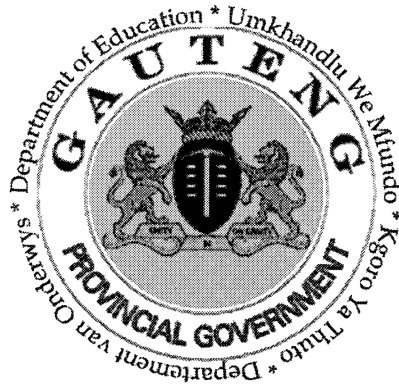


SENIOR CERTIFICATE EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN



OCTOBER / NOVEMBER
OKTOBER / NOVEMBER

2004

BIOLOGY

BIOLOGIE

(First Paper)
(Eerste Vraestel)

LG

306-3/1 LS

BIOLOGY LG: Paper 1

12 pages
12 bladsye



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GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

BIOLOGIE LG
(Eerste Vraestel)

TYD: 2 uur

PUNTE: 150

INSTRUKSIES EN INLIGTING AAN KANDIDATE:

- Beantwoord AL die vrae in jou antwoordboek.
 - Begin elke vraag se antwoord bo-aan 'n nuwe bladsy.
 - Nommer die antwoorde presies soos die vrae genommer is.
 - Skryf netjies en leesbaar.
 - Indien antwoorde nie volgens die instruksies van elke vraag aangebied word nie, sal punte afgetrek word.
 - Die diagramme in die vraestel is nie noodwendig volgens skaal geteken nie.
 - Nie-programmeerbare sakrekenaars mag gebruik word.
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-

AFDELING A

VRAAG 1

- 1.1 Verskeie moontlike antwoorde word vir elke vraag verskaf. Dui die korrekte antwoord aan deur slegs die letter langs die toepaslike vraagnommer neer te skryf.
- 1.1.1 Wanneer daar 'n gebrek van vitamien D in groeiende kinders ontstaan, kan hulle aan _____ ly.
- A. skeurbuik
 - B. anaemia (bloedarmoede)
 - C. beri-beri
 - D. ragitis

GAUTENG DEPARTMENT OF EDUCATION**SENIOR CERTIFICATE EXAMINATION****BIOLOGY LG
(First Paper)****TIME: 2 hours****MARKS: 150**

INSTRUCTIONS AND INFORMATION TO CANDIDATES:

- Answer ALL the questions in your answer book.
 - Start the answer to each question at the top of a new page.
 - Number the answers exactly as the questions are numbered.
 - Write neatly and legibly.
 - If answers are not presented according to the instructions of each question, marks will be deducted.
 - The diagrams in the question paper may not necessarily be drawn to scale.
 - Non-programmable calculators may be used.
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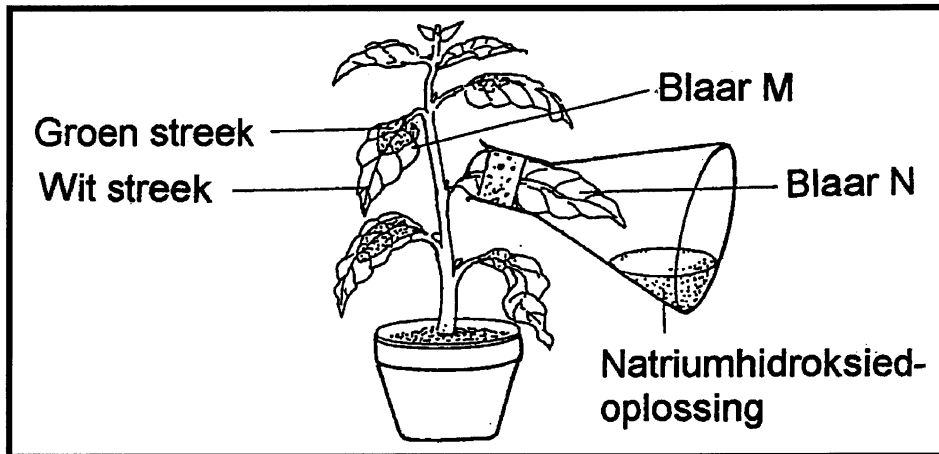
SECTION A**QUESTION 1**

1.1 Various possible answers are provided for each question. Indicate the correct answer by writing down only the letter next to the question number.

1.1.1 If growing children lack vitamin D, they can develop _____ .

- A. scurvy
- B. anaemia
- C. beri-beri
- D. rickets

Vraag 1.1.2 en 1.1.3 is gebaseer op die volgende diagram van 'n eksperiment :



1.1.2 Die potplant word eers vir 24 uur lank in donkerte gehou om _____ .

- A. dit koolstofdiksied te laat ontbeer
- B. te verseker dat die huidmondjies oop is
- C. chlorofil uit die blare te haal
- D. die plant te ontstysel

1.1.3 Die gasse afgegee deur blaar **M** tydens fotosintese is onderskeidelik _____ .

- A. slegs suurstof
- B. koolstofdiksied en suurstof
- C. waterdamp
- D. slegs koolstofdiksied

