



DEPARTMENT OF EDUCATION
REPUBLIC OF SOUTH AFRICA

DEPARTEMENT VAN ONDERWYS
REPUBLIEK VAN SUID-AFRIKA

SENIOR CERTIFICATE EXAMINATION - 2004
SENIORSERTIFIKAAT-EKSAMEN - 2004

BIOLOGY P1
BIOLOGIE V1

HIGHER GRADE
HOËR GRAAD

OCTOBER/NOVEMBER 2004
OKTOBER/NOVEMBER 2004

306-1/1

Marks: 200
Punte : 200

2 Hours
2 Ure

This question paper consists of 17 pages.
Hierdie vraestel bestaan uit 17 bladsye.

BIOLOGY HG: Paper 1



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INSTRUKSIES EN INLIGTING AAN KANDIDATE

Lees die volgende sorgvuldig 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 die vrae nie beantwoord word volgens elke vraag se instruksies nie, sal punte afgetrek word.
7. Alle tekeninge moet met 'n potlood gemaak word en die byskrifte met ink.
8. Gebruik diagramme en vloedigramme slegs wanneer dit versoek word.
9. Die diagramme in die vraestel is nie noodwendig volgens skaal geteken nie.
10. Grafiekpapier mag NIE gebruik word 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, marks will be deducted.
7. All drawings should be done in pencil and labelled in ink.
8. Only use 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.

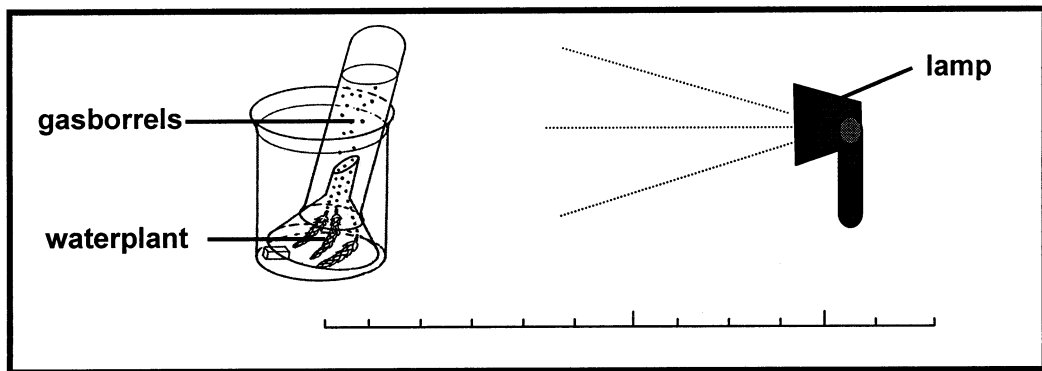
1.1.1 Die siekte wat veroorsaak word as gevolg van 'n tekort aan vitamien C is ...

- A ragitis.
- B pellagra.
- C skeurbuik.
- D anorexia nervosa.

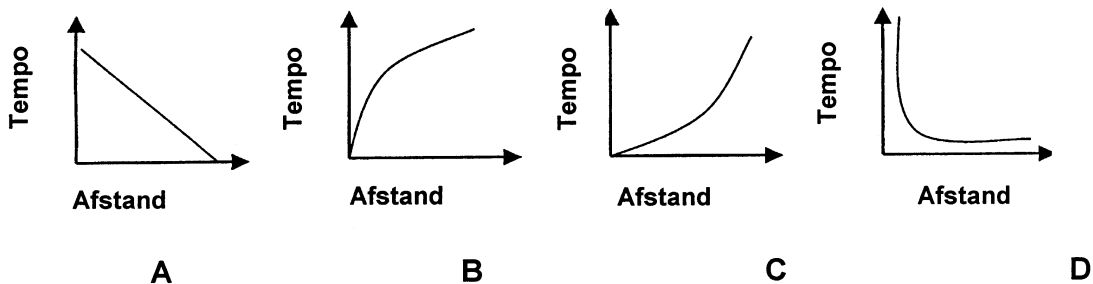
1.1.2 Brunner-kliere word ... aangetref.

- A in die duodenum en ileum
- B slegs in die maag
- C slegs in die duodenum
- D in die maag, duodenum en ileum

1.1.3 'n Groep leerders het 'n eksperiment opgestel om die invloed van lig op die tempo van fotosintese te toets. Terwyl die lamp weg van die plant af beweeg, het hulle die aantal borrels van die gas wat deur die waterplant vrygestel is, getel.



Watter EEN van die volgende grafieke toon die verwagte resultate die beste?



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.

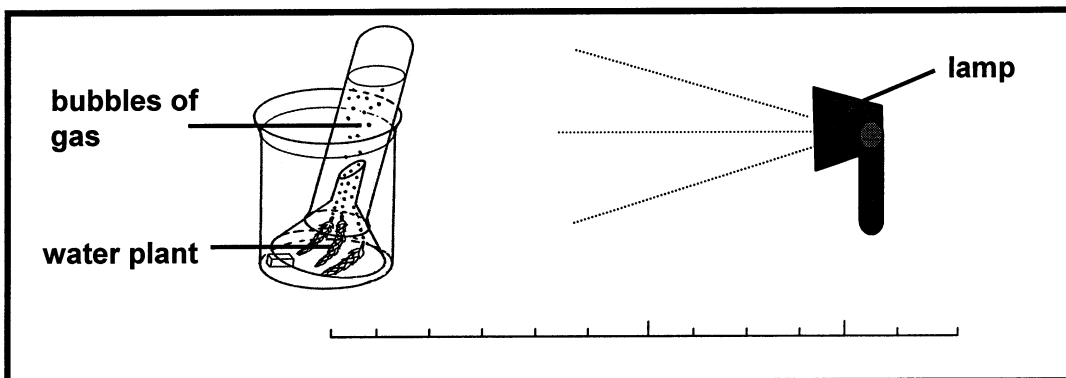
1.1.1 The disease caused by the deficiency of vitamin C is ...

- A rickets.
- B pellagra.
- C scurvy.
- D anorexia nervosa.

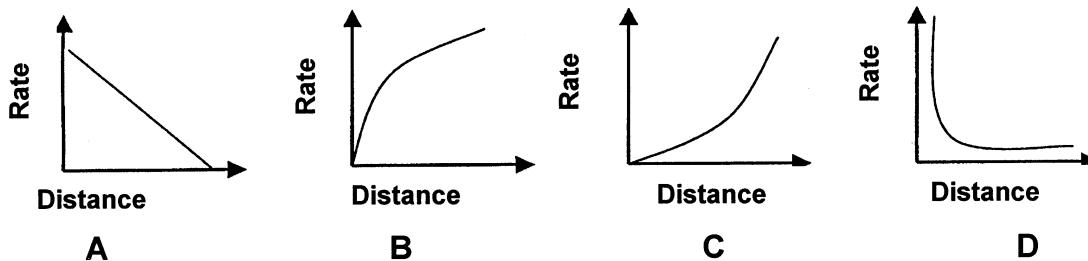
1.1.2 Brunner's glands are found in the ...

- A duodenum and ileum.
- B stomach only.
- C duodenum only.
- D stomach, duodenum and ileum.

1.1.3 A group of learners set up an investigation to test the effect of light on the rate of photosynthesis. They counted the number of bubbles of gas given off by the water plant as the lamp was moved away from the plant.



Which ONE of the following graphs best shows the expected results?



