alle opsigte dieselfde is as voor die aanvang van die onderskeie aktiwiteite?
- A 'n Uitputtende rugbywedstryd
 - B Een uur se swem in koue water
 - C Een uur se rus op 'n koel oggend
 - D Drink 'n liter koue water
- (5 x 2) (10)
- 1.2 Gee die korrekte **biologiese term** vir elk van die volgende beskrywings. Skryf slegs die **term** langs die toepaslike vraagnommer.
- 1.2.1 'n Membraan wat die uitwendige oor van die middeloor skei
- 1.2.2 Kleurlose vloeistof wat die benige labirint van die oor vul
- 1.2.3 Die weefsel wat water en anorganiese ione vanaf die wortels vervoer
- 1.2.4 Die proses wat lei tot die verlies van waterdruppels vanaf die rande van blare
- 1.2.5 Die fisiese verskynsel wat lei tot die spontane styging van water in baie dun buisies
- 1.2.6 Groep plante met ingesinkte huidmondjies
- 1.2.7 Beweging van molekule vanaf 'n gebied van hul hoë konsentrasie na 'n gebied van hul lae konsentrasie
- 1.2.8 Die bedekking van blare wat die verlies van waterdamp grootliks beperk (8)

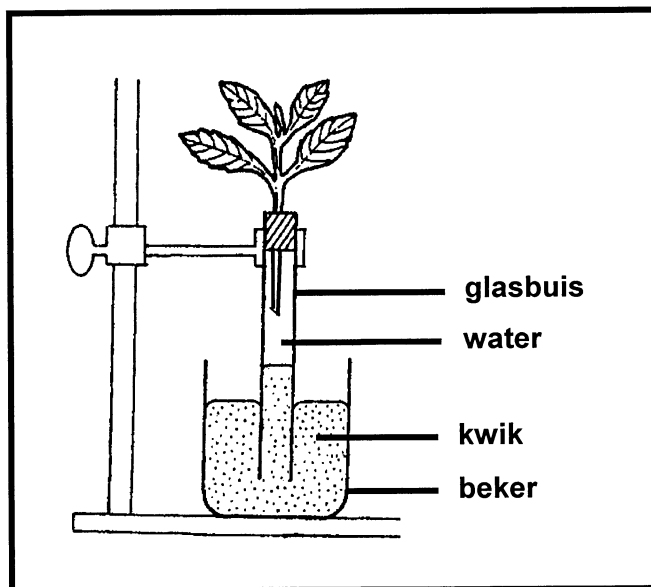
- 1.1.3 An advantage of the bending of the stem in the direction of the light is to ...
- A facilitate transpiration.
 - B expose the leaves to light for photosynthesis.
 - C limit transpiration.
 - D prevent lengthening of the plant.
- 1.1.4 If the pH of blood becomes too low, which substance will the cells of the renal tubule extract from the blood and pass into the filtrate to correct this imbalance?
- A Potassium ions
 - B Carbonate ions
 - C Bicarbonate ions
 - D Hydrogen ions
- 1.1.5 After which ONE of the following activities would a person produce most concentrated urine, assuming that conditions are similar in all other aspects before the start of the various activities?
- A A strenuous game of rugby
 - B One hour of swimming in cold water
 - C One hour rest on a cool morning
 - D Drinking a litre of cold water
- (5 x 2) **(10)**
- 1.2 Give the correct **biological term** for each of the following descriptions. Write only the **term** next to the relevant question number.
- 1.2.1 A membrane separating the outer and middle ear
- 1.2.2 Colourless fluid filling the bony labyrinth of the ear
- 1.2.3 The tissue that carries water and inorganic ions from the roots
- 1.2.4 The process that results in the loss of water droplets from the margins of leaves
- 1.2.5 The physical phenomenon causing the spontaneous rise of water in very thin tubes
- 1.2.6 Group of plants which have sunken stomata
- 1.2.7 Movement of molecules from a region of their high concentration to a region of their low concentration
- 1.2.8 The covering of leaves that greatly reduces the loss of water vapour **(8)**

- 1.3 Pas die items in KOLOM I by die inligting in KOLOM II deur slegs die korrekte **letter** langs die toepaslike vraagnommer te skryf.

KOLOM I	KOLOM II
1.3.1 Stippels	A Vervoer urien na buite
1.3.2 Kelke	B Orgaan vir tydelike berging van urien
1.3.3 Uretra	C Versterkingsmateriaal in trageïede
1.3.4 Hormone	D Maak laterale beweging van water in xileemvate moontlik
1.3.5 Lignien	E Vervoer urien na die renale pelvis
	F Bevorder groei en ontwikkeling by plante
	G Ongeperforeerde dwarswande in watergeleidingsweefsel

(5 x 2) (10)

- 1.4 Bestudeer die volgende diagram en beantwoord die vrae wat volg.



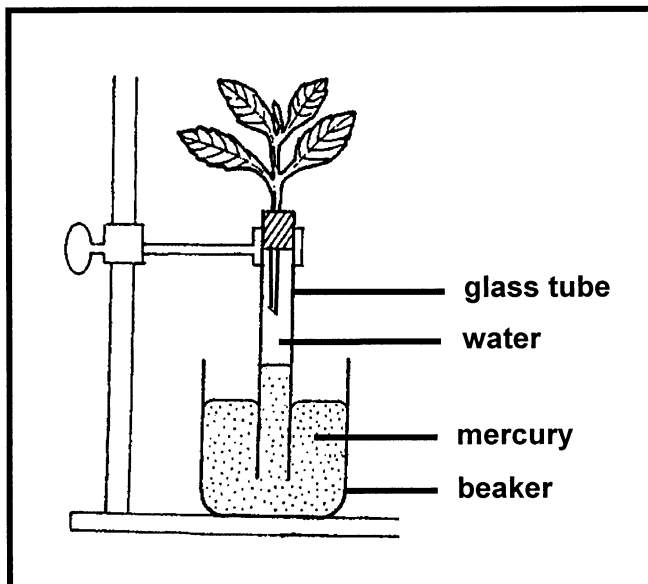
- 1.4.1 Wat sou jy waarneem indien die apparaat vir 'n paar uur in die son gelaat is? (1)
- 1.4.2 Gee TWEE redes waarom kwik, en nie water nie, in die beker gebruik word. (2)
- 1.4.3 Verduidelik TWEE voorsorgmaatreëls wat jy sal tref wanneer jy die apparaat opstel. (4)
- (7)

- 1.3 Match the items in COLUMN I with the information in COLUMN II by writing only the correct **letter** next to the relevant question number.