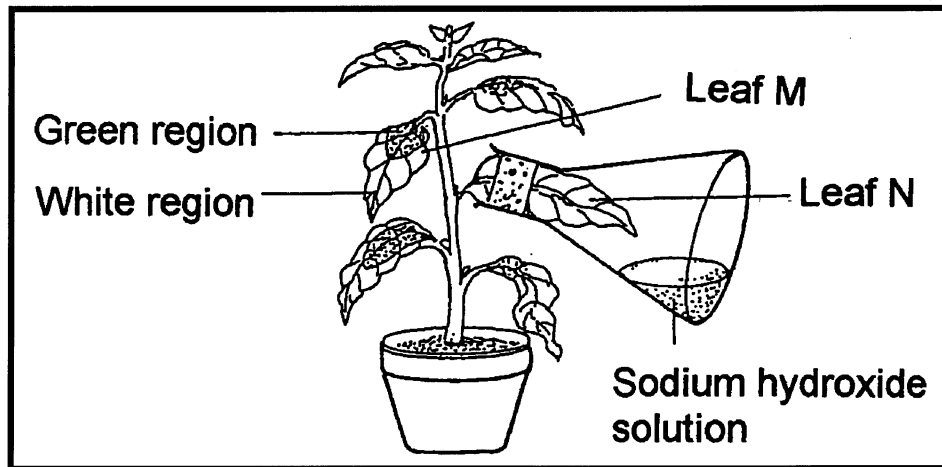
1.1.4 Watter van die volgende verteenwoordig 'n bevolking?

- A. Al die visse in 'n rivier
- B. Al die voëls in 'n woud
- C. Al die bobbejane in die wêreld
- D. Al die rooibokke in 'n wildreservaat

1.1.5 Die meeste van die koolstofdiksied in die bloed word _____ vervoer.

- A. in oplossing
- B. as bikarbonaatione
- C. as oksihemoglobien
- D. as karbaminohemoglobien

Questions 1.1.2 and 1.1.3 are based on the following diagram of an experiment:



1.1.2 The potted plant is first kept in darkness for 24 hours to _____ .

- A. deprive it of carbon dioxide
- B. ensure that the stomata are open
- C. remove chlorophyll from the leaves
- D. destarch the plant

1.1.3 The gases given off by leaf **M** during photosynthesis respectively are _____ .

- A. oxygen only
- B. carbon dioxide and oxygen
- C. water vapour
- D. carbon dioxide only

1.1.4 Which of the following represents a population?

- A. All the fish in a river
- B. All the birds in a forest
- C. All the baboons in the world
- D. All the impala in a game reserve

1.1.5 Most of the carbon dioxide in blood is transported _____ .

- A. in a solution
- B. as bicarbonate ions
- C. as oxyhaemoglobin
- D. as carbaminohaemoglobin

1.1.6 Die vitamien wat nagblindheid voorkom, is _____ .

- A. vitamien K
- B. vitamien A
- C. vitamien D
- D. vitamien C

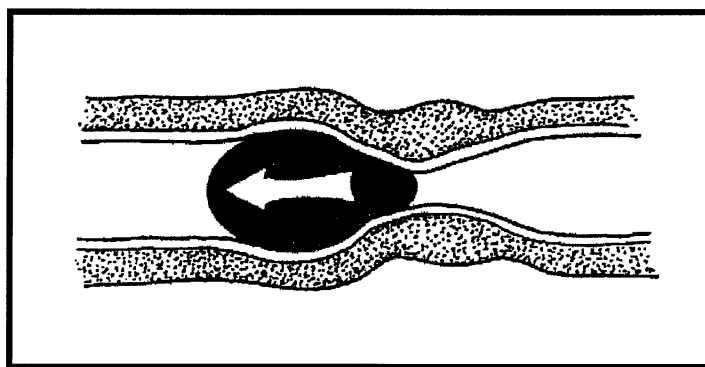
1.1.7 Watter een van die volgende kombinasies sal 'n afname in die grootte van 'n herbivoorbevolking veroorsaak?

- (i) Nataliteit
 - (ii) Emigrasie
 - (iii) Mortaliteit
 - (iv) Predasie
- A. (ii); (iii) en (iv)
 - B. (i) en (ii)
 - C. (i); (ii); en (iii)
 - D. (i); (ii); (iii) en (iv)

1.1.8 Die langste deel van die spysverteringstelsel is die dunderm. 'n Moontlike rede hiervoor is omdat _____ .

- A voedingstowwe hier geberg word
- B ensieme bygevoeg word
- C maksimum absorpsie van voedingstowwe hier plaasvind
- D herabsorpsie van water hier geskied

Vraag 1.1.9 en 1.1.10 is op die volgende proses gebaseer wat in die spysverteringskanaal plaasvind.



