

1. **If more information than marks allocated is given**  
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right hand margin.
2. **If, for example, three reasons are required and five are given**  
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only part of it is required**  
Read all and credit relevant part.
4. **If comparisons are asked for and descriptions are given**  
Accept if differences / similarities are clear.
5. **If tabulation is required but paragraphs are given**  
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**  
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**  
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**  
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognized abbreviations**  
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.
10. **Wrong numbering**  
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**  
Do not accept.
12. **Spelling errors**  
If recognizable accept provided it does not mean something else in Biology or if it is out of context.
13. **If common names given in terminology**  
Accept provided it is accepted at *this* memo discussion.

*Senior Certificate Examination*

14. **If only letter is asked for and only name is given (and vice versa)**  
No credit.
15. **If units are not given in measurements**  
Candidates will lose marks. Memorandum will allocate marks for units separately.
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**  
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. If you have doubts consult the other language memo, if still have doubts ask the Provincial Internal Moderator to contact the National Internal Moderator or the External Moderators.
19. **Code-switching of official languages (terms and concepts)**  
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.
20. No changes must be made to the marking memoranda without consulting the Provincial Internal Moderator who in turn will consult with the External Moderator/s.
21. Only memoranda bearing the signatures of the UMALUSI moderators and distributed by the National Department of Education via the Provinces must be used.

## Senior Certificate Examination

## SECTION A

## QUESTION 1

- |     |       |   |         |            |
|-----|-------|---|---------|------------|
| 1.1 | 1.1.1 | C ✓✓  |         |            |
|     | 1.1.2 | A ✓✓  |         |            |
|     | 1.1.3 | C ✓✓  |         |            |
|     | 1.1.4 | B ✓✓  |         |            |
|     | 1.1.5 | B ✓✓  |         |            |
|     | 1.1.6 | A ✓✓  |         |            |
|     | 1.1.7 | C ✓✓  |         |            |
|     | 1.1.8 | B ✓✓  | (8 x 2) | (16)       |
| 1.2 | 1.2.1 | Osmosis ✓   |         |            |
|     | 1.2.2 | (Glomerular / Pressure / Ultra-)Filtration ✓  |         |            |
|     | 1.2.3 | Feedback ✓ mechanism  |         |            |
|     | 1.2.4 | Reabsorption / Absorption / Diffusion / Active transport / Secretion ✓  |         |            |
|     | 1.2.5 | Hilum ✓   |         |            |
|     | 1.2.6 | Xerophytes ✓  |         |            |
|     | 1.2.7 | Hydathodes ✓  |         |            |
|     | 1.2.8 | Co-ordination ✓   |         |            |
|     | 1.2.9 | Guard cells ✓   |         | (9)        |
| 1.3 | 1.3.1 | A only ✓✓   |         |            |
|     | 1.3.2 | A and B / (B only) ✓✓   |         |            |
|     | 1.3.3 | A only ✓✓   |         |            |
|     | 1.3.4 | A only ✓✓   |         |            |
|     | 1.3.5 | <b>+ 2 to all candidates</b>  |         |            |
|     | 1.3.6 | A and B ✓✓  | (6 x 2) | (12)       |
| 1.4 | 1.4.1 | - Auxin ✓   |         | (1)        |
|     | 1.4.2 | - Y ✓   |         | (1)        |
|     | 1.4.3 | - auxins moved ✓ to shaded side ✓<br>OR<br>- auxins were destroyed ✓ by light ✓<br>OR<br>- auxins moved ✓ to lower side due to gravity ✓        |         | (2)        |
|     |       |   |         | (4)        |
| 1.5 | 1.5.1 | A reflex arc / Path taken by an impulse during a reflex action ✓  |         | (1)        |
|     | 1.5.2 | (a) C ✓<br>(b) B ✓  |         | (1)<br>(1) |
|     | 1.5.3 | - Direction of arrows / impulse incorrect ✓<br>- Impulse to enter dorsal root / from receptor ✓<br>- and emerge at ventral root / to effector ✓ |         | (3)        |
|     |       |   |         | (6)        |

## Senior Certificate Examination

- 1.6 1.6.1 To determine the rate✓ of transpiration / absorption ✓ (2)
- 1.6.2 Water level in calibrated tube will have dropped / oil droplet will move lower down ✓ (1)
- 1.6.3 - Water level must be the highest / greatest capillary force✓  
- in the thinnest tube / tube A✓ (2)
- 1.6.4 - Determine the mass of the apparatus at the beginning ✓  
- and at the end ✓ of the investigation  
- Calculate the difference✓ in mass  
- This represents the mass✓ of water lost by the plant  
**OR**  
- Record the initial water level ✓  
- Record the final water level / at different time intervals✓  
- Find the difference✓ between these two water levels / for each time interval  
- This represents the volume✓ of water lost (4)
- 1.6.5 - Does not damage✓ the xylem✓  
**OR**  
- Allows for free movement of water✓ through the xylem ✓ (2)
- 1.6.6 - Air bubble will move slower ✓ (**compulsory mark**)  
**AND**  
- The smaller water vapour gradient between the leaves and the air ✓  
- slows down the rate of transpiration ✓ (any 1) (2)
- (13)**

**TOTAL QUESTION 1: 60**  
**TOTAL SECTION A: 60**

## SECTION B

## QUESTION 2

- 2.1 2.1.1 (a) B ✓ (1)
- (b) C ✓ (1)
- (c) D ✓ (1)
- 2.1.2 - To prevent the tympanic membrane from bursting ✓  
 - extra vibrations / sound waves / pressure leave the ear ✓  
 - along the Eustachian tube ✓  
 - through the mouth to the outside ✓ (Any 3) (3)
- 2.1.3 - Difference in pressure on ✓  
 - either side of tympanic membrane ✓  
 - causes sound waves to be distorted during transmission ✓ (Any 2) (2)
- 2.1.4 - Wax glands in the wall secrete wax / cerumen ✓ which traps foreign bodies / keeps canal moist ✓  
 - Hairs ✓ in the canal keep dust particles out ✓  
 - Long / hollow / curved / narrow tube ✓ transmits sound ✓ (Mark first 2 answers only) (4)  
**(12)**
- 2.2 2.2.1 (a) C ✓ (1)
- (b) A ✓ (1)
- (c) D ✓ (1)
- 2.2.2 - Allows light ✓ to enter ✓ the eyeball  
**OR**  
 - Refracts ✓ light ✓ (2)
- 2.2.3 - Controls the amount of light entering the eye ✓  
 - For more light ✓ to enter the eye  
 - radial muscles contract ✓  
 - circular muscles relax ✓  
 - iris becomes narrower / pupil dilates ✓ (Any 3) (3)  
**(8)**

## Senior Certificate Examination

- 2.3 In a person whose ciliary muscles do not function properly:
- Since ciliary muscles cannot contract / relax ✓
  - the tension on the suspensory ligaments cannot change ✓
  - This in turn prevents the lens from changing its shape / accommodating ✓
  - to focus image on the retina / yellow spot ✓
  - Hence spectacles are needed to assist the lens to refract light ✓  
to focus image on retina (any 4) **(4)**
- 2.4 2.4.1 (a) B ✓ Medulla oblongata ✓ (2)
- (b) A ✓ Cerebellum ✓ (2)
- (c) C ✓ Hypophysis / Pituitary gland ✓ (2)
- 2.4.2 - Acts as a cushion / protects ✓ delicate structures  
- Maintains a constant pressure ✓ within the central nervous system  
- Nourishes ✓ the cells with food and oxygen  
- Prevents drying out of cells ✓  
- Removes metabolic waste ✓ from the cells  
- Provides optimal conditions ✓ for chemical functioning (3)  
**(Mark first 3 only)**
- 2.4.3 - So that the conduction of impulses from one neuron to the next ✓  
- can be controlled ✓  
- such that it does not take place continuously ✓  
- Allows alternate pathways for impulses ✓  
- Allows for impulses to move in one direction ✓  
- To prevent a short circuit ✓ (2)  
- Allows space for the neurotransmitters ✓  
(Any 2) **(11)**
- TOTAL QUESTION 2: 35**