COLUMN I	COLUMN II
1.3.1 Pits	A Transports urine to the exterior
1.3.2 Calyces	B Organ for temporary storage of urine
1.3.3 Urethra	C Strengthening material in tracheids
1.3.4 Hormones	D Enable lateral movement of water in xylem vessels
1.3.5 Lignin	E Transports urine to the renal pelvis
	F Facilitates growth and development in plants
	G Unperforated cross walls in water conducting tissue

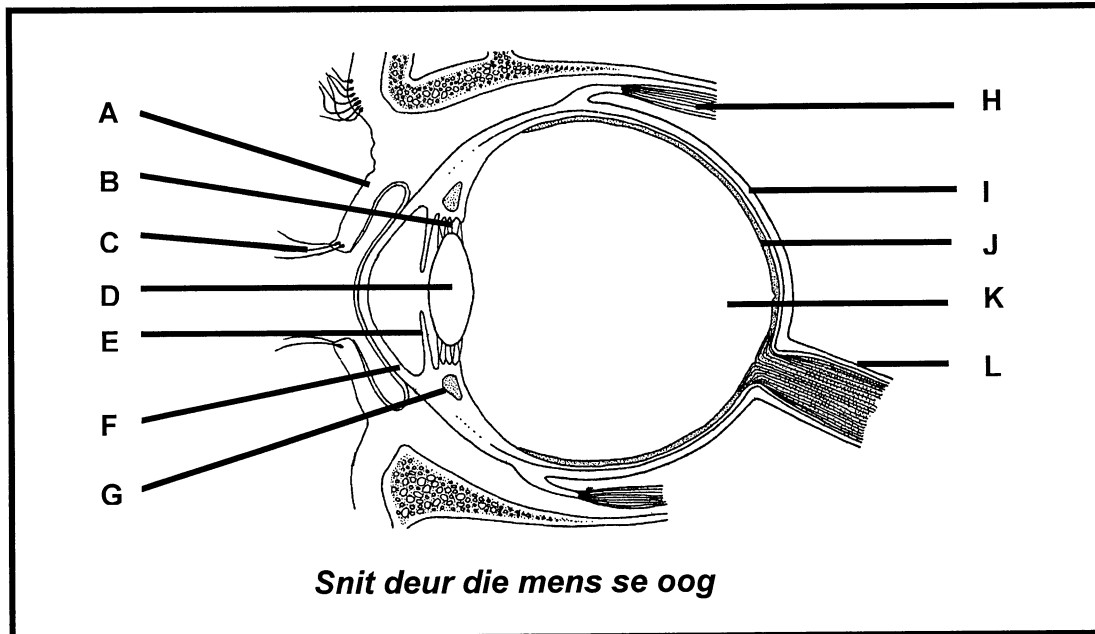
(5 x 2) (10)

- 1.4 Study the diagram below and answer the questions that follow.



- 1.4.1 What would you observe if this apparatus was left in the sun for several hours? (1)
- 1.4.2 List TWO reasons why mercury is used in the beaker instead of water. (2)
- 1.4.3 Explain TWO precautions you would take while setting up the apparatus. (4)
- (7)**

1.5 Bestudeer die volgende diagram en beantwoord die vrae wat volg.



1.5.1 Skryf die **letters** van die dele wat verantwoordelik is vir die volgende:

- | | | |
|-----|---|-----|
| (a) | Beskerming van die oog teen fisiese beskadiging | (3) |
| (b) | Akkommodasie | (3) |
| (c) | Breking van ligstrale | (3) |

1.5.2 Skryf die **naam** van die benoemde deel wat verantwoordelik is vir die volgende:

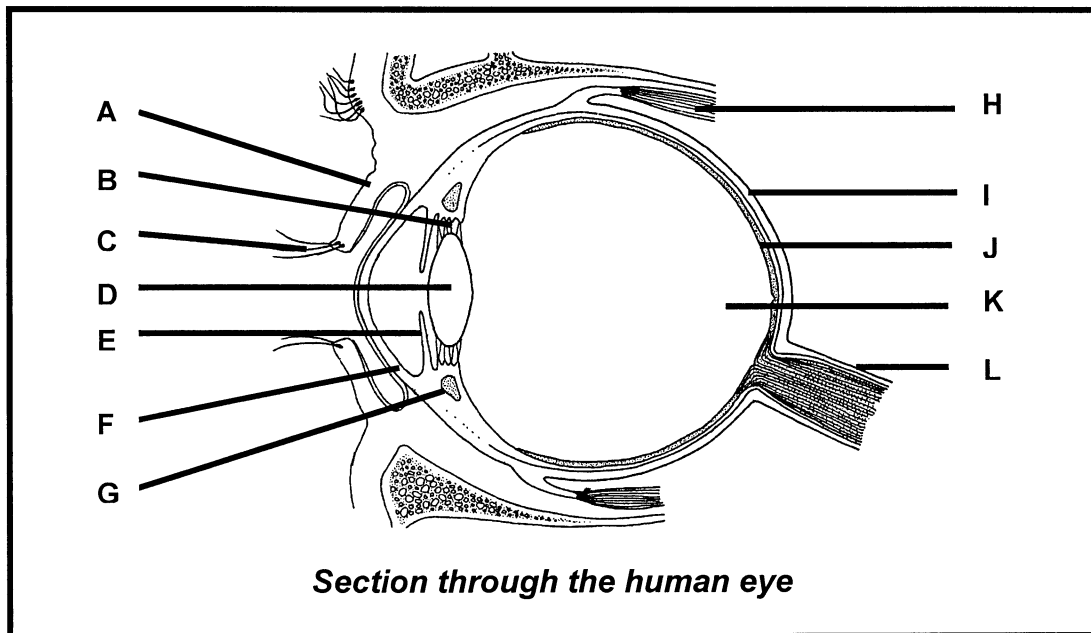
- | | | |
|-----|---------------------------------------|-----|
| (a) | Beweging van die oogbal | (1) |
| (b) | Omskakeling van ligstimuli na impulse | (1) |

1.5.3 Verduidelik die rol van deel E tydens helder ligtoestande. (4)
(15)

Totaal Vraag 1: 50

TOTAAL AFDELING A: 50

1.5 Study the following diagram and answer the questions that follow.



1.5.1 Write the **letters** of the parts which are responsible for the following:

- | | | |
|-----|--|-----|
| (a) | Protection of the eye from physical damage | (3) |
| (b) | Accommodation | (3) |
| (c) | Refraction of light rays | (3) |

1.5.2 Write the **name** of the labelled part which is responsible for the following:

- | | | |
|-----|---|-----|
| (a) | Movement of the eye ball | (1) |
| (b) | Conversion of light stimuli into impulses | (1) |