1.1.9 Die geïllustreerde proses staan bekend as _____ .

- A metabolisme
- B absorpsie
- C spysvertering
- D peristalse

1.1.6 The vitamin that prevents night blindness is _____ .

- A. vitamin K
- B. vitamin A
- C. vitamin D
- D. vitamin C

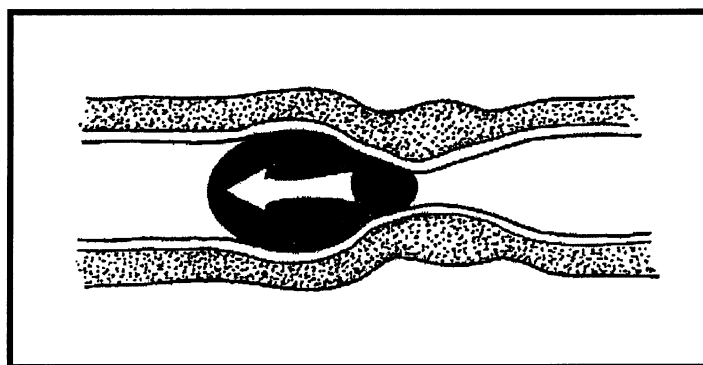
1.1.7 Which one of the following combinations will cause a decrease in the size of a herbivore population?

- (i) Natality
 - (ii) Emigration
 - (iii) Mortality
 - (iv) Predation
- A. (ii); (iii) and (iv)
 - B. (i) and (ii)
 - C. (i); (ii); and (iii)
 - D. (i); (ii); (iii) and (iv)

1.1.8 The longest part of the digestive system is the small intestine. A possible reason for this is because it is here that _____ .

- A. nutrient storage takes place
- B. enzymes are added
- C. maximum absorption of nutrients takes place
- D. water reabsorption takes place

Questions 1.1.9 and 1.1.10 are based on the following process which takes place in the digestive tract.



1.1.9 The illustrated process is known as _____ .

- A. metabolism
- B. absorption
- C. digestion
- D. peristalsis

1.1.10 In watter deel van die spysverteringskanaal vind hierdie proses plaas?

- A In die dunderm, kolon en slukderm
- B Slegs in die slukderm en dunderm
- C Slegs in die slukderm en kolon
- D Slegs in die kolon en dunderm

10x2=(20)

1.2 Dui aan of elk van die frases in **KOLOM B** op slegs **A**, slegs **B**, beide **A** en **B** of op **geen**, in **KOLOM A**, van toepassing is. Skryf slegs **A**, **B**, **A** en **B** of **geen** langs die toepaslike vraagnommer neer.

	KOLOM A	KOLOM B
1.2.1	A - Longpypie B - Longblasie	Gaswisseling vind hoofsaaklik hier plaas
1.2.2	A - Stysel B - Proteïene	Organiese verbinding(s)
1.2.3	A - Strotteklep B - Strottehoof	Klep wat die lugpyp sluit as voedsel gesluk word
1.2.4	A - Chloroplaste B - Mitochondria	Organell(e) waarin respirasie plaasvind.
1.2.5	A - Kompetisie B - Predasie	Verantwoordelik vir bevolkingsregulering

5x2=(10)

1.3 Gee die korrekte biologiese term vir elk van die volgende beskrywings. Skryf slegs die term langs die toepaslike vraagnommer neer.

- 1.3.1 Die groen pigment wat vir die proses van fotosintese benodig word.
- 1.3.2 Die gas wat noodsaaklik is vir aërobiese respirasie om plaas te vind.
- 1.3.3 Die eindproduk van koolhidraatvertering.
- 1.3.4 Stof wat 'n goeie vervoermedium is.
- 1.3.5 'n Chemiese stof wat die vermoë besit om 'n chemiese reaksie te verhaas sonder om in die reaksie deel te neem.
- 1.3.6 Energie-ontbindende proses wat in elke lewende sel by plante, diere en die mens plaasvind
- 1.3.7 Die tipe stof wat in die rooibloedliggaampies teenwoordig is en wat help om suurstof deur die liggaam te vervoer

1.1.10 In which part of the digestive tract does the process take place?

- A. Small intestine, colon and oesophagus
- B. Oesophagus and small intestine only
- C. Oesophagus and colon only
- D. Colon and small intestine only

10x2=(20)

1.2 State whether each phrase in **COLUMN B**, applies to **A** only, **B** only, both **A** and **B** or **none** in **COLUMN A**. Write down **A** only, **B** only, **A** and **B** or **None** next to the appropriate question number.

	COLUMN A	COLUMN B
1.2.1	A - Bronchiole B - Alveolus	Gaseous exchange occurs mainly here.
1.2.2	A - Starch B - Protein	Organic compound(s)
1.2.3	A - Epiglottis B - Larynx	Flap which closes off the trachea when food is swallowed
1.2.4	A - Chloroplast B - Mitochondria	Organelle(s) in which respiration occurs
1.2.5	A - Competition B - Predation	Responsible for population control

5x2=(10)

1.3 Give the correct biological term for each of the following descriptions. Write down only the term next to the relevant question number.