## Senior Certificate Examination

## QUESTION 3

- 3.1 3.1.1 Narrower in Diagram I / wider in Diagram II ✓ (1)
- 3.1.2 D ✓ (1)
- 3.1.3 - Gland D is the adrenal gland ✓  
 - that secretes adrenalin ✓  
 - that is transported to the skin capillaries ✓  
 - causing them to constrict ✓  
 - Less blood flows to the skin ✓  
 - so that more blood ✓  
 - can be directed to the strategic organs (examples) ✓  
 - to provide more fuel and oxygen ✓  
 - to provide more energy ✓  
 - to deal with the emergency situation ✓ (any 7) (7)
- 3.1.4 A ✓ (1)
- 3.1.5 - Will secrete less ✓  
 - TSH ✓  
 - leading to decreased ✓  
 - thyroid activity ✓  
 - and hence less ✓  
 - thyroxin ✓ produced by the thyroid gland  
 which decreases the metabolic rate (any 4) (4)
- 3.2 3.2.1 - They have a large surface area ✓ in comparison with their volume  
 - through which they lose heat energy ✓  
 - The food they consume is oxidised to provide extra energy / to  
 allow for a higher metabolic rate ✓  
 - to make up for the excessive heat lost ✓ (any 3) (3)
- 3.2.2 - Pigments in the skin become concentrated ✓  
 - making the skin darker to absorb more heat ✓  
 - to increase the body temperature ✓  
 - Since reptiles are ectothermic / cannot generate enough body  
 heat ✓  
 - for the normal / optimal functioning of enzymes ✓ (any 3) (3)
- (14)**

## Senior Certificate Examination

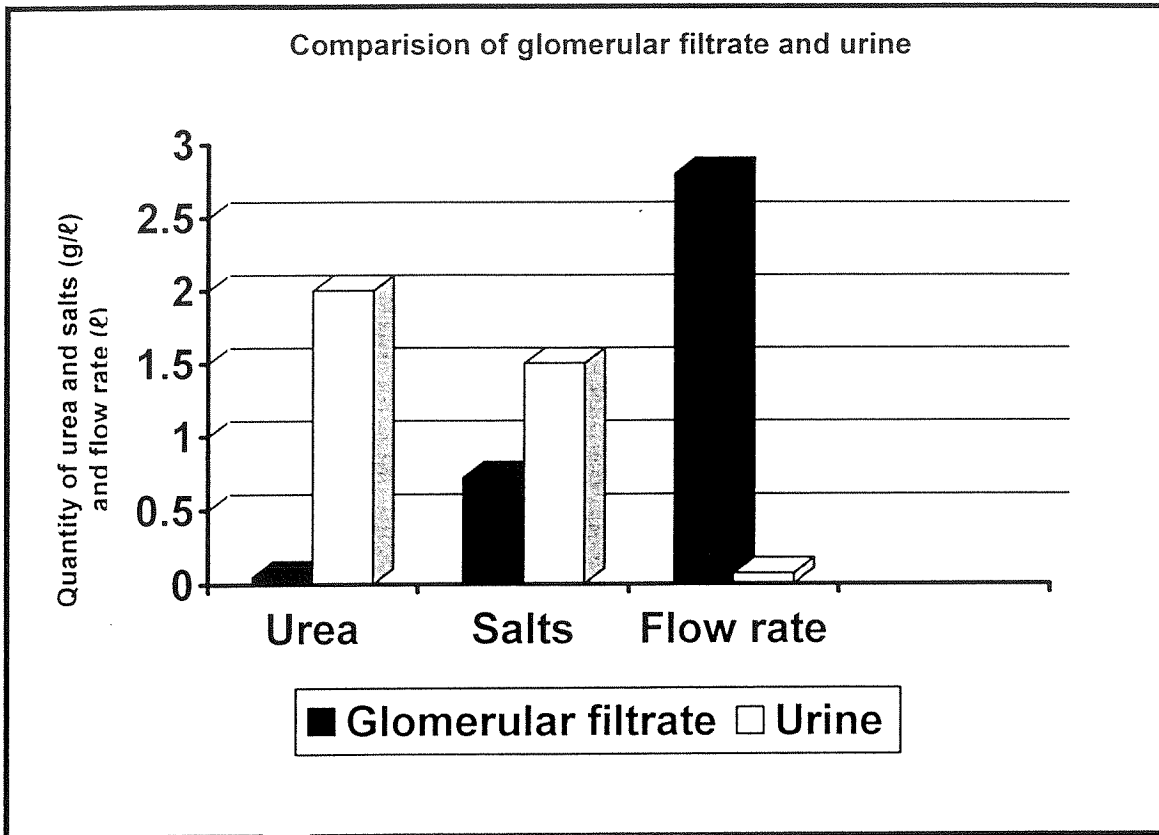
- 3.3 3.3.1 A ✓ (1)
- 3.3.2 - Greater variation from 37 °C / than in B / human temperature ✓  
 - because of contact with surrounding environment ✓  
 - where heat exchange takes place ✓  
 - since the environmental temperature does not remain constant ✓  
**OR**  
 - In B there is less variation in temperature / body temperature is more or less constant ✓  
 - because not in direct contact ✓ with environment  
 - hence less heat is lost / gained ✓  
 (any 3) (3)
- 3.3.3 - Temperature ✓ fluctuates ✓ within a narrow range  
**OR**  
 - Temperature ✓ does not remain constant ✓  
**OR**  
 - humans are endothermic ✓ ✓ (2)
- 3.3.4 - Skin becomes hotter ✓  
 - since the skin blood capillaries become dilated ✓  
 - more blood is sent to the skin ✓  
 - The sweat glands become more active ✓  
 - The erector muscles relax ✓  
 - The hairs lie flat ✓ (any 3)  
**OR**  
 - Increased muscle activity (exercises) ✓  
 - Increased metabolism ✓  
 - Fever ✓  
 - Intake of warm nutrients (liquids) ✓  
 - Warm clothes / exposure to high temperatures ✓ (any 3) (3)
- 3.3.5 - As a result of low environmental temperatures / illness / thermoregulation malfunction ✓  
 - too much ✓ heat is lost ✓  
 - core temperature decreased ✓ (any 3) (3)
- 3.4 - Substances forced out ✓ of the blood capillaries by higher pressure  
 - leading to the formation of the tissue fluid ✓  
 - that forms the essential internal environment of the cells ✓  
 - Also useful substances now become available to enter the cells ✓  
 - Metabolic wastes and other substances / water not needed by the cells can re-enter the blood stream ✓ due to the lower pressure on the venous side  
 - Prevents accumulation of tissue fluid / oedema ✓  
 - Promotes flow of blood ✓ (any 3) (3)