1.5.3 Explain the role of part E in bright light conditions. (4)
(15)

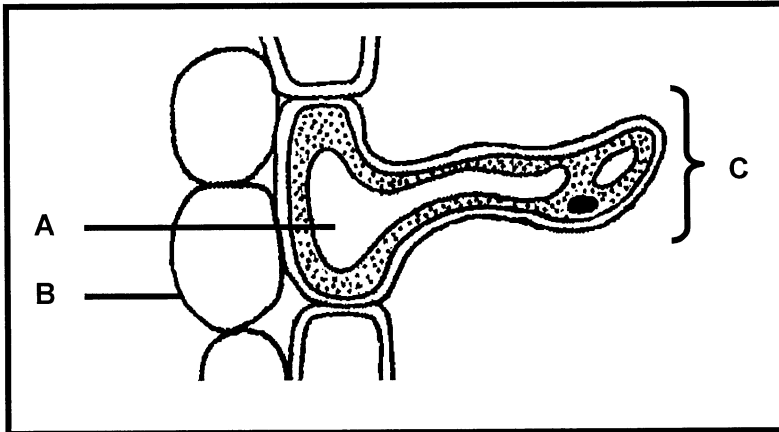
Total Question 1: 50

TOTAL SECTION A: 50

AFDELING B

VRAAG 2

2.1 Bestudeer die volgende diagram en beantwoord die vrae wat volg.



2.1.1 Identifiseer die volgende:

(a) Dele A en C (2)

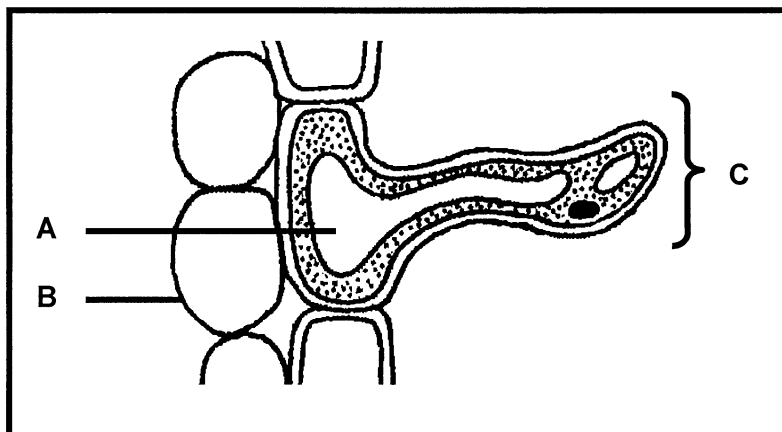
(b) Sel B (1)

2.1.2 Maak 'n lys van TWEE strukturele eienskappe van sel B wat dit geskik maak vir die translokasie van water. (2)

2.1.3 Beskryf hoe deel C water absorbeer. (4)
(9)

SECTION B**QUESTION 2**

2.1 Study the following diagram and answer the questions that follow.



2.1.1 Identify the following:

(a) Parts A and C (2)

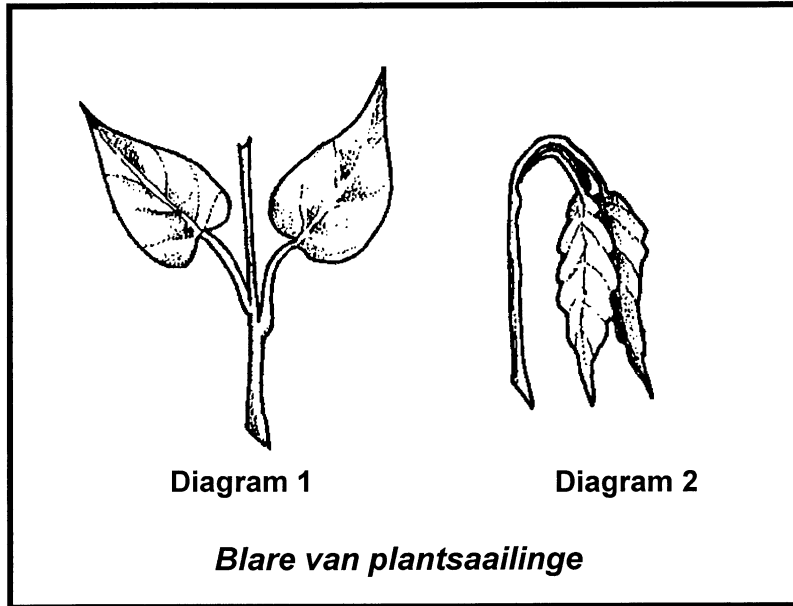
(b) Cell B (1)

2.1.2 List TWO structural features of cell B that make it suitable for the translocation of water. (2)

2.1.3 Describe how part C absorbs water. (4)
(9)

- 2.2 Die volgende diagramme verteenwoordig die blare van saailinge van 'n mesofitiese plant wat op verskillende tye tydens 'n warm somersmaand verplant is. Een saailing is om 12:00 en die ander een om 20:00 verplant. Alle ander faktore was dieselfde vir beide saailinge tydens die verplanting.

Bestudeer die diagramme en beantwoord die vrae wat volg.