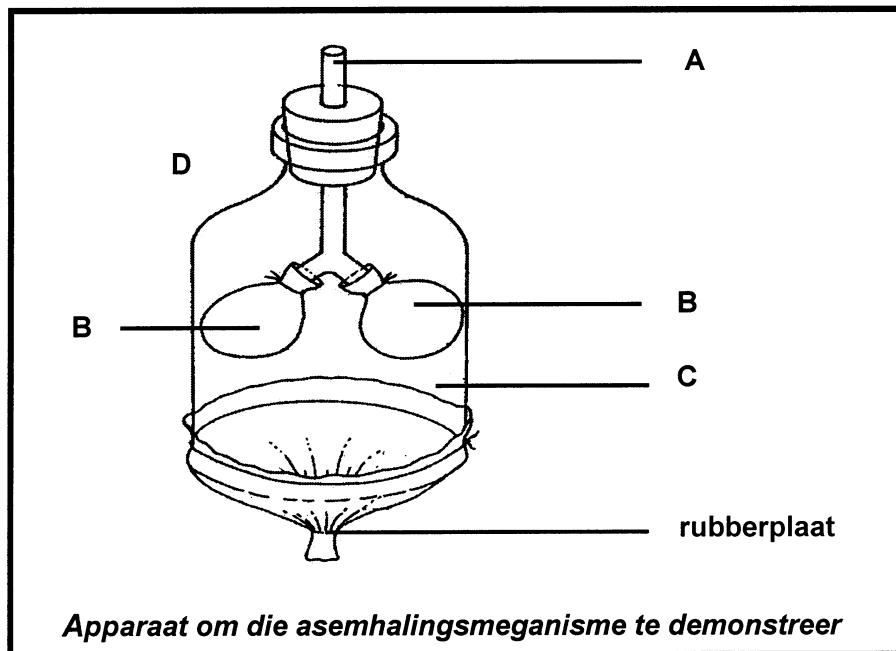
1.1.4 Die volgende stowwe word in die kolon aangetref:

- (i) Water
- (ii) Sommige vitamieene
- (iii) Sellulose

Watter EEN van die volgende toon die korrekte kombinasie stowwe wat deur die wande van die kolon geabsorbeer word?

- A Slegs (i)
- B Slegs (i) en (ii)
- C Slegs (i) en (iii)
- D (i), (ii) en (iii)

1.1.5 Beantwoord die vraag wat op die onderstaande diagram gebaseer is.



Watter van die volgende sal gebeur indien die rubberplaat afwaarts getrek word?

- (i) Die volume in B sal verminder
- (ii) Die druk in C en D sal konstant bly
- (iii) Lug sal B deur A binnekom
- (iv) Die druk op B en in C sal toeneem
- (v) Die druk in B en C sal afneem
- (vi) Lug sal die klokglas deur A verlaat

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



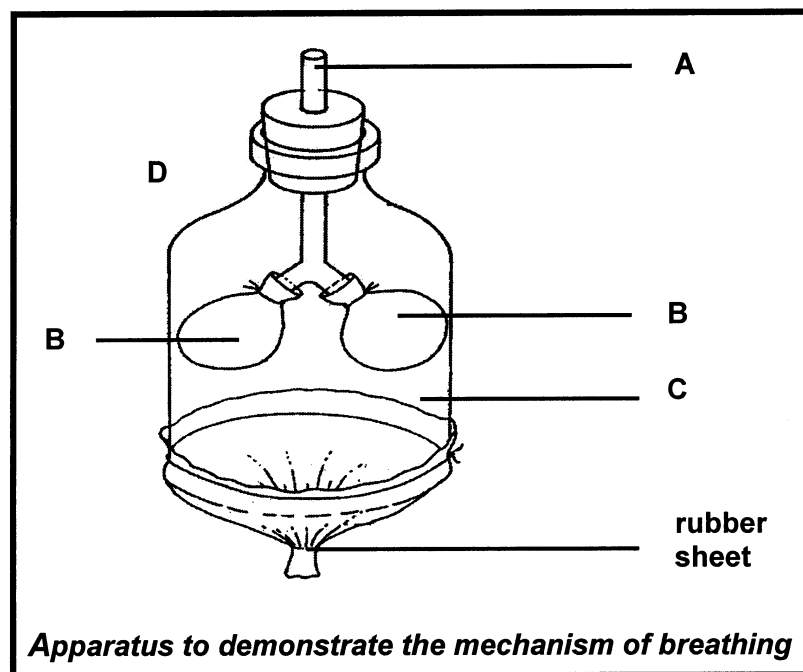
1.1.4 The following substances are present in the colon:

- (i) Water
- (ii) Some vitamins
- (iii) Cellulose

Which ONE of the following shows the correct combination of substances absorbed by the walls of the colon?

- A (i) only
- B (i) and (ii) only
- C (i) and (iii) only
- D (i), (ii) and (iii)

1.1.5 Answer this question based on the diagram below.



Which of the following will occur when the rubber sheet is pulled downwards?

- (i) The volume of B will decrease
 - (ii) The pressure in C and D will remain constant
 - (iii) Air will enter B through A
 - (iv) The pressure on B and in C will increase
 - (v) The pressure in B and C will decrease
 - (vi) Air will leave the bell jar through A
- A (i) and (ii)
 - B (iii) and (v)
 - C (iv) and (v)
 - D (i) and (vi)



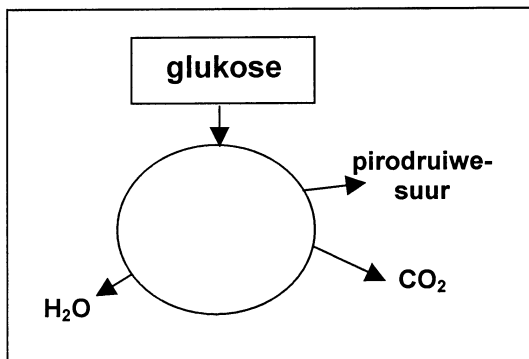
1.1.6 Die onderstaande tabel toon die waarnemings wat gemaak is tydens toetse op monsters van 'n sekere voedselsoort.

Toets	Waarneming
Millon-/Biuret-toets vir proteïene	Kleurloos
Jodiumoplossingtoets vir stysel	Bruin
Benedict-/Fehlingtoets vir glukose	Oranjerooi neerslag

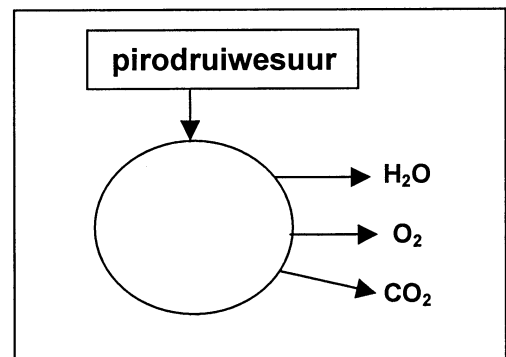
Wat het die voedselsoort bevat?

	Proteïene	Stysel	Glukose
A	Nee	Ja	Nee
B	Nee	Nee	Ja
C	Ja	Nee	Nee
D	Nee	Ja	Ja

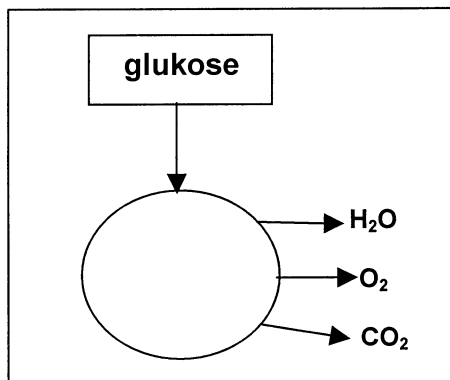
1.1.7 Watter EEN van die volgende is die beste voorstelling van 'n deel van die Krebs-siklus?



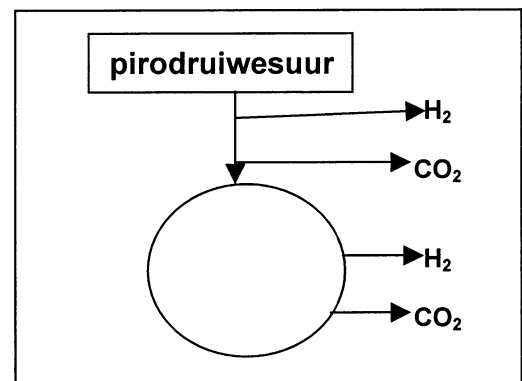
A



B



C



D

(7 x 2)

(14)



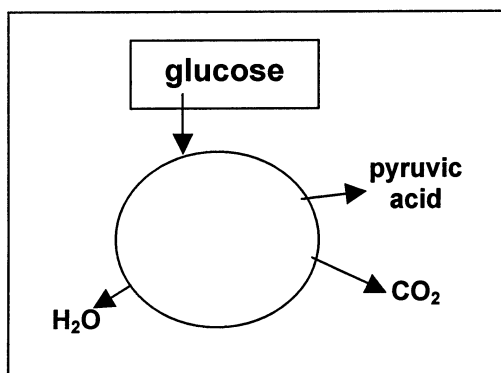
1.1.6 The table below shows observations made during tests carried out on samples of a particular food.