**TOTAL QUESTION 3: 35**



**QUESTION 4**

4.1 4.1.1

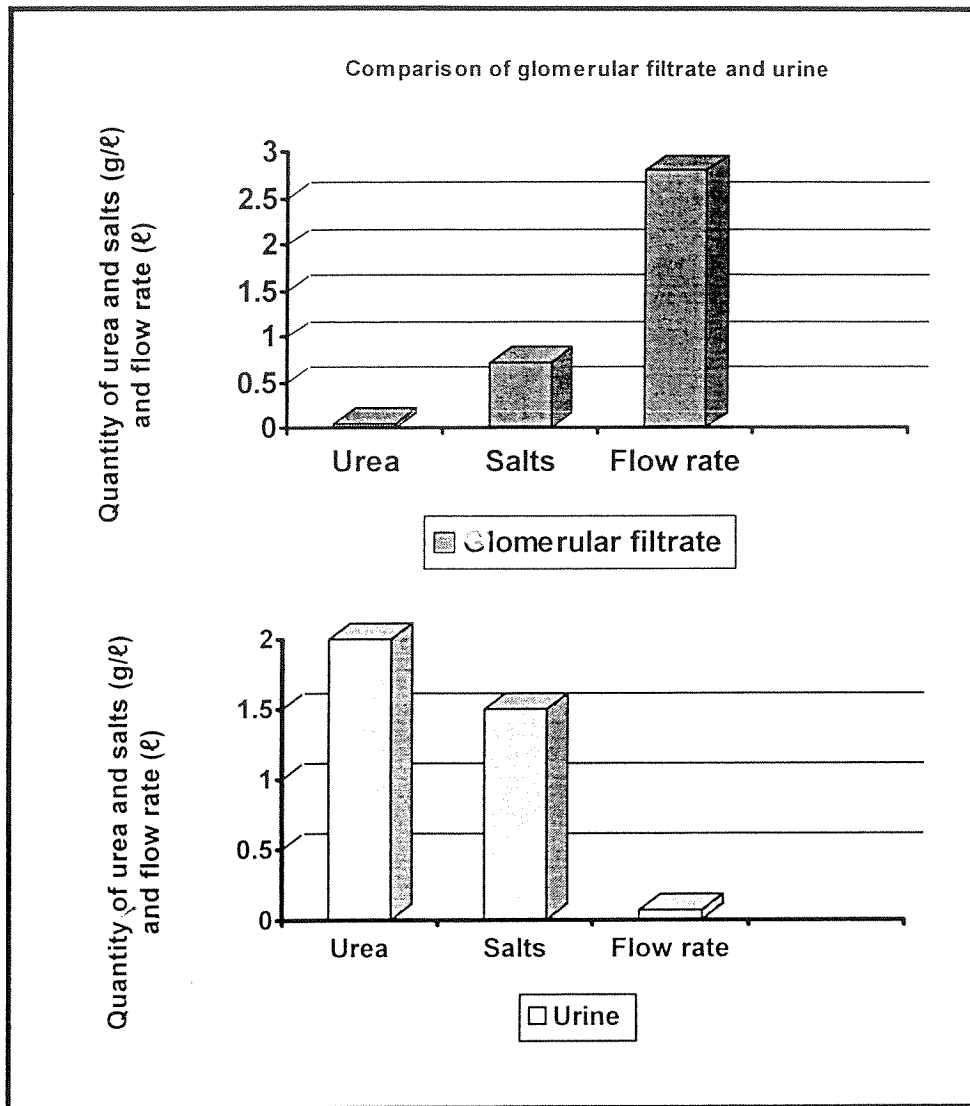


**Marking criteria:**

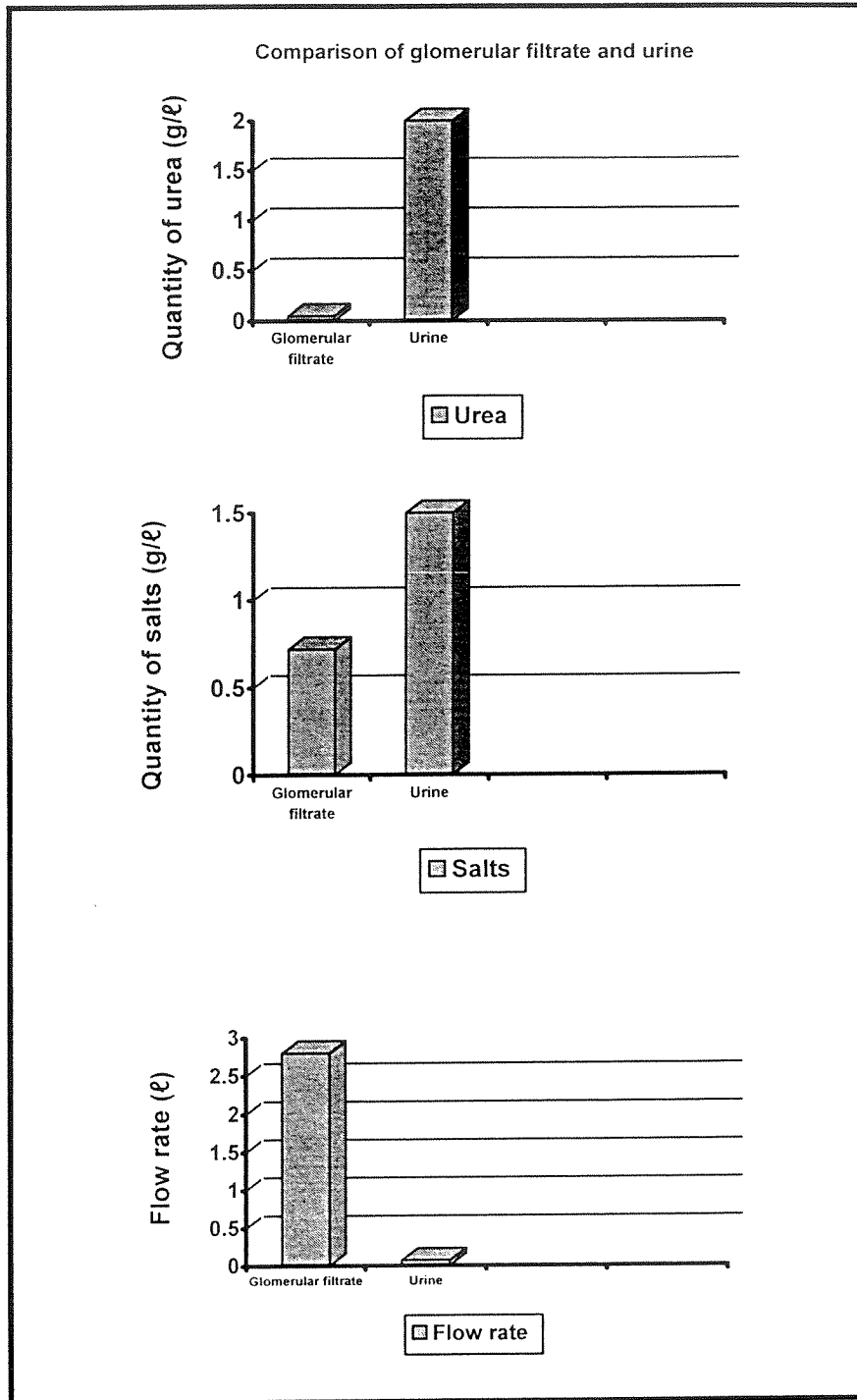
Correct type of graph	1	
Caption	1	
Key / labels for bars	1	
Title of Y-axis with units	1 urea and salts (g/l)	1 flow rate (l)
Scale Y-axis	1	
Title of X-axis	1	
Bars	1 Only 1-3 bars drawn correctly	2 4-6 bars drawn correctly

**NOTE:** Two alternate representations are shown on the next two pages. The above criteria must also be applied if candidates have presented one of these options.