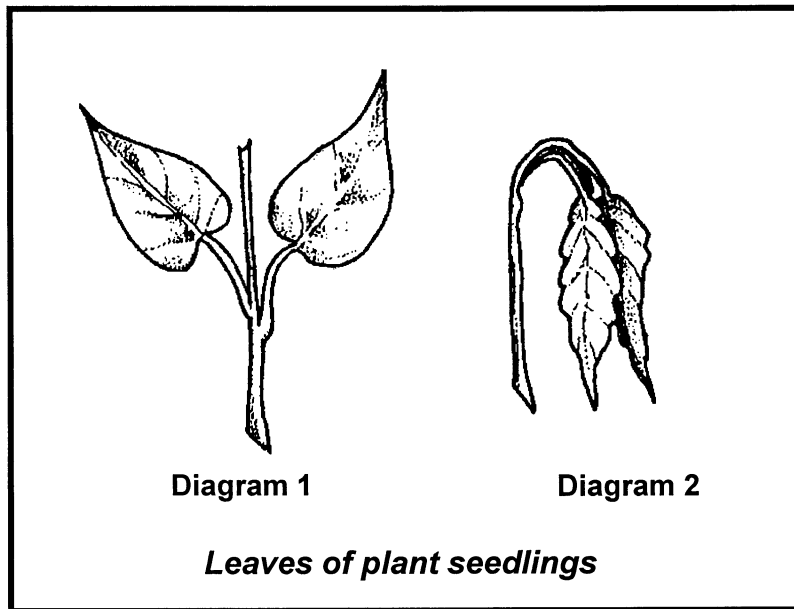


- 2.2.1 (a) Watter diagram (1 of 2) toon die saailing wat om 12:00 verplant is? (1)
- (b) Gee 'n waarneembare rede vir jou antwoord by VRAAG 2.2.1(a). (1)
- (c) Verduidelik die rede wat in VRAAG 2.2.1(b) verskaf is. (3)
- 2.2.2 Teken 'n diagram wat die toestand van die sluitselle en stoma van die blare van die saailing wat om 20:00 verplant is, toon. (5)
- (10)**
- 2.3 'n Varkblaas is met 'n 20%-suikeroplossing gevul en stewig vasgebind. Daarna is die blaas in 'n beker met gedistilleerde water gesit. Na 'n rukkie het die blaas sy oorspronklike massa verdubbel. Die inhoud van die beker en die blaas is getoets. Daar was steeds suiker in die blaas maar geen suiker in die beker nie.
- 2.3.1 Watter molekules was in staat om vrylik uit die blaas te diffundeer? (1)
- 2.3.2 Verduidelik waarom daar geen suiker in die beker was nie. (2)
- 2.3.3 Verduidelik waarom die blaas sy oorspronklike massa verdubbel het. (3)
- (6)**

Totaal Vraag 2: 25

- 2.2 The following diagrams represent the leaves of seedlings of a mesophytic plant that were transplanted at different times during a hot summer month. One seedling was transplanted at 12:00 and the other at 20:00. All other factors were the same for both seedlings during transplantation.

Study the diagrams and answer the questions that follow.

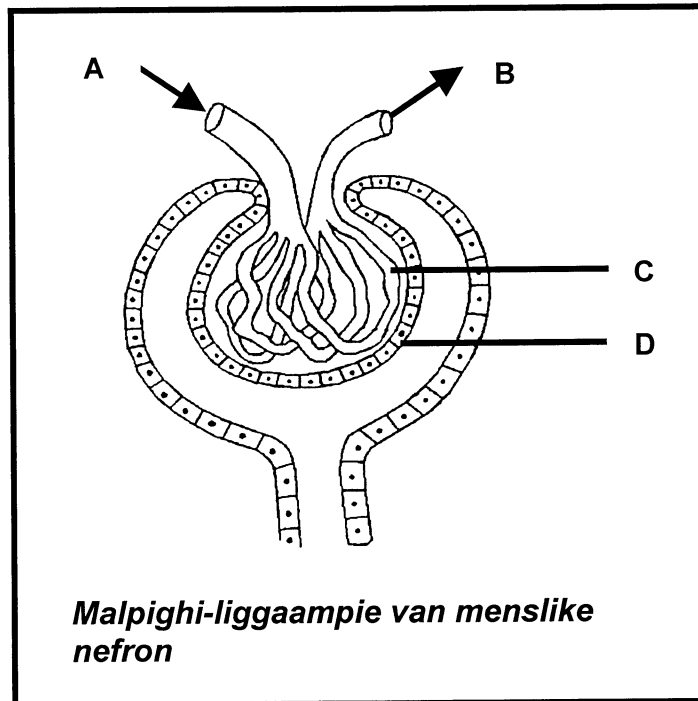


- 2.2.1 (a) Which diagram (1 or 2) shows the seedling that was transplanted at 12:00? (1)
- (b) Give an observable reason for your answer in QUESTION 2.2.1(a). (1)
- (c) Explain the reason given in QUESTION 2.2.1(b). (3)
- 2.2.2 Draw a diagram showing the state of the guard cells and stoma of the leaves of the seedling which was transplanted at 20:00. (5)
- (10)**
- 2.3 A pig's bladder was filled with a 20% sugar solution and securely tied. The bladder was placed in a beaker of distilled water. After a while the bladder had doubled its original mass. The contents of the bladder and the beaker were tested. There was still sugar in the bladder but no sugar in the beaker.
- 2.3.1 Which molecules were able to diffuse freely through the bladder? (1)
- 2.3.2 Explain why there was no sugar in the beaker. (2)
- 2.3.3 Explain why the bladder had doubled its original mass. (3)
- (6)**

Total Question 2: 25

VRAAG 3

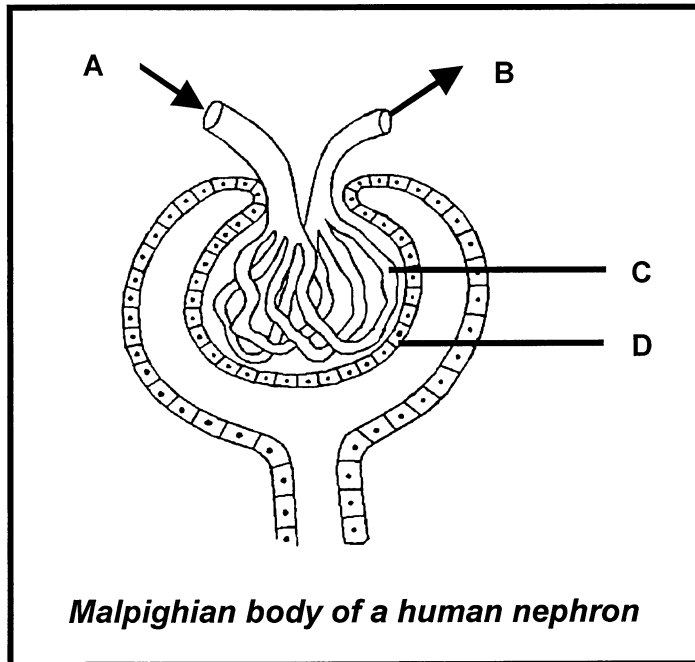
3.1 Bestudeer die volgende diagram en beantwoord die vrae wat volg.



- 3.1.1 In watter deel van die nier sal jy hierdie struktuur vind? (1)
- 3.1.2 Noem die prosesse van urienvorming wat in hierdie struktuur plaasvind. (1)
- 3.1.3 Identifiseer deel C. (1)
- 3.1.4 Verduidelik TWEE strukturele aanpassings van deel C vir die prosesse genoem by VRAAG 3.1.2 hierbo. (4)
- 3.1.5 Deel A is wyer as deel B. Wat is die belangrikheid hiervan? (1)
- 3.1.6 Noem die tipe gespesialiseerde selle wat in deel D gevind word. (1)
- 3.1.7 Noem die hormoon wat afgeskei word wanneer daar 'n water-tekort by A is. (1)
- 3.1.8 Hoe funksioneer die hormoon wat in VRAAG 3.1.7 genoem is? (2)
- (12)**