Test	Observation
Millon's/Biuret test for protein	Colourless
Iodine solution test for starch	Brown
Benedict's/Fehlings test for glucose	Orange-red precipitate

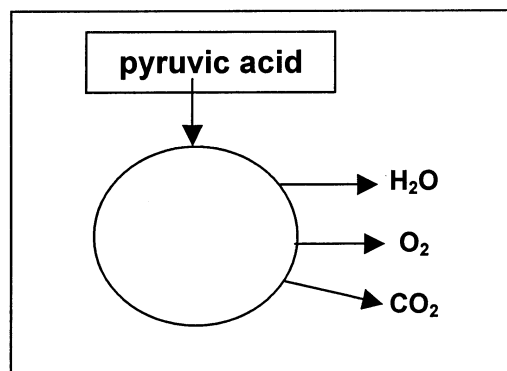
What did the food contain?

	Protein	Starch	Glucose
A	No	Yes	No
B	No	No	Yes
C	Yes	No	No
D	No	Yes	Yes

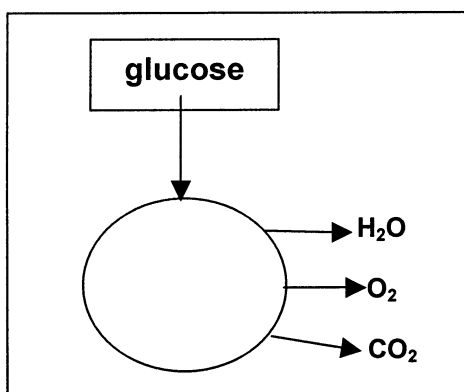
1.1.7 Which ONE of the following is the best representation of a part of the Krebs cycle?



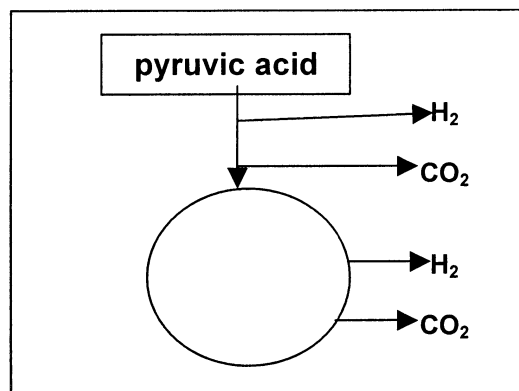
A



B



C



D

(7 x 2) (14)



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

1.2.1 Die flapagtige struktuur wat verhoed dat voedsel die tragea binnekom

1.2.2 Die proses in die mond waartydens voedsel fyn gekou en in kleiner deeltjies opgebreek word

1.2.3 'n Ringvormige spier wat die opening tussen die ileum en die kolon beheer

1.2.4 Voedingstowwe wat in relatief klein hoeveelhede deur organismes benodig word

1.2.5 'n Tekort aan hierdie voedingstof veroorsaak 'n goiter by volwassenes (5)

1.3 Dui aan vir elk van die stellings in KOLOM I, of dit op slegs A, slegs B, beide A en B of op **geeneen** van die items in KOLOM II van toepassing is nie. Skryf slegs A, slegs B, beide A en B, of **geeneen** langs die toepaslike vraagnommer.

	KOLOM I	KOLOM II
1.3.1	Opname van gliserol in die lakteaalvate	A Hidrolise B Kondensasiereaksie
1.3.2	'n Tekort aan hierdie voedingstof lei tot chlorose	A Magnesium B Stikstof
1.3.3	Noodsaaklike vereiste vir bloedstolling	A Kalsium B Vitamien K
1.3.4	Kan deur die bloed sonder enige verdere vertering geabsorbeer word	A Glukose B Sukrose
1.3.5	Die proses waar verteerde voedsel deel van die liggaam word	A Assimilasie B Detoksifisering
1.3.6	Skakel tripsinogeen om na tripsien	A Erepsien B Enterokinase
1.3.7	Hoë temperatuur veroorsaak denaturering	A Ensieme B Proteïene

(7 x 2)

(14)



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 The flap-like structure which prevents food from entering the trachea

1.2.2 The process by which food is chewed and broken down into smaller pieces in the mouth

1.2.3 A ring of muscle which controls the opening between the ileum and the colon

1.2.4 Nutrients that are required in relatively small quantities by organisms

1.2.5 A deficiency of this nutrient causes goitre in adults (5)

1.3 Indicate whether each of the statements in COLUMN I, applies to **A only**, **B only**, **both A and B** or **none** of the items in COLUMN II. Write **A only**, **B only**, **both A and B**, or **none** next to the relevant question number.

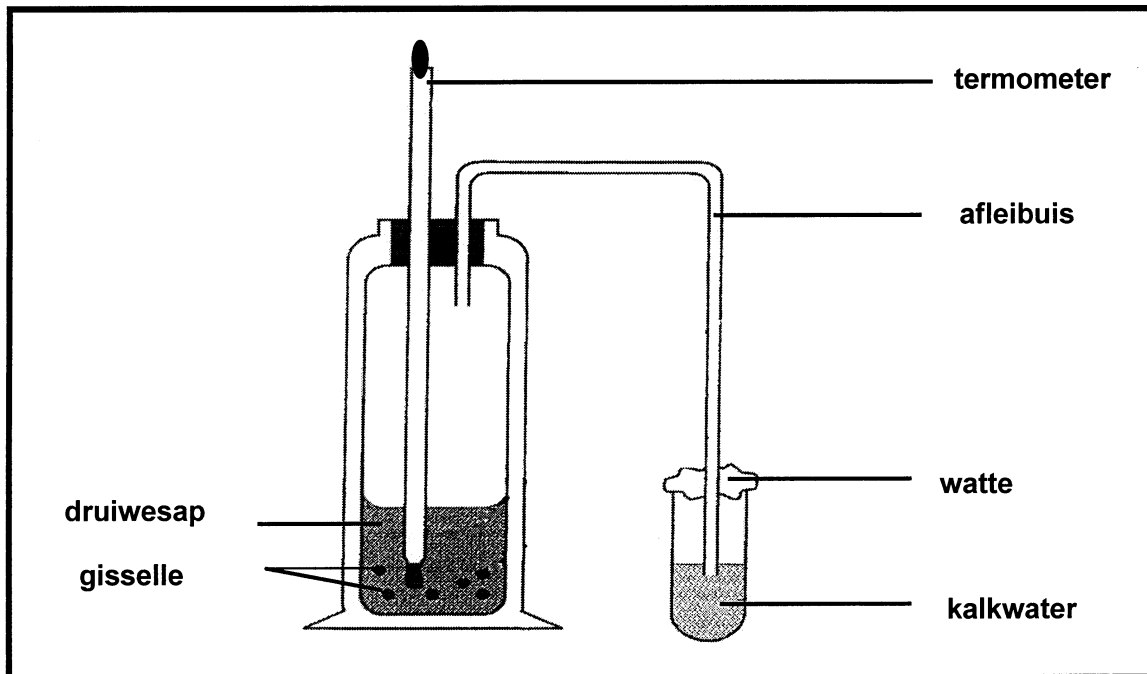
	COLUMN I	COLUMN II
1.3.1	Uptake of glycerol into the lacteal vessels	A Hydrolysis B Condensation reaction
1.3.2	Lack of this nutrient results in chlorosis	A Magnesium B Nitrogen
1.3.3	Important requirement for the clotting of blood	A Calcium B Vitamin K
1.3.4	Can be absorbed into the blood without further digestion	A Glucose B Sucrose
1.3.5	Process by which digested food becomes part of the body	A Assimilation B Detoxification
1.3.6	Converts trypsinogen into trypsin	A Erepsin B Enterokinase
1.3.7	High temperature causes denaturation	A Enzymes B Proteins