Senior Certificate Examination



Senior Certificate Examination



(9)

4.1.2  $(0,05 \times 24) \checkmark = 1,2 \checkmark$  litres  $\checkmark$

(3)

- 4.1.3 - The kidneys must get rid of metabolic waste  $\checkmark$   
 - which can only be excreted in solution  $\checkmark$   
 - so little water must be excreted with the waste  $\checkmark$

(3)

## Senior Certificate Examination

- 4.1.4 - Presence of many substances (any example) ✓  
 can be used to determine any related condition (any example) ✓  
**OR**  
 - It is more convenient / cheaper / less invasive / less painful / less dangerous ✓✓ than using a blood sample  
**(Mark first answer only) (2)**

- 4.1.5 - High protein meal results in high amino acid level ✓  
 - Excess amino acids deaminated ✓ to form urea ✓  
 - and urine will have an increased ✓ concentration of urea  
 (any 3) (3)  
**(20)**

- 4.2 4.2.1 - Loop of Henlé is long / U shaped ✓  
 filtrate spends a longer time for re-absorption of useful substances / increases surface area ✓  
 - The diameter is the smallest at the curve ✓  
 so that filtrate moves slower / to allow re-absorption of useful substances ✓  
 - The walls consist of a single layer / thin / cuboidal epithelial ✓  
 for easy passage of sodium ions / sodium pump ✓  
 - The ascending limb is thicker and is impermeable to water ✓  
 - to prevent water from tissue fluid to enter the Loop of Henle ✓  
 - presence of mitochondria ✓ for active transport ✓  
**(6)**  
**Marks first 3 answers only**

- 4.2.2 - Osmoreceptors ✓  
 - in the hypothalamus ✓  
 - are stimulated ✓  
 - An impulse is generated ✓  
 - and sent to the hypophysis ✓  
 - to secrete more ADH ✓  
 - which is transported by the blood ✓  
 - to the distal tubules ✓  
 - and collecting ducts ✓ of kidney  
 - increasing their permeability ✓  
 - and more water is conserved / re-absorbed ✓  
 - Concentrated urine is formed ✓  
 - Urine is formed less frequently ✓  
 (any 7) (7)

- 4.2.3 Skin ✓  
 Lungs ✓  
 Liver ✓  
 Colon ✓  
**(2)**  
**(Mark first 2 answers only) (15)**

**TOTAL QUESTION 4: 35**  
**TOTAL SECTION B: 105**

**SECTION C**

**QUESTION 5**

- 5.1 5.1.1 Fifth / between 4 and 5 / last hour ✓ (1)
- 5.1.2 - Transpiration rate increases ✓  
- as the wind speed increases ✓ (2)
- 5.1.3 - Water vapour molecules are blown away from the vicinity of the leaves ✓  
- creating an increased water vapour molecule / diffusion pressure gradient ✓  
- leading to an increase in the transpiration rate ✓ (3)

5.1.4	A ✓	<b>OR</b>	B ✓	(1)
5.1.5	closes stomata ✓ at high wind speeds ✓		lower transpiration rates ✓ than plant A ✓	(2)

- 5.1.6 - Stomata may have partially closed/ leaves lost through wind damage ✓  
- thus reducing water loss ✓  
- The higher transpiration rate of species A may have caused excessive water loss ✓ from the plant  
- that increased the absorption of water from the soil ✓  
- and less soil water became available for absorption ✓  
- and less water reached the leaves ✓ (any 4) (4)
- 5.1.7 **+ 2 to all candidates** (2)
- 5.1.8 - Temperature ✓  
- Light intensity ✓  
- Humidity ✓  
- Soil water ✓ (Mark first 2 answers only) (2)

**(17)**

Senior Certificate Examination

- 5.2
- The soil water has a higher water potential ✓
  - The root hair has a lower water potential ✓
  - as a result of the large solute content/large vacuole ✓
  - Water moves by osmosis ✓
  - through the porous / thin ✓ cell wall ✓ of the root hair,
  - through the cell membrane ✓, into the vacuole
  - The root hair occurs as a projection, ✓
  - increasing the amount of water ✓ absorbed in this way.
  - The absence of a cuticle ✓
  - facilitates absorption ✓ of water into the root hair
  - The thin ✓ cytosol ✓
  - decreases the distance ✓ for water movement to the vacuole
  - Water then moves through the contents (symplastic) ✓ of the
  - parenchyma cells ✓
  - and also internally along their cell walls (apoplastic) ✓
  - and then through the endodermis ✓
  - The Casparian strips ✓ of the endodermis
  - directs the water through the endodermis into the pericycle ✓
  - and then into the xylem of the root ✓

(any 15) (15)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Level descriptions
0	Did not attempt the question.
1	Poor structuring of the answer with significant gaps in the knowledge of concepts and the adaptations of the tissues.
2	Answer is structured in a superficial way, illustrating the passage of water, using some gaps of knowledge of concepts. The adaptations of the various tissues have been included as an add on (separated from the description of the passage of water)
3	Answer is well structured, and logically describes the sequence of the passage of water, together with the associated concepts. The adaptations of the tissues are explained/embedded in this logical sequential description.

(3)  
(18)

TOTAL QUESTION 5: 35

TOTAL SECTION C: 35

GRAND TOTAL: 200

**Hierdie dokument moet aan alle memoranda en aan alle hersiene riglyne geheg word wat in 2006 versprei word en moet vroeg in 2007 aan ALLE Biologieonderwysers beskikbaar gestel word.**

1. **Indien meer inligting as die puntetoekenning gegee word**  
Hou op merk nadat die maksimum punte verkry is en trek 'n kronkellyn en dui 'maks' punte in die regterkantse kantlyn aan.
2. **Indien, by voorbeeld drie redes vereis en vyf word gegee.**  
Merk net die eerste drie ongeag daarvan of almal of sommige korrek / nie korrek is nie.
3. **Indien die hele proses beskryf word terwyl slegs 'n deel vereis word**  
Lees alles en krediteer die relevante dele.
4. **Indien vergelykings vereis, maar beskrywings word gegee**  
Aanvaar indien die verskille/ooreenkomste duidelik is.
5. **Indien tabulering vereis word en paragrawe word gegee**  
Kandidate sal punte verbeur indien nie getabuleer nie.
6. **As geannoteerde diagramme aangebied in plaas van beskrywings wat vereis word**  
Kandidate sal punte verbeur.
7. **Indien vloiediagramme i.p.v beskrywings aangebied word**  
Kandidate sal punte verbeur.
8. **Indien die volgorde vaag en skakelings nie sin maak nie**  
Krediteer waar volgorde en skakelings korrek is. Waar volgorde en skakelings nie korrek is nie, moenie krediteer nie. As die volgorde weer korrek is, gaan voort om te krediteer.
9. **Onherkenbare afkortings**  
Aanvaar indien dit aan begin van antwoord omskryf is. Indien dit nie omskryf is nie, moenie die onherkenbare afkorting krediteer nie, maar krediteer die res van die antwoord indien dit korrek is.
10. **Verkeerd genommer**  
Indien die antwoorde die regte volgorde van die vrae pas, is dit aanvaarbaar.
11. **Indien die taal wat gebruik word die bedoelde betekenis verander**  
Moenie aanvaar nie.
12. **Spelfoute**  
Aanvaar as dit herkenbaar is, met die voorbehoud dat dit nie iets anders in Biologie beteken nie of as dit buite konteks is.