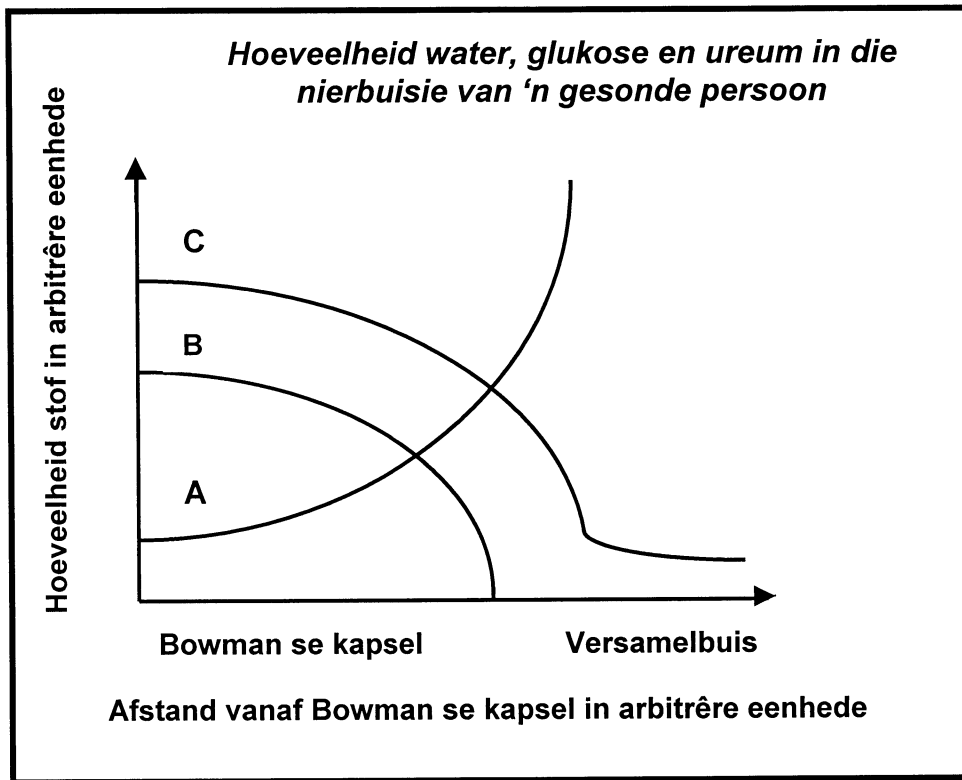
QUESTION 3

3.1 Study the following diagram and answer the questions that follow.



- 3.1.1 In which region of the kidney would you find this structure? (1)
- 3.1.2 Name the process of urine formation that occurs in this structure. (1)
- 3.1.3 Identify part C. (1)
- 3.1.4 Explain TWO structural adaptations of part C for the process mentioned in QUESTION 3.1.2 above. (4)
- 3.1.5 Part A is wider than part B. What is the importance of this? (1)
- 3.1.6 Name the type of specialised cells found in part D. (1)
- 3.1.7 Name the hormone secreted when there is a shortage of water in A. (1)
- 3.1.8 How does the hormone named in QUESTION 3.1.7 function? (2)
- (12)**

3.2 Bestudeer die volgende grafiek en beantwoord die vrae wat volg.



3.2.1 Watter grafiek (A, B of C) verteenwoordig elkeen van die volgende stowwe:

- | | | |
|-----|---------|-----|
| (a) | Water | (1) |
| (b) | Glukose | (1) |
| (c) | Ureum | (1) |

3.2.2 Verduidelik jou antwoord in:

- | | | |
|-----|----------------|-----|
| (a) | VRAAG 3.2.1(a) | (2) |
| (b) | VRAAG 3.2.1(b) | (2) |
| (c) | VRAAG 3.2.1(c) | (2) |

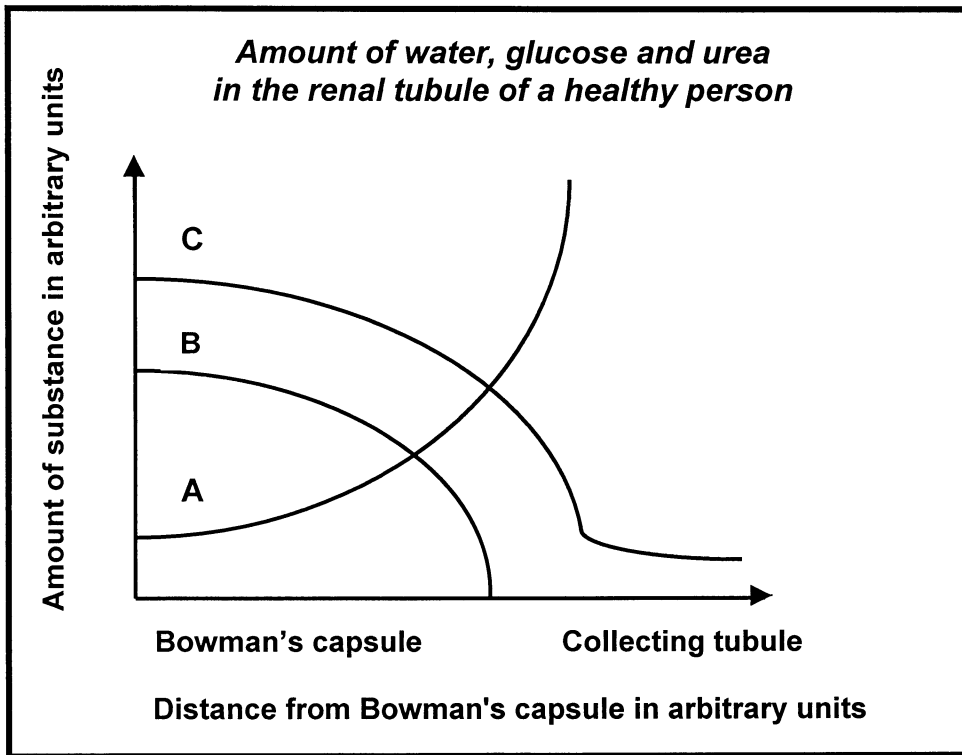
3.2.3 Sal die grafiek wat getrek word om die hoeveelheid aminosure te verteenwoordig, soortgelyk wees aan A, B of C? Verduidelik jou antwoord. (2)

3.2.4 Verduidelik waarom proteïene nie deel is van die stowwe wat in die grafiek hierbo getoon word nie. (2)

(13)

Totaal Vraag 3: 25

3.2 Study the following graph and answer the questions that follow.



3.2.1 Which graph (A, B or C) represents each of the following substances:

- (a) Water (1)
- (b) Glucose (1)
- (c) Urea (1)

3.2.2 Explain your answer in:

- (a) QUESTION 3.2.1(a) (2)
- (b) QUESTION 3.2.1(b) (2)
- (c) QUESTION 3.2.1(c) (2)