(7 x 2)

(14)



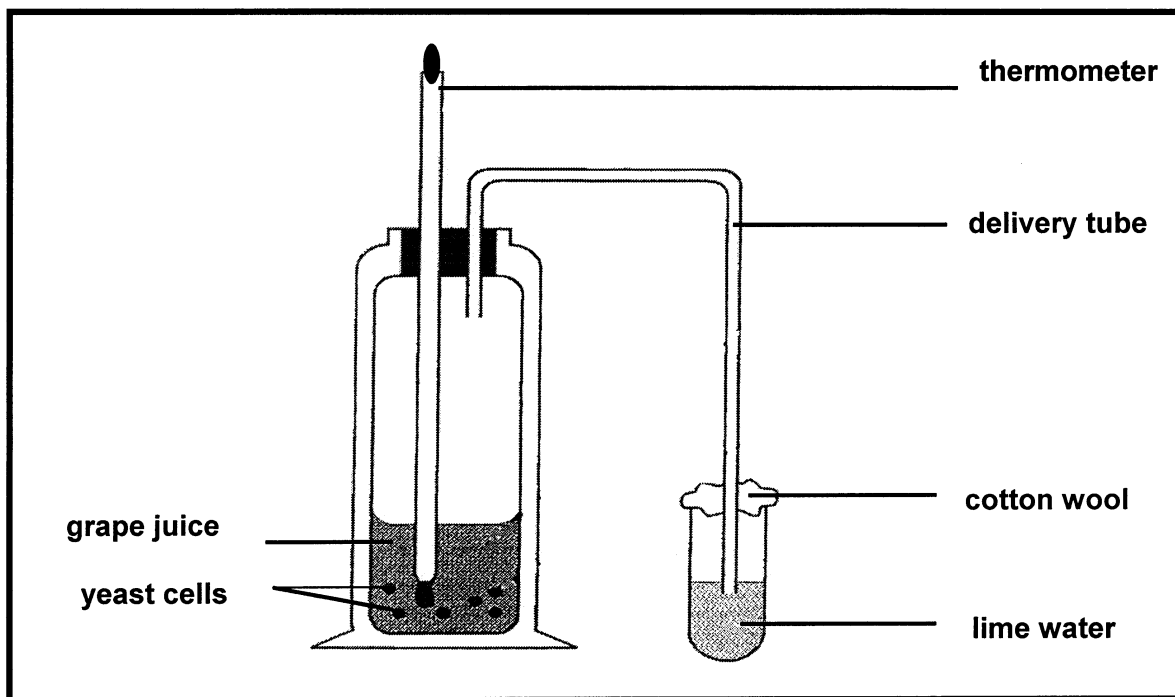
- 1.4 Die onderstaande diagram stel die apparaat voor wat tydens 'n ondersoek gebruik is. Die druiwesap is gekook voordat dit in die fles met die gisselle gegooi is.



- 1.4.1 Stel 'n doel vir hierdie ondersoek voor. (2)
- 1.4.2 Waarom is die druiwesap voor die ondersoek gekook? (1)
- 1.4.3 Noem EEN funksie vir elk van die volgende:
- (i) Die helder kalkwater (1)
 - (ii) Die druiwesap (1)
- 1.4.4 Beskryf hoe jy 'n kontrole vir die ondersoek sal opstel. (2)
- (7)



1.4 The diagram below represents the apparatus used in an investigation. The grape juice was boiled before it was put into the flask with the yeast.



- 1.4.1 Suggest an aim for this investigation. (2)
 - 1.4.2 Why was the grape juice boiled before the investigation? (1)
 - 1.4.3 State ONE function of each of the following:
 - (i) The clear lime water (1)
 - (ii) The grape juice (1)
 - 1.4.4 Describe how you would set up a control for this investigation. (2)
- (7)**



- 1.5 Die onderstaande tabel toon voedingsinligting op die etikette van drie houers babakos **A, B en C**. Al drie die houers kos dieselfde en bevat dieselfde massa voedsel.

Voedsel	Koolhidraat (g) per 100 g monster	Proteïen (g) per 100 g monster	Vet (g) per 100 g monster	Energie (kJ) per 100 g monster
A	11,9	1,0	1,9	285
B	14,5	2,2	3,0	375
C	15,1	3,1	2,5	405

- 1.5.1 Behalwe water en vesel, noem nog TWEE ander voedingstowwe wat deel vorm van 'n gebalanseerde dieet wat nie in die tabel voorkom nie. (2)
- 1.5.2 Identifiseer die voedsel wat waarskynlik die **meeste** suiker sal bevat. (2)
- 1.5.3 Watter voedsel is die **beste** waarde vir geld? (2)
- 1.5.4 Watter voedsel is die **geskikste** om kwasjiorkor te voorkom? (2)
- 1.5.5 As 'n een-jaar-oue baba van omtrent 8 kg, 2 000 kJ energie per dag benodig, bereken hoeveel van voedsel A word deur die baba in gram per dag benodig, met die veronderstelling dat die baba geen ander voedsel inneem nie.
Toon alle berekeninge. (3)
(11)

- 1.6 Dui EEN ooreenkoms en EEN verskil tussen elk van die onderstaande pare terme aan:

- 1.6.1 Immigrasie en migrasie (3)
- 1.6.2 Digtheidsafhanklike- en digtheidsonafhanklike parameters (3)
- 1.6.3 Primêre produksie en sekondêre produksie (3)
(9)

Totaal Vraag 1: 60

TOTAAL AFDELING A: 60



- 1.5 The table below shows the nutritional information on the label of three containers of baby foods **A**, **B** and **C**. All three containers cost the same and contain the same mass of food.

Foods	Carbohydrate (g) per 100 g sample	Protein (g) per 100 g sample	Fat (g) per 100 g sample	Energy (kJ) per 100 g sample
A	11,9	1,0	1,9	285
B	14,5	2,2	3,0	375
C	15,1	3,1	2,5	405

- 1.5.1 Name TWO other food components of a balanced diet, except water and fibre, that are not listed in the table. (2)
- 1.5.2 Identify the food that is most likely to contain the **most** sugar. (2)
- 1.5.3 Which food provides the **best** value for money? (2)
- 1.5.4 Which food is **most suitable** to prevent kwashiorkor? (2)
- 1.5.5 If a one-year-old baby of about 8 kg requires 2 000 kJ of energy per day, calculate how much of food A the baby will require per day in grams, assuming no other food is eaten by the baby. Show all workings. (3)
- (11)**
- 1.6 For each of the following pairs of terms below, state ONE **similarity** and ONE **difference** between them:
- 1.6.1 Immigration and migration (3)
- 1.6.2 Density-dependent and density-independent parameters (3)
- 1.6.3 Primary production and secondary production (3)
- (9)**

Total Question 1: 60
TOTAL SECTION A: 60



AFDELING B

VRAAG 2

2.1 Bestudeer die onderstaande diagram en beantwoord dan die vrae wat volg.



2.1.1 Benoem:

- (i) Bloedvate E en H (2)
 (ii) Organe B en G (2)

2.1.2 Noem DRIE ensieme wat in C gevorm word en wat op koolhidrate inwerk. (3)

2.1.3 Maak 'n lys van DRIE funksies van elk van die volgende:

- (i) Die vloeistof in F (3)
 (ii) Die soutsuur in A (3)

2.1.4 Watter gedeelte, E of H, sal die hoër glukosekonsentrasie bevat nadat 'n langafstandresies gehardloop is? Verduidelik die antwoord. (5)