13. **Indien gewone name gegee word in terminologie**  
Aanvaar, indien dit by die memobespreking aanvaar is.
14. **Indien slegs letter vereis word en slegs die naam word gegee (en andersom)**  
Geen krediet.
15. **As eenhede van mate nie aangedui word**  
Kandidate sal punte verbeur. Memorandum sal afsonderlike punte vir eenhede aandui.
16. Wees sensitief vir die **betekenis van die antwoord, wat soms op verskillende maniere aangebied kan word.**
17. **Opskrif.** Alle illustrasies (soos diagramme, tekeninge, grafieke, tabelle, ens.) moet van 'n opskrif voorsien word
18. As u twyfel, raadpleeg die memo in die ander taal, as u steeds twyfel vra die Provinsiale Interne Moderator om kontak met die Nasionale Interne of Eksterne Moderatore te maak.
19. **Vermenging van amptelike tale (terme/konsepte)**  
  
Slegs 'n enkele woord of twee wat in enige ander amptelike taal anders as die leerder se assesseringstaal waarin die meeste van sy/haar antwoorde aangebied word, moet gekrediteer word, indien dit korrek is. 'n Nasionale wat in die relevante amptelike taal vaardig is, behoort geraadpleeg te word. Dit geld vir alle amptelike tale.
20. Geen veranderinge mag aan die goedgekeurde memorandum aangebring word sonder dat daar met die Provinsiale Interne Moderator, wat op sy/haar beurt met die Eksterne Moderator(e), sal beraadslaag, nie.
21. Slegs memorandums wat die handtekeninge van die UMALUSI moderatore bevat en deur die Nasionale Departement van Onderwys versprei word, mag gebruik word.



**AFDELING A**

**VRAAG 1**

1.1	1.1.1	C ✓✓		
	1.1.2	A ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	B ✓✓		
	1.1.6	A ✓✓		
	1.1.7	C ✓✓		
	1.1.8	B ✓✓	(8 x 2)	(16)
1.2	1.2.1	Osmose ✓		
	1.2.2	(Glomerulêre /Druk /Ultra)Filtrasie ✓		
	1.2.3	Terugvoer-✓meganisme		
	1.2.4	Herabsorpsie/Absorpsie/Diffusie/Aktiewe vervoer/ Sekresie ✓		
	1.2.5	Hilum ✓		
	1.2.6	Xerofiete ✓		
	1.2.7	Hidatodes ✓		
	1.2.8	Koördinering ✓		
	1.2.9	Sluitselle ✓		(9)
1.3	1.3.1	Slegs A ✓✓		
	1.3.2	A en B (slegs B) ✓✓		
	1.3.3	Slegs A ✓✓		
	1.3.4	Slegs A ✓✓		
	1.3.5	<b>+2 aan alle kandidate</b>		
	1.3.6	A en B ✓✓	(6 x 2)	(12)
1.4	1.4.1	- Ouksien ✓		(1)
	1.4.2	- Y ✓		(1)
	1.4.3	- Ouksien na die skaduweekant ✓ beweeg ✓		
		<b>OF</b>		
		Ouksiene beweeg ✓ na skadukant a.g.v. gravitasie ✓		
		<b>OF</b>		
		Ouksiene word deur lig ✓ vernietig ✓		(2)
				(4)
1.5	1.5.1	'n Refleksboog / Pad gevolg deur impuls gedurende 'n refleksaksie ✓		(1)
				(1)
	1.5.2	(a) C ✓		(1)
		(b) B ✓		
	1.5.3	- Die rigting van die pyle / impuls is verkeerd ✓		
		- Impuls moet by die dorsale wortel ingaan / vanaf reseptor ✓		(3)
		- Uitkom by ventrale wortel / na effektor ✓		(6)

- 1.6 1.6.1 Om die transpirasietempo / absorpsietempo ✓ te bepaal ✓ (2)
- 1.6.2 - Watervlak in kapillêre buise sal gedaal het / oliedruppel sal laer af beweeg het ✓ (1)
- 1.6.3 - Watervlak moet die hoogste wees / grootste kapillere krag ✓  
- in die in die dunste buis / buis A ✓ (2)
- 1.6.4 - Bepaal die massa van die apparaat aan die begin ✓  
- en aan die einde ✓ van die ondersoek  
- Bereken die verskil ✓ in massa  
Dit verteenwoordig die massa ✓ water wat die plant verloor het  
**OF**  
- Notuleer die aanvanklike watervlak ✓  
- notuleer die finale watervlak / by verskillende tydintervalle/verskillende tydintervalle ✓  
- vind die verskil ✓ tussen die twee watervlakke / vir elke tyd interval (4)  
dit stel die volume ✓ water voor wat verloor is
- 1.6.5 - Beskadig nie ✓ die xileem ✓ nie (2)  
**OF**  
- laat vrye beweging van water ✓  
deur die xileem toe ✓
- 1.6.6 - Die lugblasie sal stadiger beweeg ✓ (**verpligte punt**)  
- Die kleiner waterdampgradiënt tussen die blare en die lug ✓  
- vertraag die transpirasietempo ✓ (Enige 1) (2)  
**(13)**

**TOTAAL VRAAG 1: 60**  
**TOTAAL AFDELING A: 60**

## AFDELING B

## VRAAG 2

- 2.1 2.1.1 (a) B ✓ (1)
- (b) C ✓ (1)
- (c) D ✓ (1)
- 2.1.2 - Om te verhoed dat die timpaniese membraan bars ✓  
- ekstra vibrasies / klankgolwe / druk verlaat die oor ✓  
- langs die die buis van Eustachius ✓  
- deur die mond na buite ✓ (Enige 3) (3)
- 2.1.3 - druk die Timpaniese membraam na die buitekant ✓  
- verlaag sy elasticiteit ✓ en  
- minder vibrasies vind plaas ✓ (Enige 2)
- OF**
- Verskil in druk aan ✓  
- weers kante van die timpaniese membraan ✓  
- veroorsaak verwronging van klankgolwe tydens oordrag ✓ (Enige 2) (2)
- 2.1.4 - Waskliere in die wand skei was/serumen ✓ af wat  
- vreemde liggaampies vang / die kanaal vogtig hou ✓  
- Hare ✓ in die kanaal  
- hou stofdeeltjies uit ✓ (4)  
- Lang / hol / geboë / nou buis ✓ (12)  
- gelei klankgolwe ✓ (**Sien slegs die eerste 2 antwoorde na**)
- 2.2 2.2.1 (a) C ✓ (1)
- (b) A ✓ (1)
- (c) D ✓ (1)
- 2.2.2 - Laat toe dat lig ✓ die oogbal kan binnegaan ✓  
**OF**  
- Refrakteer ✓ die lig ✓ (2)
- 2.2.3 - Beheer die hoeveelheid lig wat die oog binnekom ✓  
- Vir meer lig ✓ om die oog binne te kom moet die  
- radiale spiere ✓ saamtrek  
- die kringspiere ontspan en ✓  
- Iris raak nouer / die pupil verwyd / ✓ (Enige 3) (3)
- (8)**

- 2.3 Aangesienn die siliaarspier nie kan saamtrek/verslap nie ✓
- sal die spanning op die suspensoriese ligamente nie verander nie ✓
  - Dit maak dat die lens nie sy vorm kan verander nie / akkomodasie ✓
  - om die beeld op die retina / geelvlak ✓ te fokus
  - Die bril word dus benodig om die lens te help om die lig te breek ✓ om die beeld op die retina te fokus
- (Enige 4) **(4)**
- 2.4 2.4.1 (a) B ✓ Medulla Oblongata ✓ (2)
- (b) A ✓ Serebellum ✓ (2)
- (c) C ✓ Hipofise/Pituitêre klier ✓ (2)
- 2.4.2 - Dien as 'n kussing/beskerm ✓ delikate strukture
- Handhaaf 'n konstante druk ✓ binne die sentrale senuweestelsel
- Voed ✓ die selle met voedsel / en suurstof
- Verkom dat selle uitdroog ✓
- Verwyder metaboliese afval ✓ uit die selle
- Verskaf optimale toestande ✓ vir chemiese toestande (Enige 3) (3)
- (Sien slegs die eerste 3 na)**
- 2.4.3 - Sodat die geleiding van impulse van een neuron na die volgende ✓
- beheer kan word ✓
- sodat dit nie aanhoudend plaasvind nie ✓
- laat alternatiewe weg vir oordrag van impulse toe ✓
- Laat eenrigtingbeweging van impulse toe ✓
- Voorkom kortsluitings ✓
- Laat ruimte toe vir neurotransmitter ✓
- (Enige 2) (2)
- (11)**
- TOTAAL VRAAG 2: 35**