3.2.3 If a graph is drawn to represent the amount of amino acids, will it look like A, B or C? Explain your answer. (2)

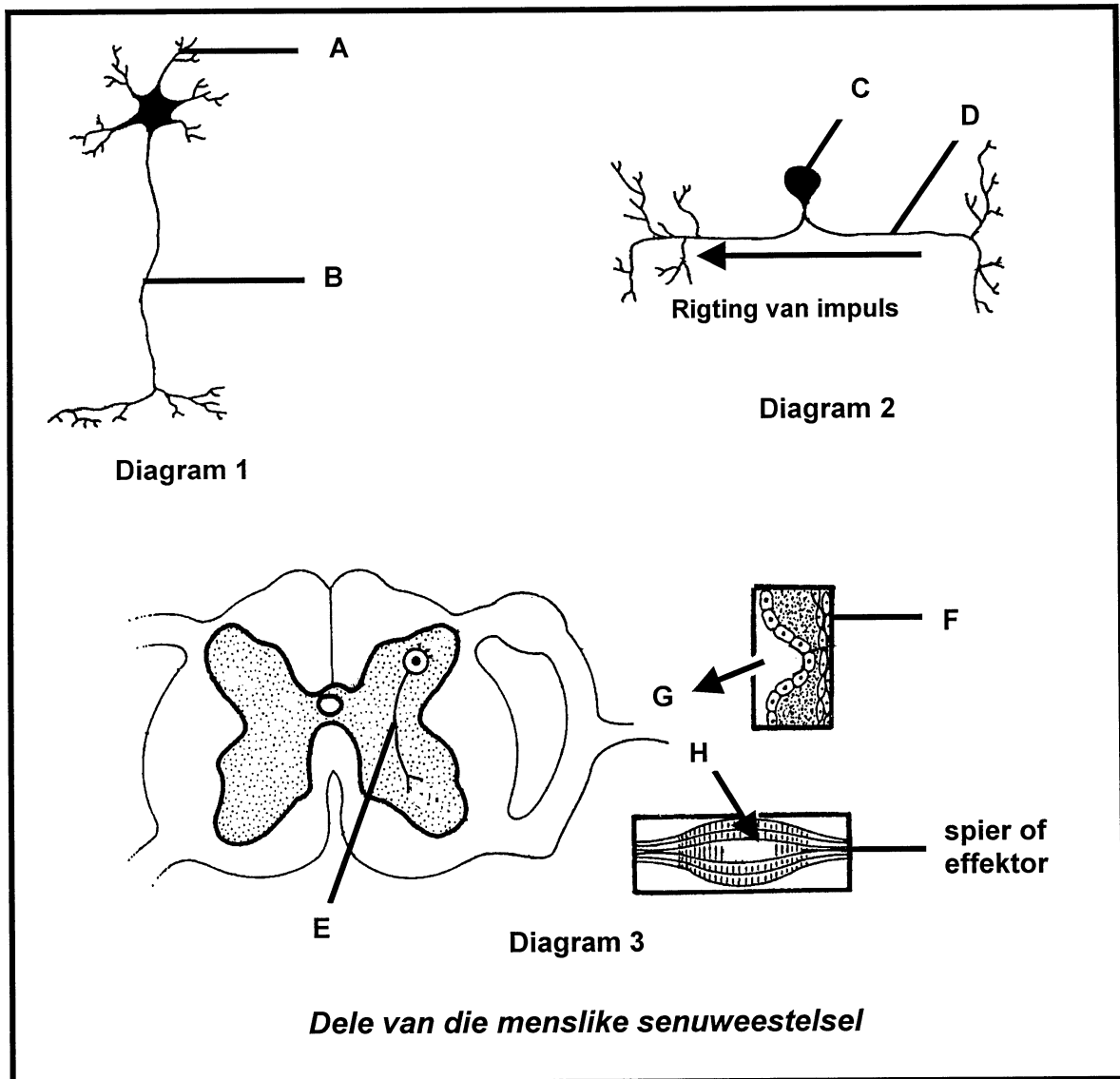
3.2.4 Explain why proteins are not part of the substances shown in the graph above. (2)

(13)

Total Question 3: 25

VRAAG 4

4.1 Bestudeer die volgende diagramme en beantwoord die vrae wat volg.



4.1.1 Identifiseer dele A, B, C, D, E en F. (6)

4.1.2 Skryf die **naam** en **diagramnommer** (1 of 2) van die neurone wat deur elk van die volgende **pyltjies** in Diagram 3 voorgestel word:

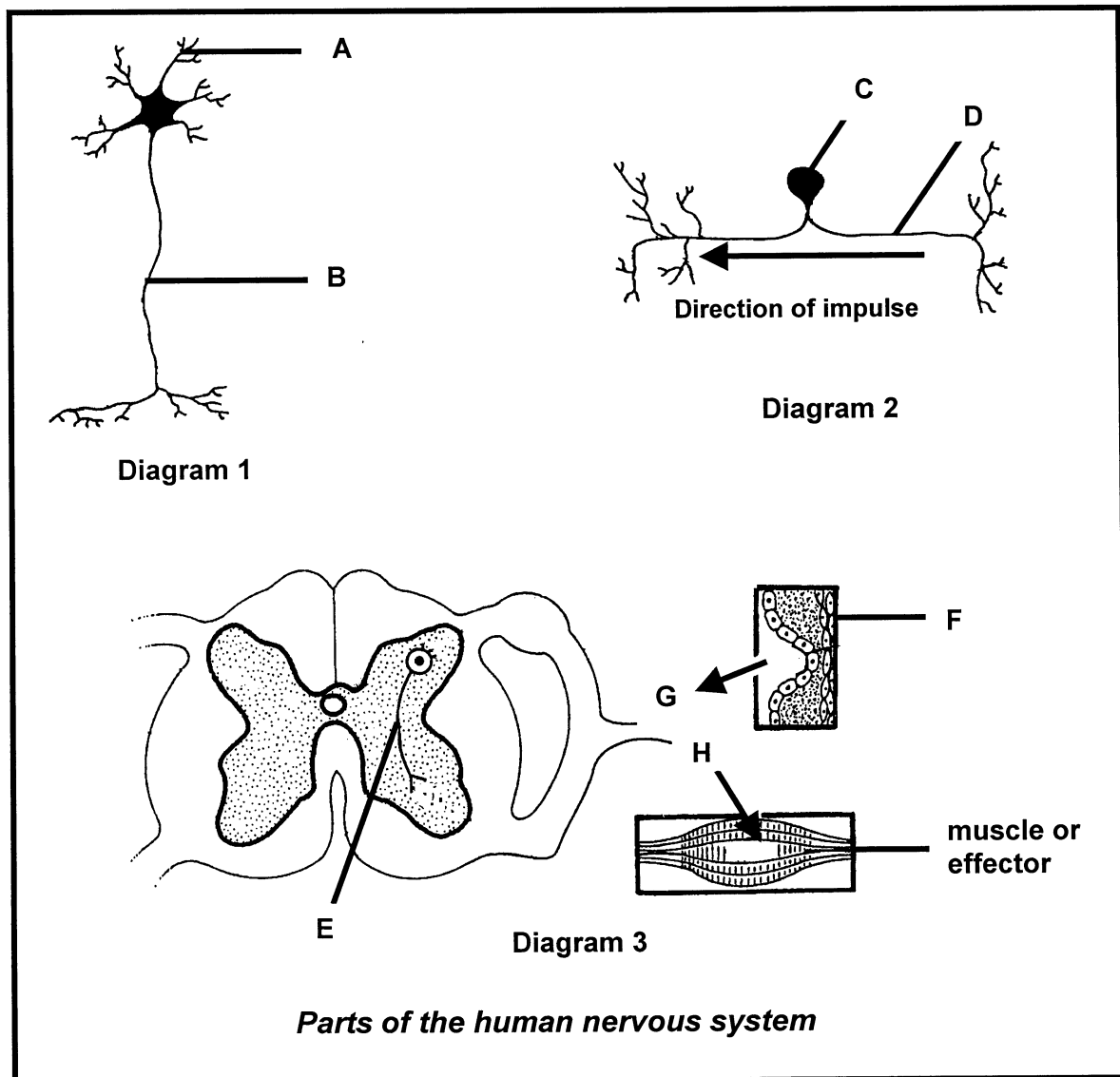
- (a) G (2)
- (b) H (2)