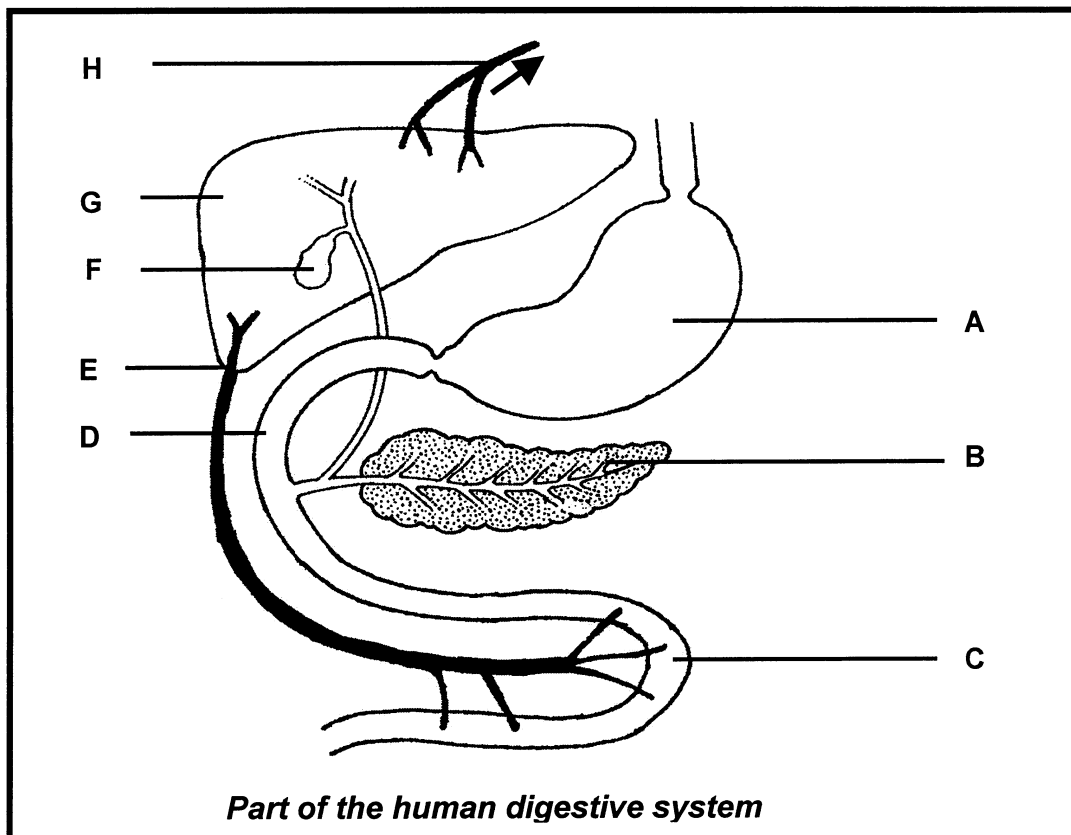
2.1.5 Beskryf wat met 'n oormaat aminosure in die liggaam gebeur. (5)
(23)



SECTION B

QUESTION 2

2.1 Study the diagram below and then answer the questions which follow.



2.1.1 Label:

- (i) Blood vessels E and H (2)
 (ii) Organs B and G (2)

2.1.2 Name THREE enzymes that are produced in C and which act on carbohydrates. (3)

2.1.3 List THREE functions of each of the following:

- (i) The fluid in F (3)
 (ii) Hydrochloric acid in A (3)

2.1.4 Which part, E or H, will contain the higher concentration of glucose after running a long distance race? Explain the answer. (5)

2.1.5 Describe what happens to the excess amino acids in the body. (5)
(23)

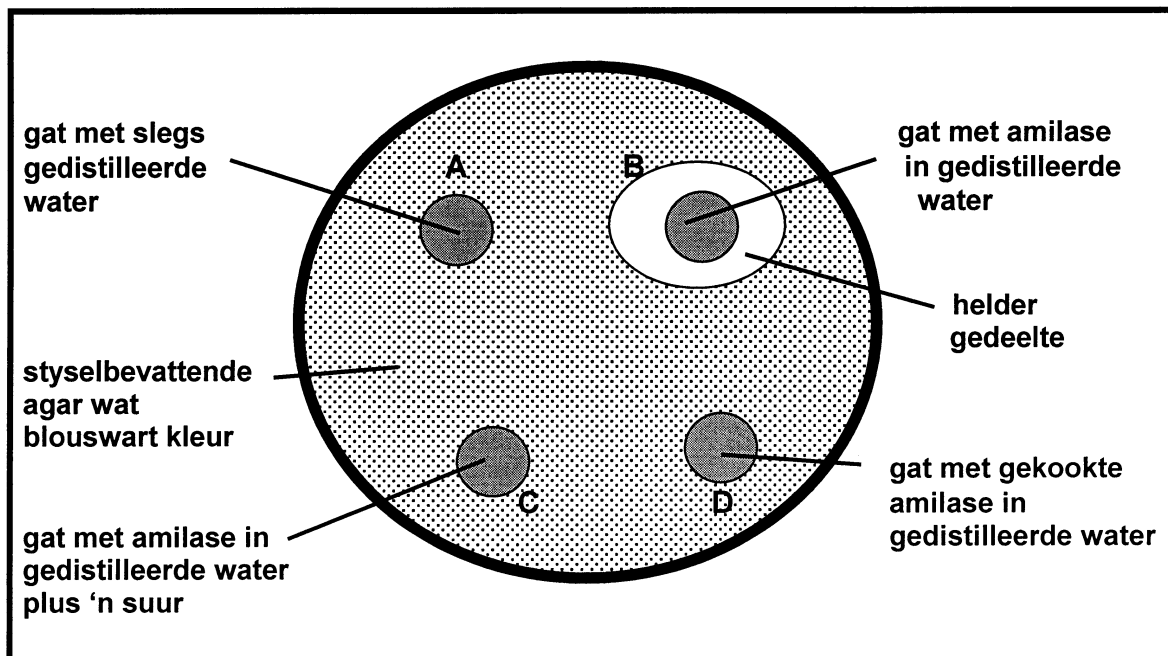


- 2.2 Tydens 'n ondersoek om die werking van die ensiem amilase op stysel te ondersoek, het 'n groep leerders 'n vlak bakkie met agar (jellieagtige groeimedium) wat stysel bevat, gebruik. Vier gate is in die agar gesny en elkeen is met 'n verskillende vloeistof, soos op onderstaande diagram aangedui, gevul.

Die bakkie is toe bedek en by 37°C vir 24 uur geïnkubeer.

Na 24 uur is jodiumoplossing oor die oppervlak van die agar gegooi.

Die resultate word hieronder aangedui.



2.2.1 Verduidelik die resultate in:

- | | | |
|-------|---|-----|
| (i) | B | (2) |
| (ii) | C | (2) |
| (iii) | D | (2) |

2.2.2 Wat is die doel van gedeelte A? (1)

2.2.3 Elke leerder in die groep het sy/haar eie ondersoek uitgevoer omdat hulle hul resultate wil vergelyk. Maak 'n lys van DRIE faktore wat hulle konstant moes hou om 'n geldige vergelyking te kon maak. (3)