**VRAAG 3**

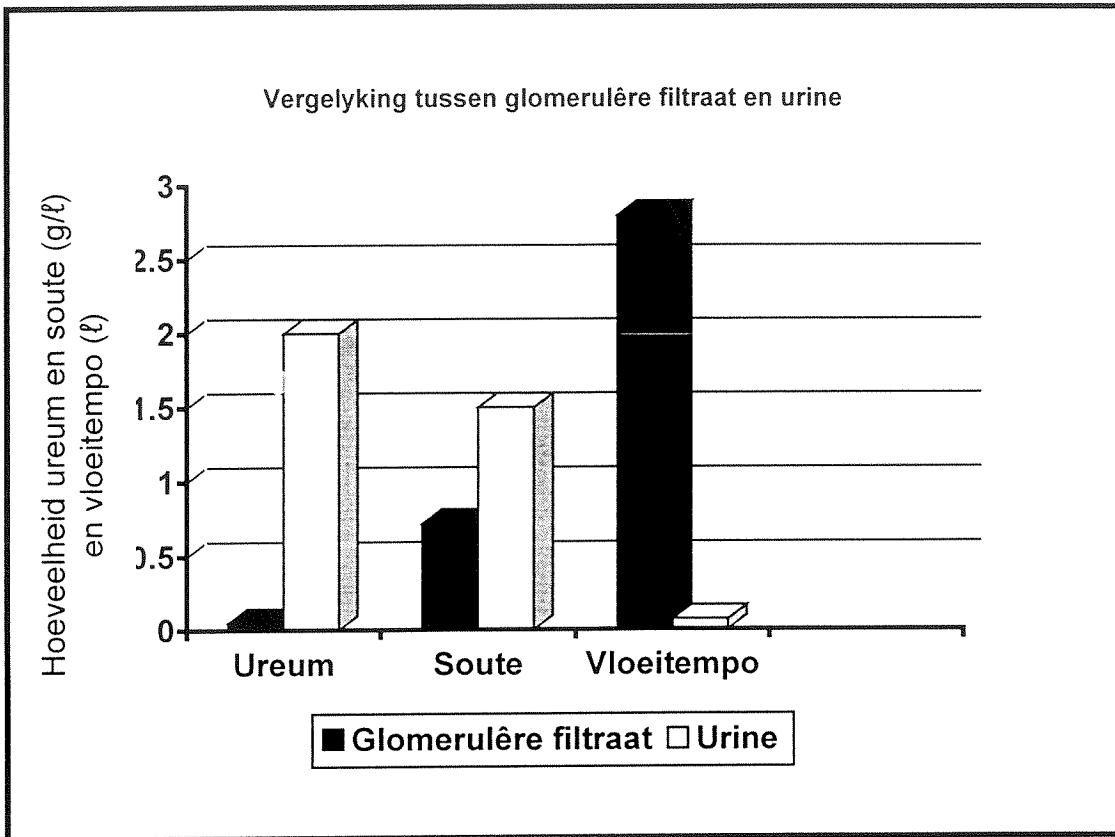
- 3.1 3.1.1 Nouer in Diagram I / Wyer in Diagram II ✓ (1)
- 3.1.2 D ✓ (1)
- 3.1.3
- Klier D is die byniere ✓
  - wat adrenalien afskei ✓
  - wat na die velkapillêres vervoer word ✓
  - wat veroorsaak dat hulle vernou ✓
  - Minder bloed vloei na die vel ✓
  - sodat meer bloed ✓ na die  
strategiese organe (voorbeelde) ✓  
gelei/gerig word
  - om meer brandstof en suurstof te voorsien ✓
  - en meer energie te verskaf ✓
  - om die noodsituasie te hanteer ✓
- (Enige 7) (7)
- 3.1.4 A ✓ (1)
- 3.1.5
- Sal minder ✓
  - TSH ✓ afskei
  - wat tot verlaagde ✓
  - tiroïedaktiwiteit lei ✓
  - aldus word minder ✓
  - tiroksien ✓ deur die tiroïedklier vervaardig wat tot 'n afname in  
metaboliese tempo lei
- (Enige 4) (4)  
**(14)**
- 3.2 3.2.1
- Hulle het 'n groot oppervlakarea ✓ in vergelyking met hulle  
volume
  - waardeur hulle hitte-energie verloor ✓
  - Die kos wat hulle verbruik, word geoksideer om ekstra hitte-  
energie te verskaf / vir hoër metaboliese tempo ✓
  - om vir die oormatige hitte-verlies te kompenseer ✓
- (Enige 3) (3)
- 3.2.2
- Pigmente in die vel raak meer gekonsentreer ✓
  - wat die vel donkerder maak om meer hitte te absorbeer ✓
  - om liggaamstemperatuur te verhoog ✓
  - Aangesien reptiele ektotermies is / kan hulle nie genoeg  
liggaamshitte genereer nie ✓
  - vir die normale / optimale funksionering van die ensieme ✓ nie
- (Enige 3) (3)  
**(6)**

- 3.3 3.3.1 A ✓ (1)
- 3.3.2 - Groter variasie vanaf 37 °C / as in B / menslike temperatuur ✓  
 - as gevolg van kontak met omliggende omgewing ✓  
 - waar hitte-uitruiling plaasvind ✓  
 - aangesien die omgewingstemperatuur nie konstant bly nie ✓  
**OF**  
 - In B minder variasie in temperatuur / liggaamstemperatuur is min of meer konstant ✓  
 - omdat dit nie in direkte kontak ✓ met omgewing is nie  
 - gevolglik minder hitte verloor / opgeneem ✓  
 (Enige 3) (3)
- 3.3.3 - Temperatuur ✓ fluktueer ✓ binne 'n baie klein (tyds)bestek  
**OF**  
 - Temperatuur ✓ bly nie konstant nie ✓  
**OF**  
 - mense is endotermies ✓✓ (2)
- 3.3.4 - Die vel raak warmer ✓  
 - omdat die velkappillêres verwyd ✓  
 - meer bloed word na die vel gestuur ✓  
 - Die sweetkliere raak aktief ✓  
 - Die haarspiere verslap ✓  
 - Die hare lê plat ✓  
**OF**  
 - Verhoogde spier aktiwiteit / oefening ✓  
 - Verhoogde metabolisme ✓  
 - Koors ✓  
 - Inname van warm voedsel / Drank ✓  
 - Warm klere / blootstelling aan hoë temperatuur ✓ (Enige 3) (3)
- 3.3.5 - Asgevolg van die lae omgewings temperatuur / siektes / termoregulering wanfunksionering ✓  
 - te veel ✓ hitte gaan verlore ✓  
 - kerntemperatuur neem af ✓ (Enige 3) (3)
- 3.4 - Stowwe word uit die bloedkapillêres geforseer ✓ deur hoër druk  
 - wat lei tot die vorming van die weefselvloeistof ✓  
 - wat die essensiële interne omgewing van die selle vorm ✓  
 - Bruikbare stowwe raak ook nou beskikbaar om die selle binne te gaan ✓  
 - Metaboliese afval en ander stowwe / water wat nie deur die selle benodig word nie, kan die bloedstroom weer binnegaan ✓ as gevolg van die laer druk op die veneuse kant  
 - Voorkom ophoping van weefselvloeistof / edeem ✓  
 - Bevoordeel die vloei van bloed ✓ (Enige 3) (3)