4.1.3 Gee EEN funksie van die neuron wat voorgestel word deur:

- (a) Diagram 1 (2)
- (b) Diagram 2 (2)

QUESTION 4

4.1 Study the following diagrams and answer the questions that follow.



4.1.1 Identify parts A, B, C, D, E and F. (6)

4.1.2 Write the **name** and **diagram number** (1 or 2), of the neurons which are represented by each of the following **arrows** in Diagram 3:

(a) G (2)

(b) H (2)

4.1.3 State ONE function of the neuron represented by:

(a) Diagram 1 (2)

(b) Diagram 2 (2)

4.1.4 Wat is 'n sinaps? (2)

4.1.5 Wat is die funksionele eenheid van die senuweestelsel? (1)
(17)

4.2 Bestudeer die volgende leesstuk en beantwoord die vrae wat volg.

Boodskapperstowwe word in die endokriene kliere van die menslike liggaam vervaardig en dan na ander dele van die liggaam vervoer waar hulle betrokke is by die regulering van die aktiwiteite van bepaalde dele. Stadige, volgehoue of voortdurende response op hierdie stowwe komplementeer of ondersteun die ander vinniger en kortstondige response van die liggaam.

4.2.1 Skryf 'n wetenskaplike naam vir elk van die volgende frases wat in die leesstuk voorkom:

(a) Boodskapperstowwe (1)

(b) Bepaalde dele waarvan die aktiwiteite gereguleer word (1)

4.2.2 Noem EEN stelsel in die liggaam wat betrokke is by koördinasie. (1)

4.2.3 Tabuleer TWEE verskille tussen die wyses waarop die stelsels genoem by VRAAG 4.2.2 funksioneer. (5)
(8)

Totaal Vraag 4: 25

4.1.4 What is a synapse? (2)

4.1.5 What is the functional unit of the nervous system? (1)
(17)

4.2 Study the following passage and answer the questions that follow.

Messenger substances are produced in endocrine glands of the human body and then transported to other parts of the body where they are involved in regulating the activity of particular parts. Slow, sustained or ongoing responses to these substances complement or support the other more rapid and short-lived responses of the body.

4.2.1 Write a scientific name for each of the following phrases taken from the passage:

(a) Messenger substances (1)

(b) Particular parts whose activities are regulated (1)

4.2.2 Name ONE system in the human body involved in co-ordination. (1)

4.2.3 Tabulate TWO differences between the way in which the systems named in QUESTION 4.2.2 operate. (5)
(8)

Total Question 4: 25

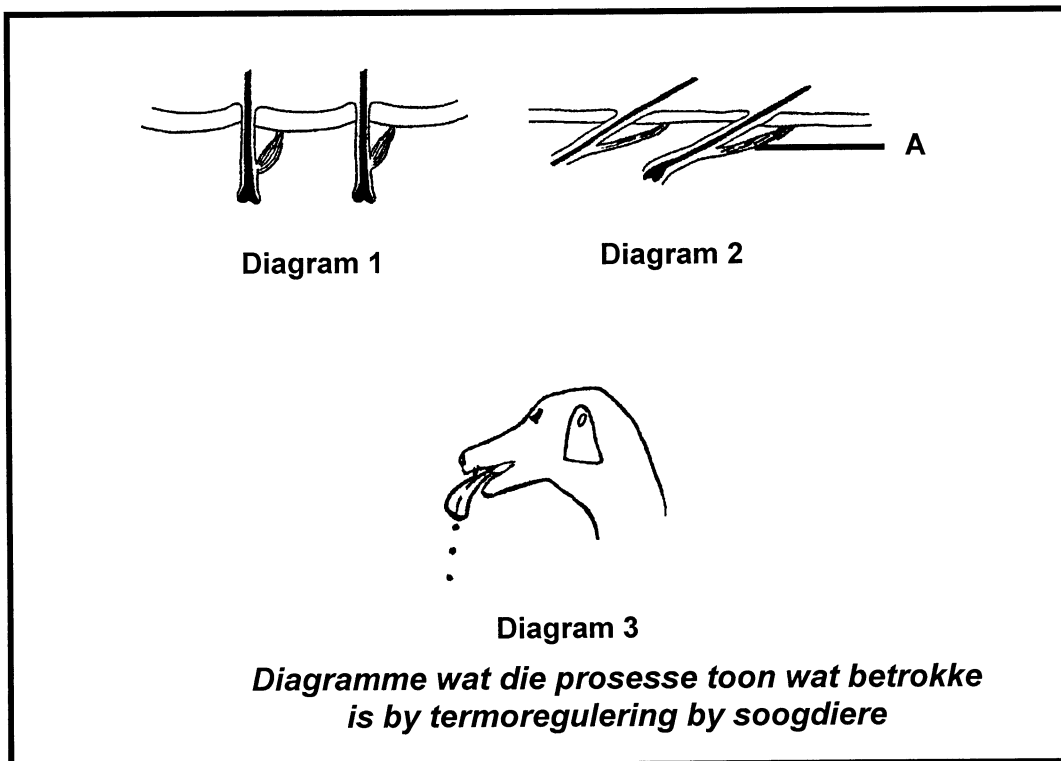
VRAAG 5

- 5.1 Voltooi die volgende tabel deur die nommers 5.1.1 tot 5.1.9 in jou antwoordeboek te skryf en langs elke nommer die korrekte ontbrekende inligting. (Moenie die tabel oorteken nie.)