1.3.1 The green pigment that is a requirement for the process of photosynthesis

1.3.2 The gas that is essential for aerobic respiration to take place

1.3.3 The end-product of carbohydrate digestion

1.3.4 Substance that is a very suitable transport medium

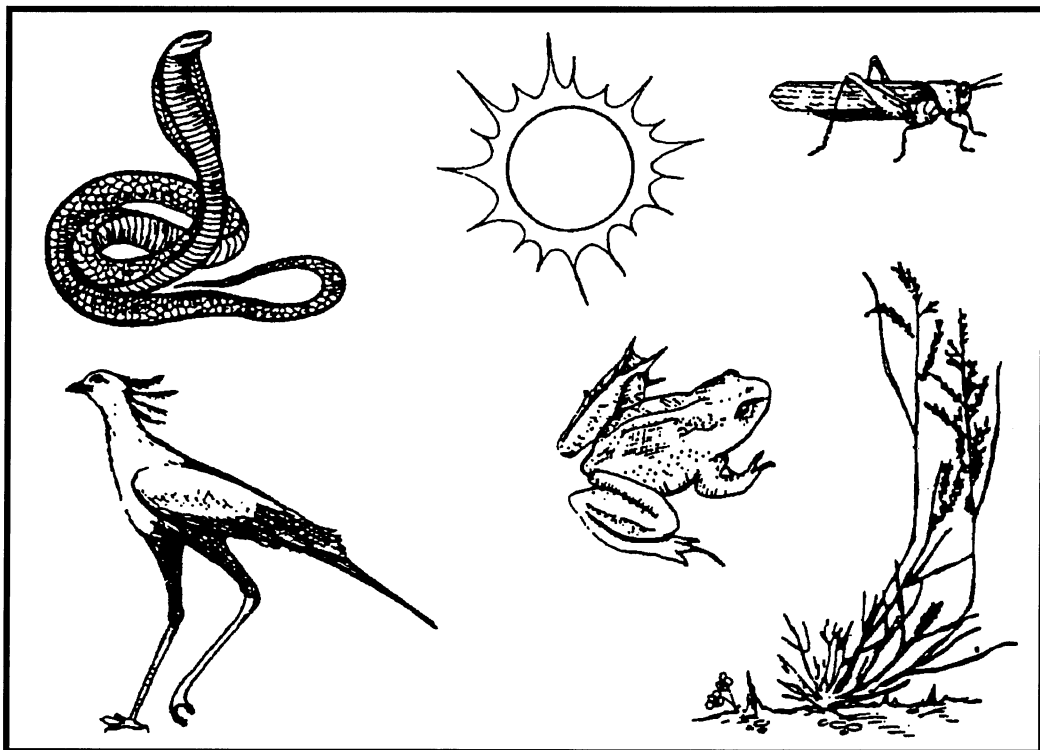
1.3.5 A chemical compound which has the ability to increase the rate of chemical reaction without taking part in the reaction

1.3.6 Energy-releasing process that occurs in all living cells of plants, animals and human beings

1.3.7 The type of substance in the red blood cells that helps with the transporting of oxygen through the body

- 1.3.8 Die reagens wat gebruik word om vir die teenwoordigheid van lipiede te toets
- 1.3.9 Studie van die kragte wat betrokke is by veranderings in die digtheid van 'n bevolking
- 1.3.10 Die onderhou van die stabiele toestand in die intrasellulêre omgewing (10)

1.4 Bestudeer die volgende diagram en beantwoord die vrae wat volg in die antwoordboek.



- 1.4.1 Verduidelik die werking struktuur van 'n voedselketting deur die organismes hierbo te gebruik. (6)
- 1.4.2 Watter organismes is karnivore? (3)
- 1.4.3 Watter organismes sou jy as herbivore beskou? (1)
(10)

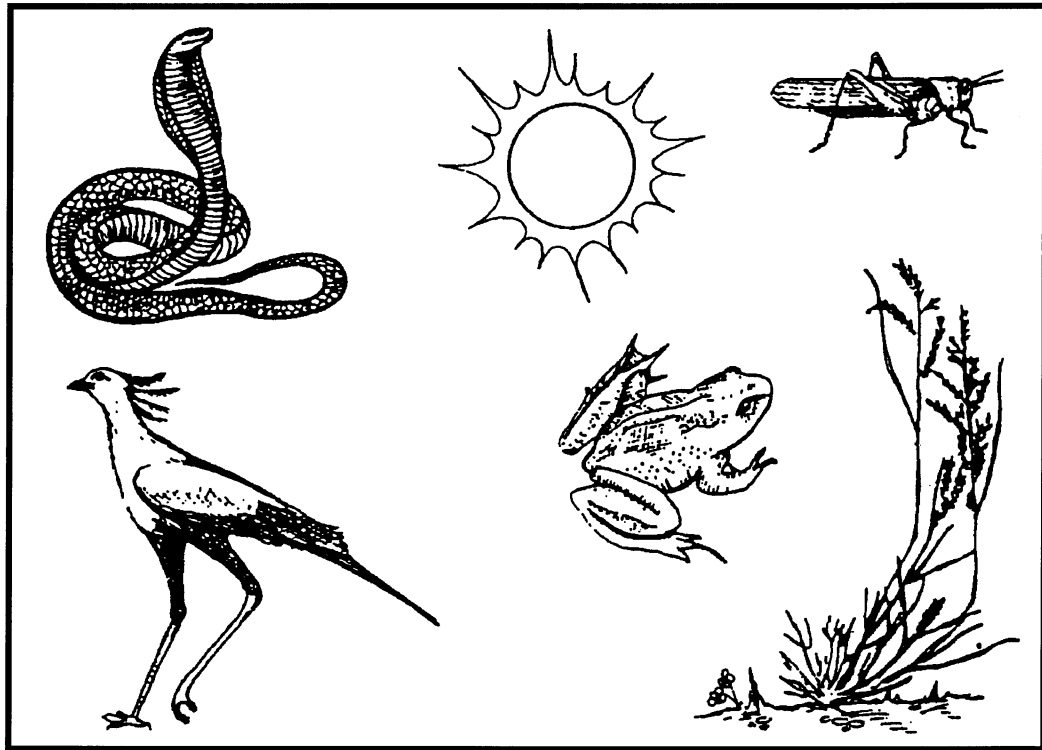
TOTAAL VIR AFDELING A: [50]