**TOTAAL VRAAG 3: 35**

**VRAAG 4**

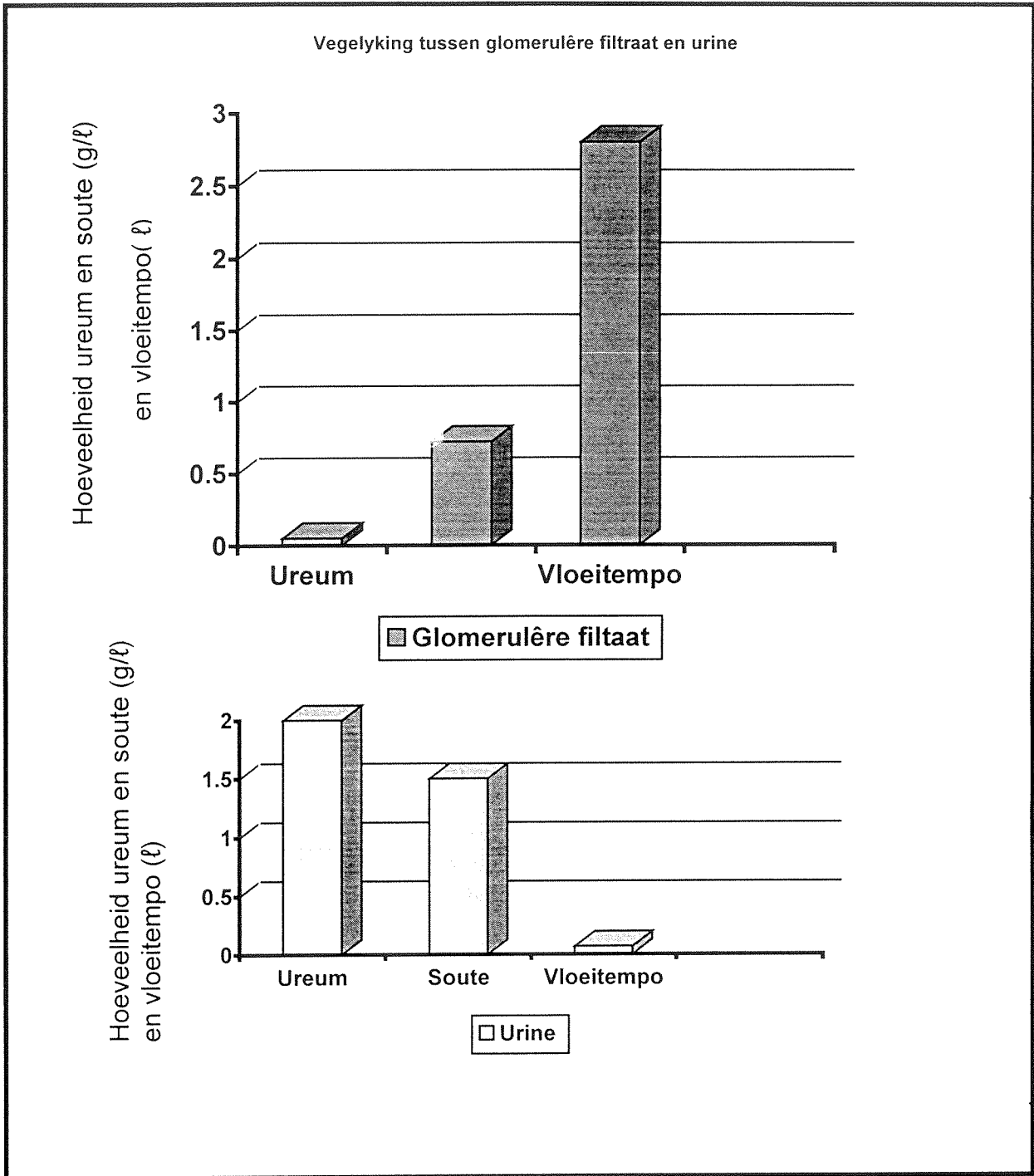
4.1 4.1.1



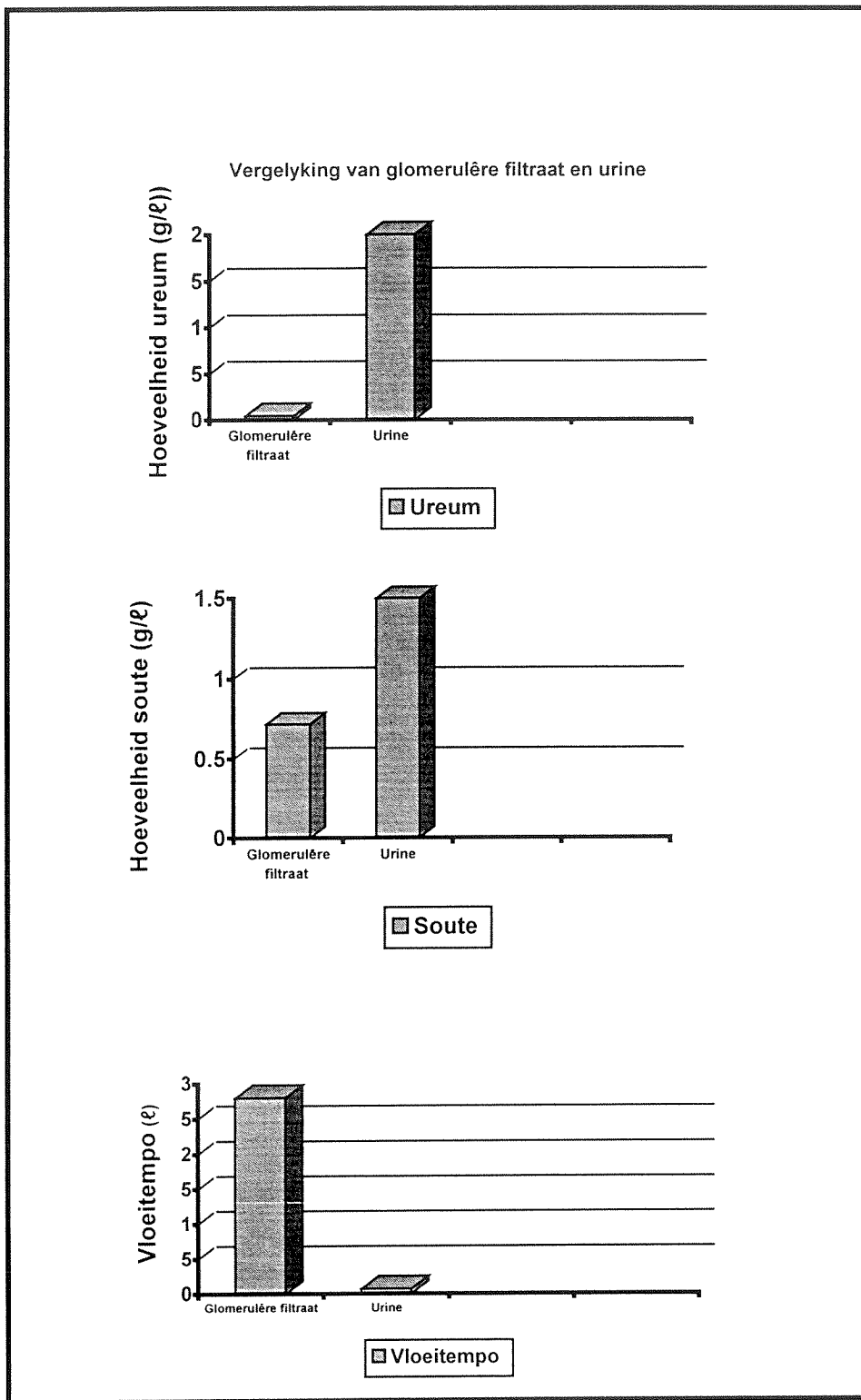
**Nasienkriteria:**

Korrekte tipe grafiek	1	
Opskrif	1	
Sleutel beyskrifte van stafies	1	
Titel van Y-as met eenhede	1 ureum en soute (g/l)	1 vloei tempo(ℓ)
Skaal Y-as	1	
Titel van X- as	1	
Stafies	1 Slegs 1-3 stafies korrek geteken	2 4-6 stafies korrek geteken

**LET WEL:** Alternatiewe voorstellings word op die volgende twee bladsye weergee. Boonste kriteria moet ook toegepas word indien kandidate een van hierdie opsies aangebied het.