2.2.4 Noem EEN stof wat moontlik in die helder gedeelte teenwoordig kan wees. (2)
(12)

Totaal Vraag 2: 35

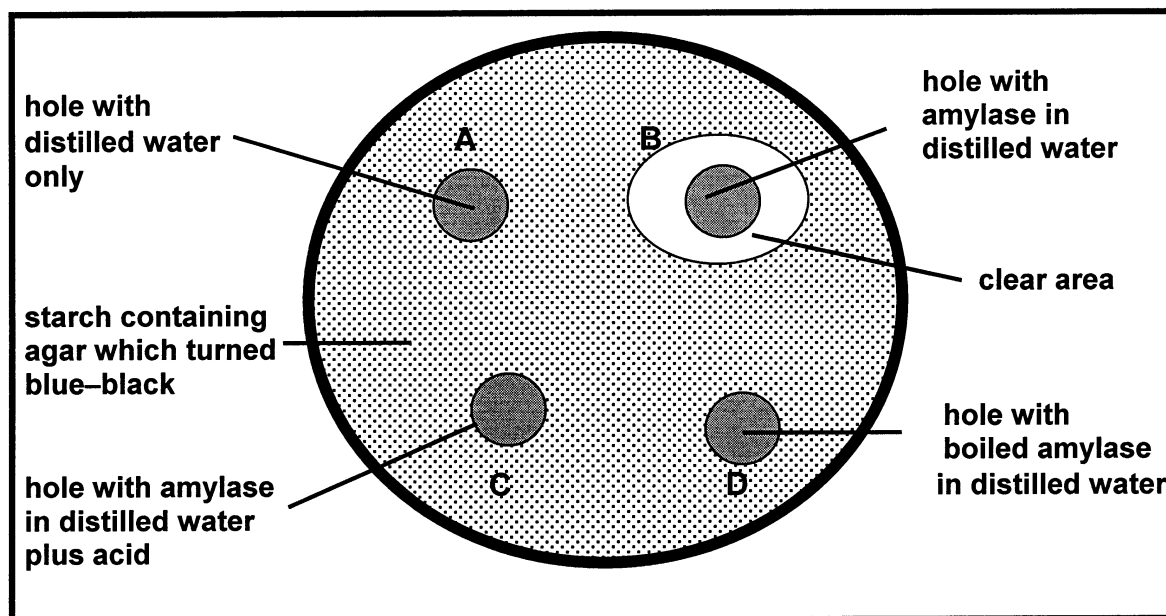


2.2 In an investigation to determine the action of the enzyme amylase on starch, a group of learners used a shallow dish with agar (jelly-like growth medium) which contained starch. Four holes were cut into the agar and each was filled with a different liquid as indicated in the diagram below.

The dish was covered and incubated at 37°C for 24 hours.

After 24 hours, iodine solution was poured over the surface of the agar.

The results are indicated below.



2.2.1 Explain the results at:

- (i) B (2)
- (ii) C (2)
- (iii) D (2)

2.2.2 What is the purpose of set-up A? (1)

2.2.3 Each learner in the group conducted his/her own investigation because they wanted to compare their results.
List THREE factors that they needed to keep the same in order to make a valid comparison. (3)

2.2.4 Name ONE substance that may be present in the clear area. (2)
(12)

Total Question 2: 35



VRAAG 3

- 3.1 In die jaar 2000 het 'n groep dieetkundiges voorstelle gemaak om die dieet van die mense in Suid-Afrika te verbeter. Die onderstaande tabel toon die gemiddelde dieet van Suid-Afrikaners in 2000 asook die voorstelle vir 'n verbeterde dieet.

Voedselsoort	Gemiddelde dieet per persoon per jaar in kg	
	2000	Voorgestelde verbeterde dieet
Melkprodukte (botter uitgesluit)	26	26
Vleis	56	48
Vis	8	8
Olies en vette	22	19
Suikers	48	40
Vrugte	55	63
Aartappels	96	111
Ander groentes	65	75
Neute	6	6
Graanprodukte	73	87

- 3.1.1 Maak 'n lys van DRIE voedselsoorte wat aanbeveel is om verminder te word. (3)
- 3.1.2 Verduidelik 'n moontlike rede waarom die voedselsoorte verminder moet word. (2)
- 3.1.3 Noem DRIE voedselsoorte wat aanbeveel is om vermeerder te word. (3)
- 3.1.4 Verduidelik 'n moontlike rede waarom die voedselsoorte vermeerder moes word. (2)
- (10)**



QUESTION 3

- 3.1 In the year 2000, a group of nutritionists made suggestions for improving the diet of people in South Africa. The table below shows the average diet of South Africans in that year and the recommendations for a better diet.

Foodstuff	Average diet in kg per person per year	
	2000	Recommended better diet
Dairy products (excluding butter)	26	26
Meat	56	48
Fish	8	8
Oils and fats	22	19
Sugars	48	40
Fruit	55	63
Potatoes	96	111
Other vegetables	65	75
Nuts	6	6
Grain products	73	87

- 3.1.1 List THREE foodstuffs which are recommended to be reduced. (3)
- 3.1.2 Explain a possible reason why these foodstuffs need to be reduced. (2)
- 3.1.3 Name THREE foodstuffs which are recommended to be increased. (3)
- 3.1.4 Explain a possible reason why these foodstuffs need to be increased. (2)
- (10)**



3.2 Bestudeer die onderstaande tabel en beantwoord die vrae wat volg.

Jaar	Menslike bevolking in miljoene
1650	500
1750	750
1850	1 000
1950	2 010
2050	8 000

- 3.2.1 Gebruik die inligting in die tabel om 'n lyngrafiek te trek. (11)
- 3.2.2 Noem die soort groeivorm wat deur die grafiek voorgestel word. (1)
- 3.2.3 Noem TWEE redes waarom die groeivorm hierdie spesifieke patroon het. (2)
- 3.2.4 Bepaal die volgende vanaf jou grafiek:
- (i) Die grootte van die bevolking in die jaar 2000 (2)
 - (ii) Die tyd wat dit die menslike bevolking geneem het om vir die eerste keer te verdubbel (2)
- 3.2.5 Dit is belangrik vir enige land om te verstaan hoe die bevolking in die toekoms sal groei.
- (i) Hoe is die menslike bevolking vir 2050 bepaal? (1)
 - (ii) Noem TWEE redes waarom dit belangrik is om sulke getalle te bepaal. (2)
 - (iii) Noem TWEE huidige wêreldkwessies wat bogenoemde getalle kan verander. (2)
 - (iv) Noem TWEE strategieë wat hierdie bevolking sal moet toepas om sy oorlewing te verseker. (2)
- (25)**

Totaal Vraag 3: 35



3.2 Study the table below and answer the questions that follow.

Year	Human population in millions
1650	500
1750	750
1850	1 000
1950	2 010
2050	8 000

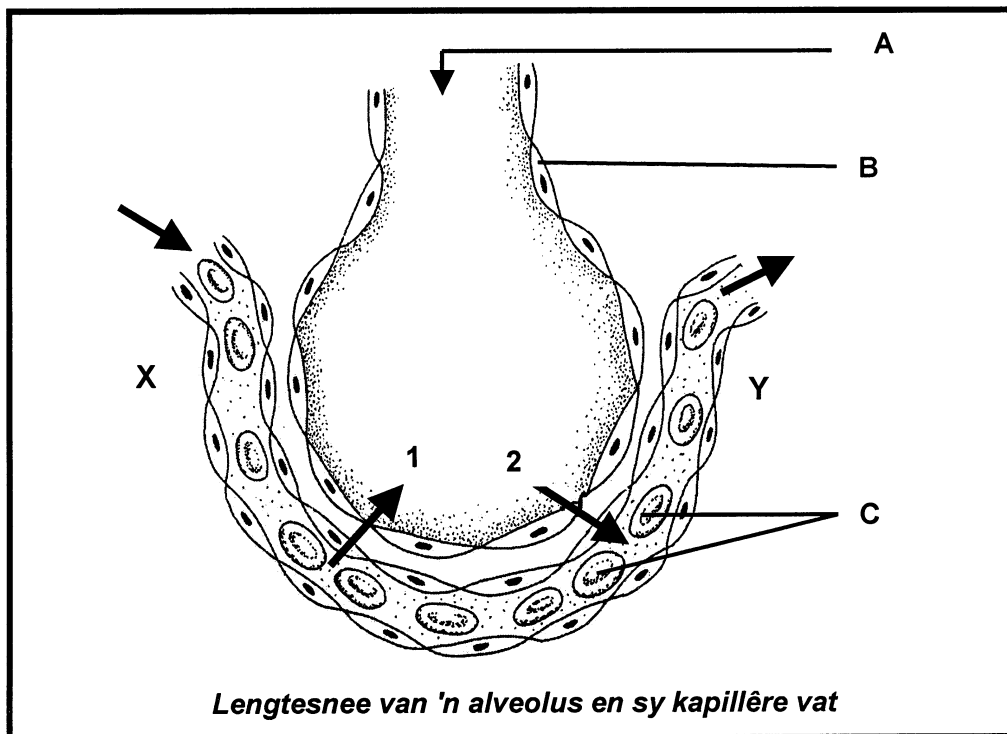
- 3.2.1 Use the information in the table to draw a line graph. (11)
- 3.2.2 Name the type of growth form shown in the graph. (1)
- 3.2.3 State TWO reasons why the growth form has this specific pattern. (2)
- 3.2.4 From your graph determine the following:
- (i) The population size in the year 2000 (2)
 - (ii) The time taken for the human population to double for the first time (2)
- 3.2.5 It is important for any country to understand how the population will grow in the future.
- (i) How was the human population for 2050 determined? (1)
 - (ii) List TWO reasons why determining such figures is important. (2)
 - (iii) Name TWO current world issues that could change the above figure. (2)
 - (iv) State TWO strategies that this population will need to apply to ensure its survival. (2)
- (25)**