1.3.8 The reagent used to test for the presence of lipids

1.3.9 Study of the forces responsible for the changes in the density of a population

1.3.10 The maintenance of a stable condition in the intra-cellular environment (10)

1.4 Study the following diagram and answer the questions that follow in the answer book.



1.4.1 Explain the working structure of a food chain by using the above organisms. (6)

1.4.2 Which organisms are carnivores? (3)

1.4.3 Which organisms are herbivores? (1)

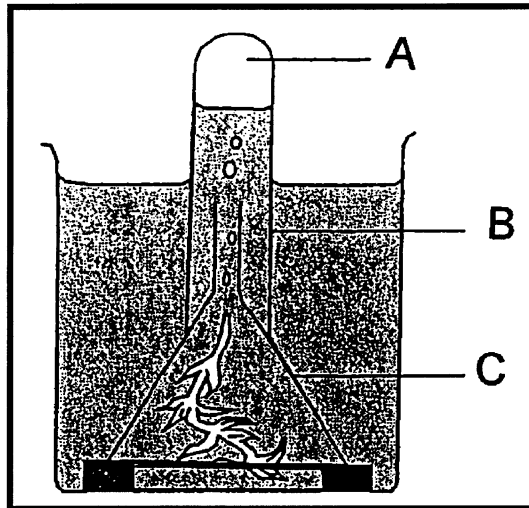
[10]

TOTAL FOR SECTION A: [50]

AFDELING B

VRAAG 2

2.1 Bestudeer die volgende eksperiment noukeurig.



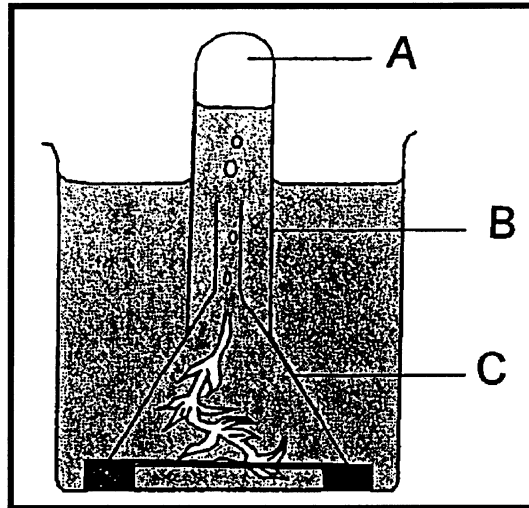
- 2.1.1 Wat is die doel van hierdie eksperiment? (1)
- 2.1.2 Identifiseer die dele wat **B** en **C** genommer is. (2)
- 2.1.3 Gee die naam van 'n plant wat geskik is om in hierdie eksperiment gebruik te kan word. (1)
- 2.1.4 Noem die belangrike eksterne faktor wat aanwesig moet wees vir die eksperiment om te kan slaag. (1)
- 2.1.5 Noem TWEE voorsorgmaatreëls wat getref moet word by die uitvoering van die eksperiment. (2)
- 2.1.6 Verduidelik hoe jy sal bepaal of dit suurstof is wat by **A** versamel het. (3)

[10]

SECTION B

QUESTION 2

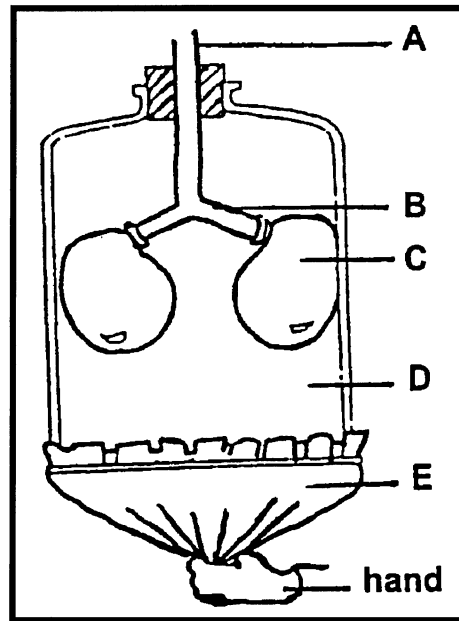
2.1 Study the following experiment carefully.



- 2.1.1 What is the aim of this experiment? (1)
- 2.1.2 Identify the parts numbered **B** and **C**. (2)
- 2.1.3 Give a name of a plant suitable to be used in the experiment. (1)
- 2.1.4 Name the important external factor which must be present for the experiment to be successful. (1)
- 2.1.5 State TWO precautionary measures taken into consideration when conducting the experiment. (2)
- 2.1.6 Explain how you would determine whether it is oxygen that accumulates at **A**. (3)

[10]

- 2.2 Bestudeer die volgende diagram wat die apparaat aantoon wat gebruik word om 'n sekere aspek van asemhaling in die mens te illustreer en beantwoord die vrae wat daarop volg.