4.1.2       $0,05 \times 24 \checkmark = 1,2 \checkmark$  liter  $\checkmark$

(9)

(3)

- 4.1.3 - Die niere moet van metaboliese afval ontslae raak ✓  
 - wat slegs in oplossing uitgeskei kan word ✓  
 - so min water moet met die afval uitgeskei word ✓ (3)
- 4.1.4 - Die teenwoordigheid van enige stof (voorbeeld) ✓  
 kan gebruik word om enige verwante toestand (voorbeeld) te bepaal ✓
- OF**
- Dit is geriefliker /goedkoper /minder pynlik / minder indringing / minder gevaarlik ✓✓ as die gebruik bloedmonsters (2)  
**(Merk slegs eerste antwoord)**
- 4.1.5 - Hoë proteïenmaaltyd het 'n hoë aminosuurvlak tot gevolg ✓  
 - oortollige aminosure gedeamineer ✓ om ureum te vorm ✓  
 - en die urine sal 'n hoë konsentrasie ✓ ureum bevat (Enige 3) (3)  
**(20)**
- 4.2 4.2.1 - Boog van Henlé is lank / U-vormig ✓  
 filtraat vertoef langer vir die herabsorpsie van nuttige stowwe / vergroot oppervlak area ✓  
 - Die deursnit is die kleinste by die kurwe ✓  
 sodat filtraat stadiger beweeg / vir die die herabsorbering van nuttige stowwe ✓  
 - Die wande bestaan uit 'n enkellaag / dun / kubusie epiteel ✓  
 vir die maklike deurlaat van natriumione / natriumpomp ✓  
 - Die stygende been is dikwandig en is ondeurlaatbaar vir water ✓  
 - om te voorkom dat die water van die weefselvloeistof die boog van Henle binnekom ✓  
 - Teenwoordigheid van mitochondria vir aktiewe vervoer ✓ (6)  
**(Merk slegs eerste 3 antwoorde)**
- 4.2.2 - Osmoreseptore ✓  
 - in die hipotalamus ✓ word  
 - gestimuleer ✓ en  
 - 'n impuls word gegenereer ✓  
 - en na die hipofise gestuur ✓  
 - om meer ADH af te skei ✓  
 - wat deur die bloed vervoer word ✓  
 - na die distalebuise ✓ van die nier  
 - en ✓ versamelbuise van die niere  
 - om meer deurlaatbaar te raak ✓  
 - en meer water te behou / te herabsorbeer ✓  
 - Sodat gekonsentreerde urine gevorm word ✓ en  
 - Urine word minder gereeld gevorm ✓ (Enige 7) (7)
- 4.2.3 Vel ✓  
 Longe ✓  
 Lewer ✓  
 Kolon ✓ (2)  
**(Sien slegs die eerste 2 antwoorde na) (15)**

**TOTAAL VRAAG 4: 35**  
**TOTAAL AFDELING B: 105**

**AFDELING C**

**QUESTION 5**

5.1 5.1.1 Vyfde / tussen 4 en 5 / laaste uur ✓ (1)

5.1.2 - Transpirasietempo verhoog ✓  
- as die windspoed verhoog ✓ (2)

5.1.3 - Waterdampmolekules word in die nabyheid van die blare weg-  
gewaai ✓  
- wat 'n verhoogde waterdampmolekulegradiënt / diffusie-druk-  
gradiënt skep ✓  
- wat tot 'n verhoging in die transpirasietempo lei ✓ (3)

5.1.4 

A ✓	OF	B ✓
-----	----	-----

 (1)

5.1.5 

Huidmondjies sluit ✓ by hoë windsnelhede ✓	OF	Laer transpirasietempo 's ✓ as plant A ✓
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 (2)

5.1.6 - Stomata dalk gedeeltelik gesluit / blare deur wind afgewaai ✓  
- en dus verminderde waterverlies ✓  
- Die hoër transpirasietempo van spesie A kon veroorsaak dat 'n  
oormaat water uit die plant verlore gegaan het ✓  
- Dit het die absorpsie van water uit die grond verhoog ✓  
- en minder grondwater vir absorpsie beskikbaar gestel ✓  
- en minder water het die blare bereik ✓  
(Enige 4) (4)

5.1.7 **+ 2 vir alle kandidate** (2)

5.1.8 - Temperatuur ✓  
- Ligintensiteit ✓  
- Humiditeit ✓  
- Grondwater ✓ **(Sien slegs die eerste 2 antwoorde na)** (2)  
**(17)**

- 5.2
- Die grondwater het 'n hoër waterpotensiaal ✓
  - Die wortelhaar het 'n lae waterpotensiaal ✓
  - as gevolg van die groot opgeloste stof inhoud / groot vakuool ✓
  - beweeg water deur osmose ✓
  - deur die poreuse / dun ✓ selwand ✓ van die wortelhaar,
  - deur die selmembraan ✓ tot in die vakuool
  - Die wortelhaar is 'n uitgroeiisel ✓
  - wat die hoeveelheid water wat op hierdie manier geabsorbeer word, verhoog ✓
  - Die afwesigheid van 'n kutikula ✓
  - bevorder die absorpsie ✓ van water in die wortelhaar in
  - Die dun ✓ sitosool ✓
  - verminder die afstand ✓ vir waterbeweging na die vakuool
  - Water beweeg dan deur die inhoud (simplasties) ✓ van die
  - parenchiemselle ✓
  - asook inwendig langs hulle selwande (apoplassties) ✓
  - en dan deur die endodermis ✓
  - Die Caspary-bandjies ✓ rondom die endodermis
  - lei/rig die water deur die perisikel ✓ en dan
  - tot in die xileem van die wortel ✓

(Enige 15) (15)

**ASSESSERING VAN DIE AANBIEDING VAN DIE OPSTEL**

Punte	Vlakbeskrywings
0	Het nie probeer om die vraag te beantwoord nie.
1	Swak strukturering van die antwoord met noemenswaardige gapings/leemtes in die kennis van die konsepte en die aanpassings van die weefsels.
2	Die antwoord is op 'n eenvoudige/simplistiese manier gestruktureerd waarin die gang van die water, deur die gebruik van toepaslike konsepte, geïllustreer word. Die aanpassings van die verskeie weefsels is as 'n byvoegsel ingesluit (apart van die beskrywing van die gang van die water).
3	Die antwoord is goed gestruktureerd, en beskryf logies die opeenvolging van die gang van die water, saam met die gebruik van die geassosieerde konsepte. Die aanpassings van die weefsels word in hierdie logiese opeenvolgende beskrywing verduidelik/ingesluit.

(3)  
(18)

TOTAAL VRAAG 5: 35  
TOTAAL AFDELING C: 35  
GROOTTOTAAL: 200