Total Question 3: 35



VRAAG 4

4.1 Bestudeer die onderstaande diagram en beantwoord die vrae wat volg.

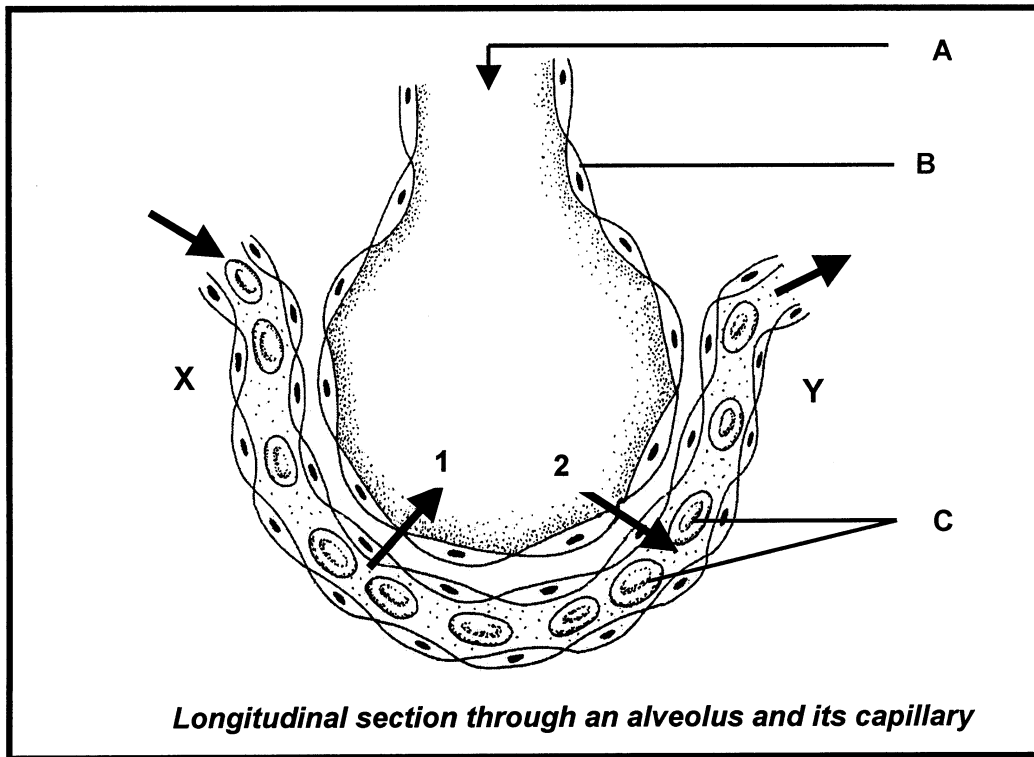


- 4.1.1 Identifiseer dele A, B en C. (3)
 - 4.1.2 Noem die proses wat deur pyle 1 en 2 voorgestel word. (1)
 - 4.1.3 Verduidelik TWEE maniere, soos waargeneem in die diagram, waarop die struktuur aan die vereistes vir 'n doeltreffende gaswissellingsoppervlak voldoen. (4)
 - 4.1.4 In watter deel (X of Y) sal bloed met 'n hoër konsentrasie bikarbonaate aangetref word? Gee 'n rede vir jou antwoord. (3)
 - 4.1.5 Verduidelik TWEE maniere waarop C struktureel aangepas is om sy funksie te verrig. (4)
- (15)**



QUESTION 4

4.1 Study the diagram below and answer the questions that follow.



- 4.1.1 Identify parts A, B and C. (3)
 - 4.1.2 Name the process represented by arrows 1 and 2. (1)
 - 4.1.3 Explain TWO ways, as seen in the diagram, in which the alveolus satisfies the requirements for an efficient gaseous exchange surface. (4)
 - 4.1.4 In which area (X or Y) will the blood contain a higher concentration of bicarbonate ions? Give a reason for the answer. (3)
 - 4.1.5 Explain TWO ways in which C is structurally suited for its function. (4)
- (15)**



4.2 Tydens 'n ondersoek, het 'n afgerigte atleet op 'n oefenmasjien gehardloop totdat hy/sy moeg geraak het. Die spoed van die masjien is so aangepas dat die atleet binne 15 minute uitgeput was, terwyl atmosferiese lug (Atm. lug) ingeasem is.

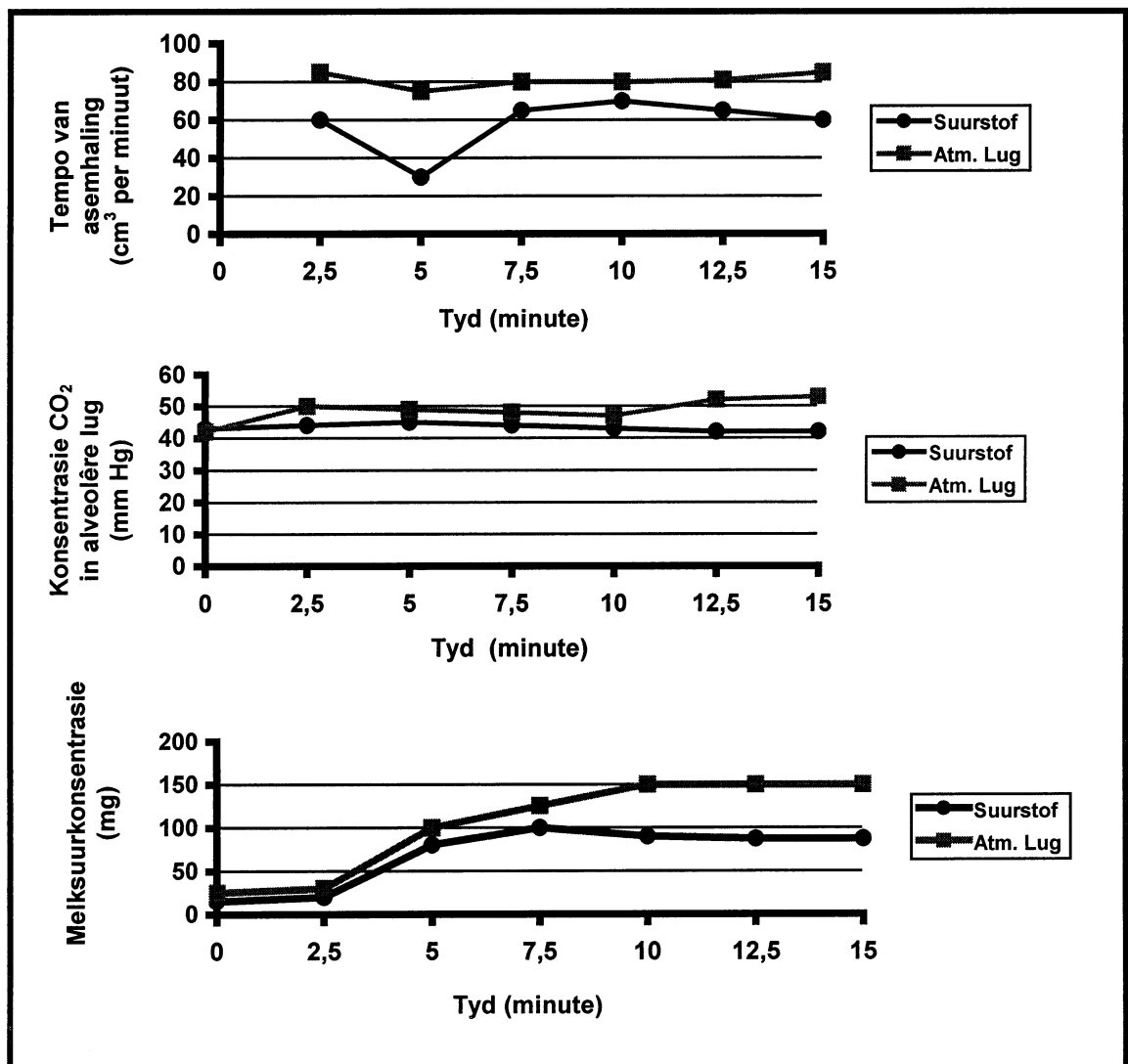
Die volgende is voortdurend tydens die oefenperiode gemeet:

- * Die tempo van asemhaling
- * Die koolstofdiksiedkonsentrasie in die alveoli per eenheidsvolume
- * Die melksuurkonsentrasie in die bloed per eenheidsvolume

Nadat die atleet ten volle herstel het, is die prosedure herhaal, maar hierdie keer is slegs suurstof ingeasem.