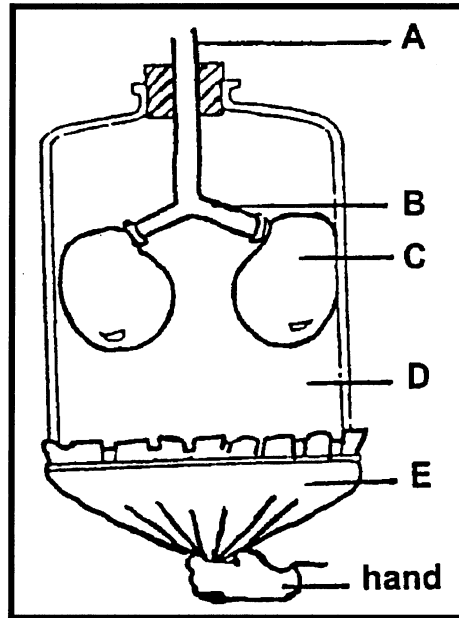


- 2.2.1 Watter liggaamsdeel word verteenwoordig deur elk van die letters A, B, C, D en E? (5)
- 2.2.2 Wat gebeur met die grootte van deel C, wanneer die hand afwaarts beweeg? (2)
- 2.2.3 Beskryf die meganisme van inaseming by die mens. (5)
- 2.2.4 Wat word verstaan onder die term **asemhaling**? (3)

[15]

[25]

- 2.2 Study the following diagram, which shows the apparatus used to demonstrate a certain aspect of breathing in a human being and answer questions which follow.



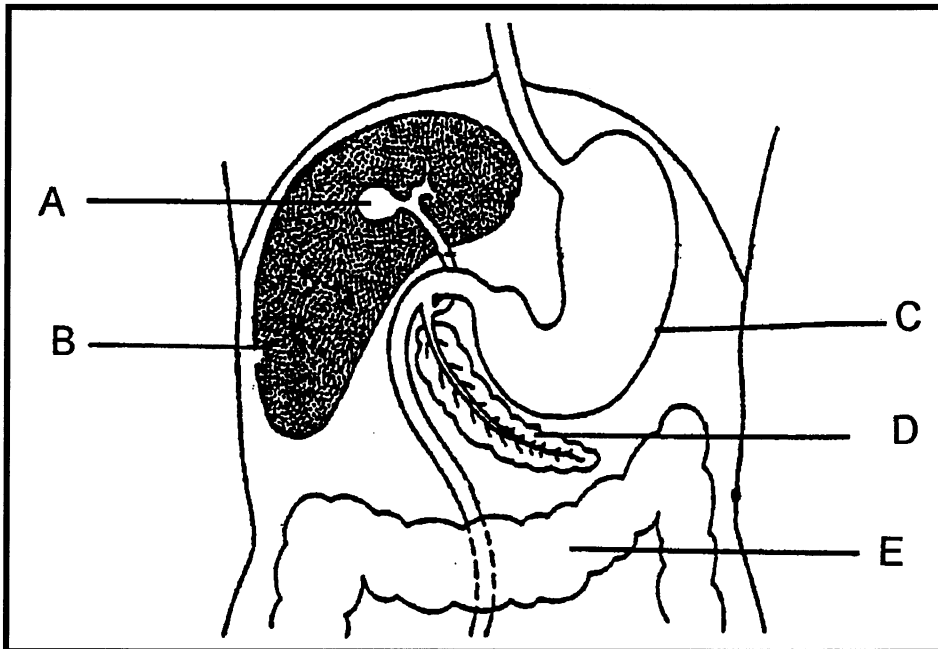
- 2.2.1 Which body part is represented by each of the letters **A**, **B**, **C**, **D** and **E**? (5)
- 2.2.2 What happens to the size of part **C** when the hand moves downwards? (2)
- 2.2.3 Describe the mechanism of inhalation in humans. (5)
- 2.2.4 What is meant by the concept **breathing**? (3)

[15]

[25]

VRAAG 3

- 3.1 Bestudeer die onderstaande diagram wat deel van die menslike spysverteringsstelsel toon en beantwoord die vrae wat volg.