Klier	Posisie in liggaam	Hormoon	Funksie van hormoon
5.1.1	5.1.2	Groeihormoon	5.1.3
5.1.4	Onder die larinks	5.1.5	5.1.6
5.1.7	5.1.8	5.1.9	Berei die liggaam vir 'n noodgeval voor

(9)

- 5.2 Bestudeer die volgende diagramme en beantwoord die vrae wat volg.



- 5.2.1 Identifiseer deel A en gee die funksie daarvan. (2)
- 5.2.2 In watter diagram (1 of 2) sal:
- (a) Die vel van 'n persoon met 'n ligte vel bleek wees (1)
 - (b) Die sweetkliere meer sweet produseer (1)
- 5.2.3 Verduidelik jou antwoord in VRAAG 5.2.2(a). (2)

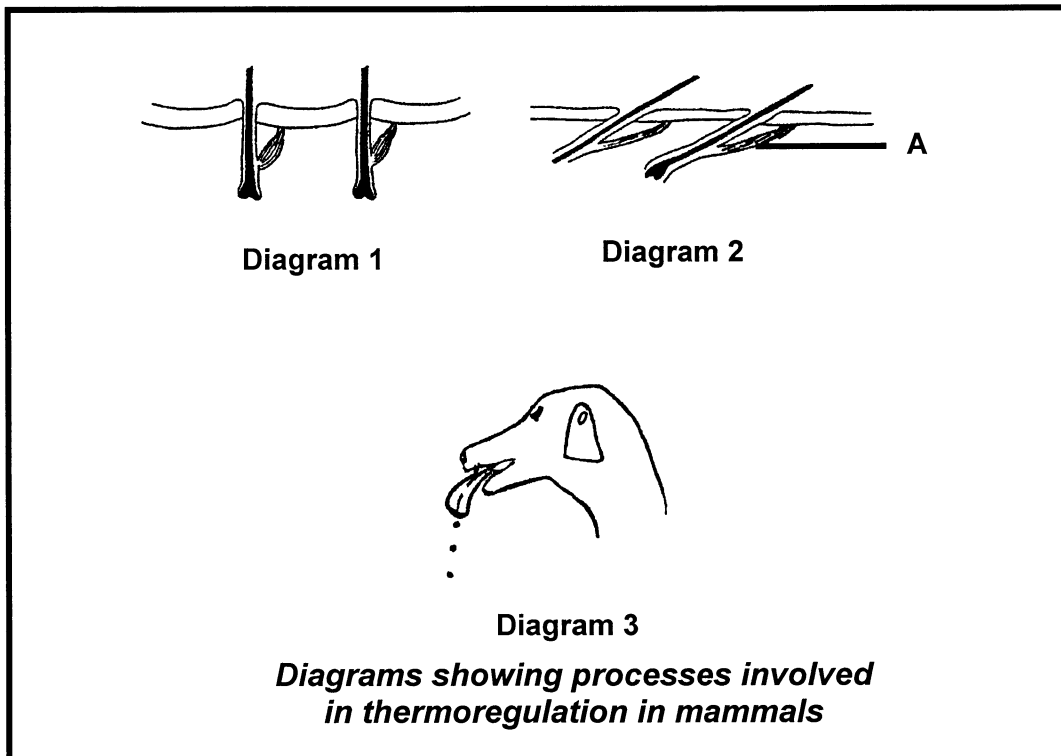
QUESTION 5

5.1 Complete the following table by writing the numbers 5.1.1 to 5.1.9 in your answer book and next to each number the correct missing information. (Do not redraw the table.)

Gland	Position in the body	Hormone	Function of hormone
5.1.1	5.1.2	Growth hormone	5.1.3
5.1.4	Below the larynx	5.1.5	5.1.6
5.1.7	5.1.8	5.1.9	Prepares the body for an emergency

(9)

5.2 Study the following diagrams and answer the questions that follow.



5.2.1 Identify part A and state its function. (2)

5.2.2 In which diagram (1 or 2) will:

(a) The skin be pale if the person is light-skinned (1)

(b) The sweat glands produce more sweat (1)

5.2.3 Explain your answer in QUESTION 5.2.2(a). (2)

- 5.2.4 Diagram 3 toon 'n respons op 'n bepaalde omgewingstemperatuur. Watter diagram (1 of 2) toon 'n respons van 'n mens op dieselfde omgewingstemperatuur? Verduidelik jou antwoord. (3)
- 5.2.5 Beskryf hoe die proses in diagram 3 geïllustreer, help met die regulering van die hond se liggaamstemperatuur. (3)
(12)
- 5.3 Beantwoord die volgende vrae in verband met termoregulering by sommige soogdiere.
- 5.3.1 'n Muis sal meer van sy liggaamshitte as 'n olifant onder dieselfde lae omgewingstemperatuurtoestande verloor. Watter EEN van die volgende kan rekenskap gee vir hierdie waarneming:
- Die muis ...
- (a) is kleiner as die olifant.
- (b) is meer aktief as die olifant.
- (c) het 'n groter oppervlakarea tot volumeverhouding as die olifant.
- (d) het kleiner ore as die olifant. (2)
- 5.3.2 Verduidelik hoe die muis steeds 'n konstante liggaamstemperatuur kan handhaaf alhoewel dit oormatige hitte aan die koue omgewing verloor. (2)

(4)**Totaal Vraag 5: 25****TOTAAL AFDELING B: 100****GROOTTOTAAL: 150**

5.2.4 Diagram 3 shows a response to a particular environmental temperature. Which diagram (1 or 2) shows a response of a human to the same environmental temperature? Explain your answer. (3)

5.2.5 Describe how the process illustrated in diagram 3 helps in the regulation of the body temperature of the dog. (3)
(12)

5.3 Answer the following questions on thermoregulation in some mammals.

5.3.1 A mouse will lose more of its body heat than an elephant under the same low environmental temperature conditions. Which ONE of the following can account for this observation:

The mouse ...

- (a) is smaller than the elephant.
- (b) is more active than the elephant.
- (c) has a larger surface area to volume ratio than the elephant.
- (d) has smaller ears than the elephant. (2)

5.3.2 Explain how the mouse can still maintain a constant body temperature although it loses excessive body heat to the cold environment. (2)
(4)

Total Question 5: 25

TOTAL SECTION B: 100

GRAND TOTAL: 150