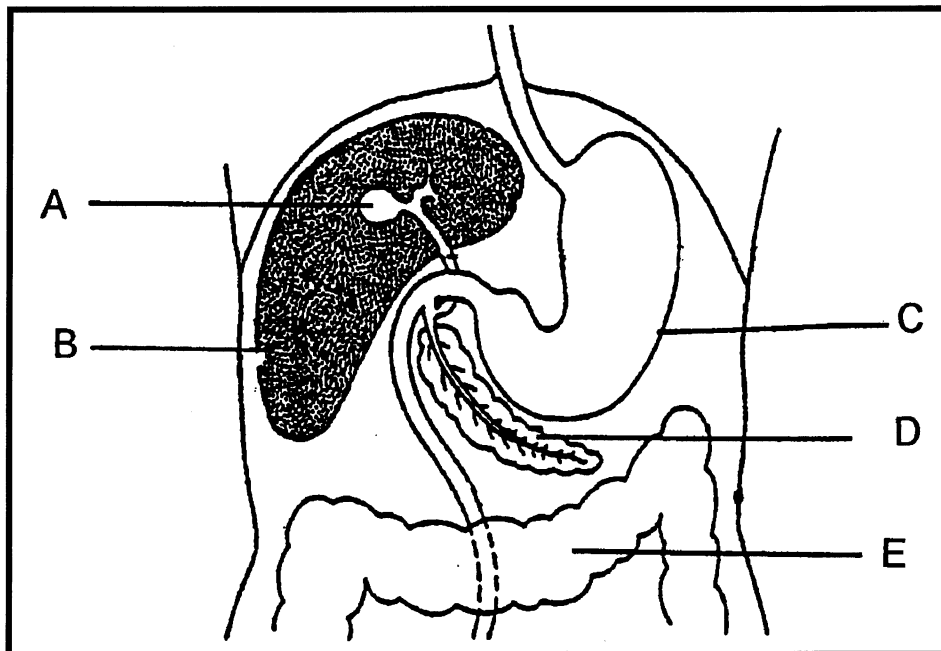


- 3.1.1 Identifiseer dele A - E. (5)
- 3.1.2 Noem die hormoon wat deur D afgeskei word. (2)
- 3.1.3 Gee die letters van TWEE dele wat verteringsensieme afskei. (2)
- 3.1.4 Wat word deur deel A geproduseer? (2)
- 3.1.5 Watter struktuur is 'n klier van die spysverteringskanaal? (2)
- 3.1.6 Lys TWEE redes waarom ru-vesel belangrik is in ons daaglikse dieët. (2)
- 3.1.7 Wat word verstaan onder die term **vertering**? (5)
- 3.2 Verskeie tegnieke word aangewend om bevolkingsgrootte te skat, bv. deur die indirekte tegniek (merk-en-vang). Wat word die ander tegniek genoem? (5)

[25]

QUESTION 3

- 3.1 Study the diagram below that shows part of the digestive system of a human and answer the questions that follow.



- 3.1.1 Identify parts A - E. (5)
- 3.1.2 Name the hormone secreted by part D. (2)
- 3.1.3 Give the letters of TWO parts that secrete digestive enzymes. (2)
- 3.1.4 What is produced through part A? (2)
- 3.1.5 Which structure is a gland of the digestive canal? (2)
- 3.1.6 List TWO reasons why roughage is important in one's daily diet. (2)
- 3.1.7 What is meant by the term **digestion**? (5)
- 3.2 Various techniques are used to estimate the size of a population, e.g. by means of an indirect technique (capture and mark). What is the other technique called? Discuss this technique. (5)

[25]

VRAAG 4

- 4.1 Die volgende resultate is verkry tydens 'n ondersoek toe termometers tussen gesteriliseerde sade in twee aparte termoflesse, **A** en **B**, geplaas is. Die flesse is met rubberproppe geseël en regop laat staan.

	Temperatuur (°C)					
	Begin	Dag 1	Dag 2	Dag 3	Dag 4	Dag 5
Fles A met ontkiemende sade	25	27	30	32	33	33
Fles B met dooie sade	25	25	25	25	25	25

- 4.1.1 Wat is die doel van hierdie ondersoek? (2)
- 4.1.2 Watter proses vind plaas om die verhoging van temperatuur by die ontkiemende sade te veroorsaak? (2)
- 4.1.3 Gee 'n verduideliking vir die toename in temperatuur in fles **A** tussen dag 1 en 3. (2)
- 4.1.4 Waarom is gesteriliseerde sade gebruik? (2)
- 4.2 Teken die onderstaande tabel in jou antwoordboek oor en voltooi dit ten opsigte van die voedselbron en 'n tekort van elke vitamien. (10)

Vitamien	Voedselbron(1)	Tekort(1)
A		
C		
B ₂		
E		
K		

QUESTION 4

- 4.1 The following results were obtained during an investigation when thermometers were placed amongst sterilized seeds in two separate thermos flasks, **A** and **B**. The flasks were sealed with rubbers and placed upright.

	Temperature (°C)					
	Start	Day 1	Day 2	Day 3	Day 4	Day 5
Flask A with germinating seeds	25	27	30	32	33	33
Flask B with dead seeds	25	25	25	25	25	25

- 4.1.1 What is the aim of this investigation? (2)
- 4.1.2 What process takes place to increase the temperature of the germinating seeds? (2)
- 4.1.3 Give an explanation for the increase in temperature in flask **A** between days 1 and 3. (2)
- 4.1.4 Why were sterilized seeds used? (2)
- 4.2 Draw the accompanying table in your answer book and complete it with regard to the food source and shortage of each of the vitamins. (10)

Vitamin	Food source (1)	Shortage (1)
A		
C		
B ₂		
E		
K		

- 4.3 Vier-en-tagtig mense is in 1982 op 'n eiland aan VIGS dood. Die onderstaande tabel dui die toename in sterftes op die eiland gedurende die daaropvolgende agt jaar aan.

JAAR	GETAL STERFTES
1982	84
1983	92
1984	105
1985	134
1986	195
1987	224
1988	211
1989	212
1990	230

- 4.3.1 In watter jaar was die sterftesyfer die hoogste? (1)
- 4.3.2 In watter jaar was die sterftesyfer die laagste? (1)
- 4.3.3 Wat is die gevolge van hierdie sterftes? (2)
- 4.3.4 Wat verstaan u onder die begrip **mortaliteit**? (2)
- 4.4 Waar vind metabolisme plaas? (1)
- [25]**

VRAAG 5

- 5.1 Lees die volgende stellings deur en sê of dit WAAR of ONWAAR is. Indien die antwoord ONWAAR is, gee die korrekte antwoord. Skryf elke antwoord langs die ooreenstemmende vraagnommer op 'n nuwe reël in jou antwoordboek neer.
- 5.1.1 Die metode van voeding by die mens staan bekend as homeostatiese voeding.
- 5.1.2 Bolus is die naam van voedsel wat fyngemaak is met behulp met weefselvloeistof.
- 5.1.3 Vetsure en gliserol word deur die limf van die limfhaarvate geabsorbeer.
- 5.1.4 Die anorganiese voedingstowwe, naamlik proteïene en vette, moet eers verteer word om dit oplosbaar vir vertering te maak.
- 5.1.5 Afskeidings van die lewer en alvleisklier word in die dikderm gestort.

5x2=(10)

- 4.3 In 1982 eighty-four people died on an island because they had AIDS. The table below shows the death rate on this island over the next eight years.

YEAR	NUMBER OF DEATHS
1982	84
1983	92
1984	105
1985	134
1986	195
1987	224
1988	211
1989	212
1990	230

- 4.3.1 In which year was the death rate the highest? (1)
- 4.3.2 In which year was the death rate the lowest? (1)
- 4.3.3 What are the consequences of the deaths? (2)
- 4.3.4 What do you understand by the word **mortality**? (2)
- 4.4 Where does metabolism take place? (1)
- [25]

QUESTION 5

- 5.1 Read the following statements and say whether they are TRUE or FALSE. If FALSE, give the correct answer. Write down each answer next to the appropriate question number on a new line, in your answer book.
- 5.1.1 The method of nutrition in man is known as homeostasis nutrition.
- 5.1.2 Bolus is the name given to food that has been chewed with the help of tissue fluid.
- 5.1.3 Fatty acids and glycerol are absorbed by the lacteals and the lymph.
- 5.1.4 Inorganic foods, that is proteins and fats, must be broken down to be soluble for digestion.
- 5.1.5 Liver and pancreas secretions are secreted into the colon.

5x2=(10)

5.2 Die onderstaande tabel dui die besonderhede aan van 'n maaltyd wat deur 'n Graad 12-leerder geëet is.

Voedsel geëet	Koolhidrate (g)	Proteïene (g)	Vet (g)	Vitamiën C (g)	Yster (mg)
Wors	5	9	24	0	1
Gebakte aartappelskyfies	70	8	20	20	2
Boontjies	20	10	1	4	3
Vrugte-pastei	60	2	25	1	1
Roomys	20	0	12	0	0

5.2.1 Identifiseer die voedsel wat aan die leerder die volgende gegee het:

- (i) Die meeste proteïene (1)
- (ii) Die minste vet (1)

5.2.2 Identifiseer die voedsel wat die beste is vir die voorkoming van skeurbuik. (1)

5.2.3 Gee 'n rede vir die antwoord in Vraag 5.2.2. (1)

5.2.4 Watter voedsel het die minste algemene voedingswaarde? (1)

5.3 Noem die eindprodukte van proteïen- en lipied-vertering. (3)

5.4 Daar bestaan 'n noue verband tussen fotosintese en respirasie. Wat is hierdie noue verband? (2)

5.5 Wat is die biologiese belangrikheid van respirasie? (4)

5.6 Waar vind fotosintese plaas? (1)

[25]

TOTAAL VIR AFDELING B: [100]

TOTAAL: 150

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5.2 The table below shows the details of a meal eaten by a Grade 12 learner.

Food eaten	Carbohydrates (g)	Protein (g)	Fat (g)	Vitamin C (g)	Iron (mg)
Sausage	5	9	24	0	1
Fried potato chips	70	8	20	20	2
Beans	20	10	1	4	3
Fruit pie	60	2	25	1	1
Ice cream	20	0	12	0	0

5.2.1 Identify the food which gave the learner the following :

- (i) Most protein (1)
- (ii) Least fat (1)

5.2.2 Identify the food that is best suited to preventing scurvy. (1)

5.2.3 Give a reason for the answer in Question 5.2.2. (1)

5.2.4 Which food has the least overall nutritional value? (1)

5.3 Name the final products of protein and lipid digestion. (3)

5.4 There is a close relationship between photosynthesis and respiration. What is this close relationship? (2)

5.5 What is the biological importance of respiration? (4)

5.6 Where does photosynthesis occur? (1)

[25]

TOTAL FOR SECTION B: [100]

TOTAL: 150

END