Let Wel: Uitgeasemde lug is nie weer tydens die ondersoek ingeasem nie.

Die resultate word hieronder aangedui.



4.2 In an investigation a trained athlete exercised by running on an exercise machine until she/he became tired. The speed of the machine was adjusted so that the athlete reached a state of tiredness in about 15 minutes, while breathing atmospheric air (Atm. air).

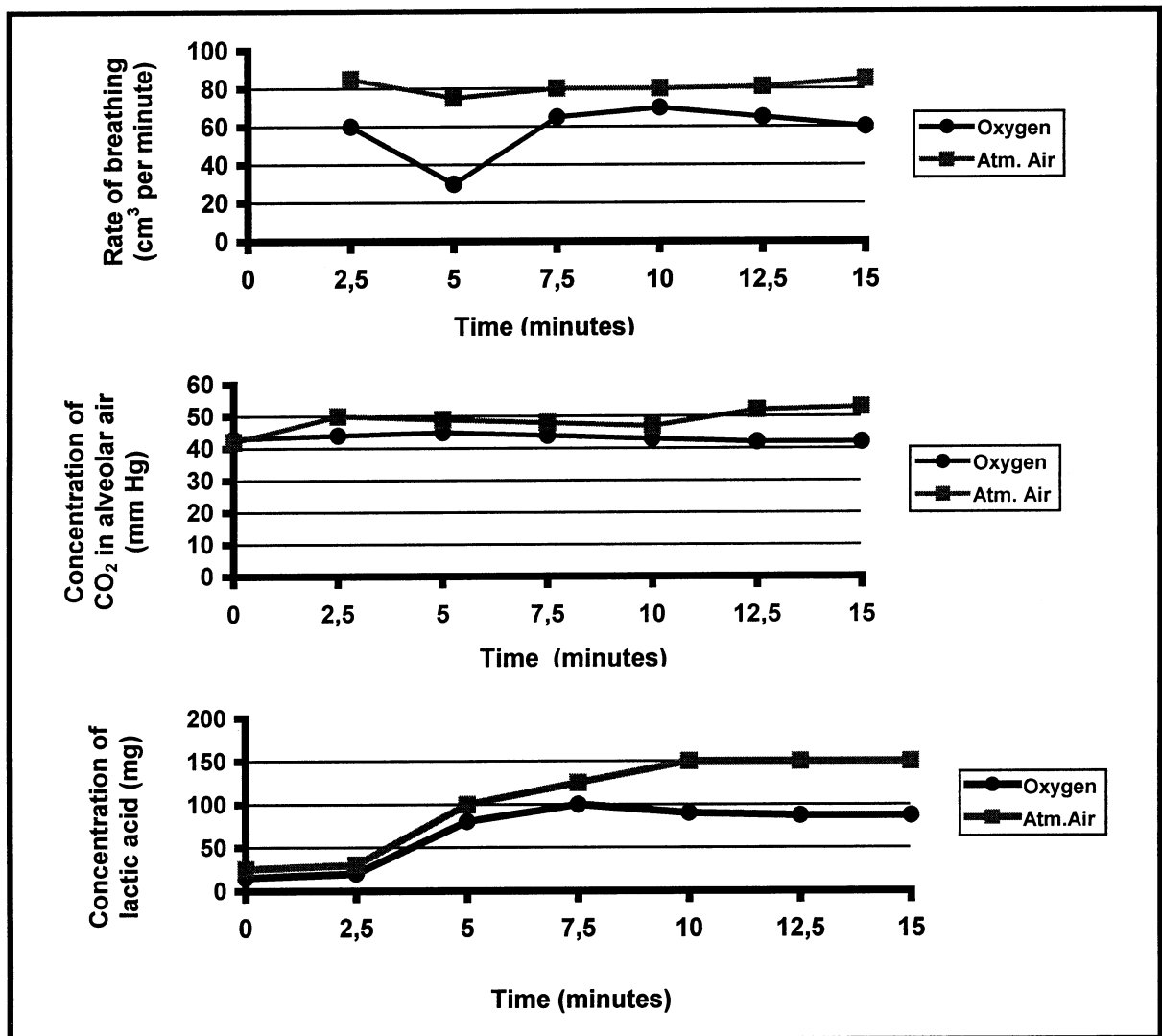
The following were measured throughout the period of exercise:

- * The rate of breathing
- * The carbon dioxide concentration in the alveoli, per unit volume
- * The lactic acid concentration in the blood, per unit volume

After the athlete had recovered fully, the procedure was repeated but this time she/he breathed oxygen only.

Note: Expired air was not re-breathed in the investigation.

The results are shown below.



- 4.2.1 Noem EEN algemene afleiding wat gemaak kan word in verband met die tempo van asemhaling in beide atmosferiese lug en slegs suurstof. (2)
- 4.2.2 Stel TWEE moontlike redes voor vir die verskille waargeneem in die alveolêre CO₂-konsentrasie tydens asemhaling van atmosferiese lug en slegs suurstof. (4)
- 4.2.3 Verklaar (verduidelik met redes) die sigbare verskil in die melksuurkonsentrasies tydens asemhaling van atmosferiese lug en slegs suurstof. (4)
- 4.2.4 Hoekom neem dit die melksuurkonsentrasie 5 tot 10 minute, na aanvang van die ondersoek, om te styg tot 'n konstante vlak? (2)
- 4.2.5 Veranderinge in die tempo van asemhaling kan teweeggebring word as gevolg van die veranderinge in die suurstofinhoud van die bloed.
Gee 'n verduideliking om dié stelling te ondersteun deur gebruik te maak van bogenoemde resultate. (3)
- 4.2.6 Verduidelik waarom uitgeasemde lug nie weer tydens die ondersoek ingeasem behoort te word nie. (2)
- 4.2.7 Verduidelik hoe bogenoemde resultate behoort te verskil as daar tydens die uitvoer van die ondersoek van 'n persoon wat nie aan sport deel neem nie, gebruik gemaak is. (3)
- (20)**

Totaal Vraag 4: 35

TOTAAL AFDELING B: 105



- 4.2.1 State ONE generalisation that can be made about the rate of breathing when breathing atmospheric air and oxygen only. (2)
- 4.2.2 Suggest TWO possible reasons for the differences observed in the alveolar CO₂ concentration when breathing atmospheric air and oxygen only. (4)
- 4.2.3 Account (explain with reasons) for the difference seen in the lactic acid concentrations when breathing atmospheric air and oxygen only. (4)
- 4.2.4 Why does it take between 5 to 10 minutes from the start for the lactic acid concentration to increase to a constant level? (2)
- 4.2.5 Changes in the rate of breathing could be brought about as a result of changes in the oxygen content of the blood.
Give an explanation, to support this statement using the above results. (3)
- 4.2.6 Explain why expired air should not be re-breathed during this investigation. (2)
- 4.2.7 Explain how the above results could have differed if the investigation was carried out with a non-athlete. (3)
- (20)**

Total Question 4: 35

TOTAL SECTION B: 105



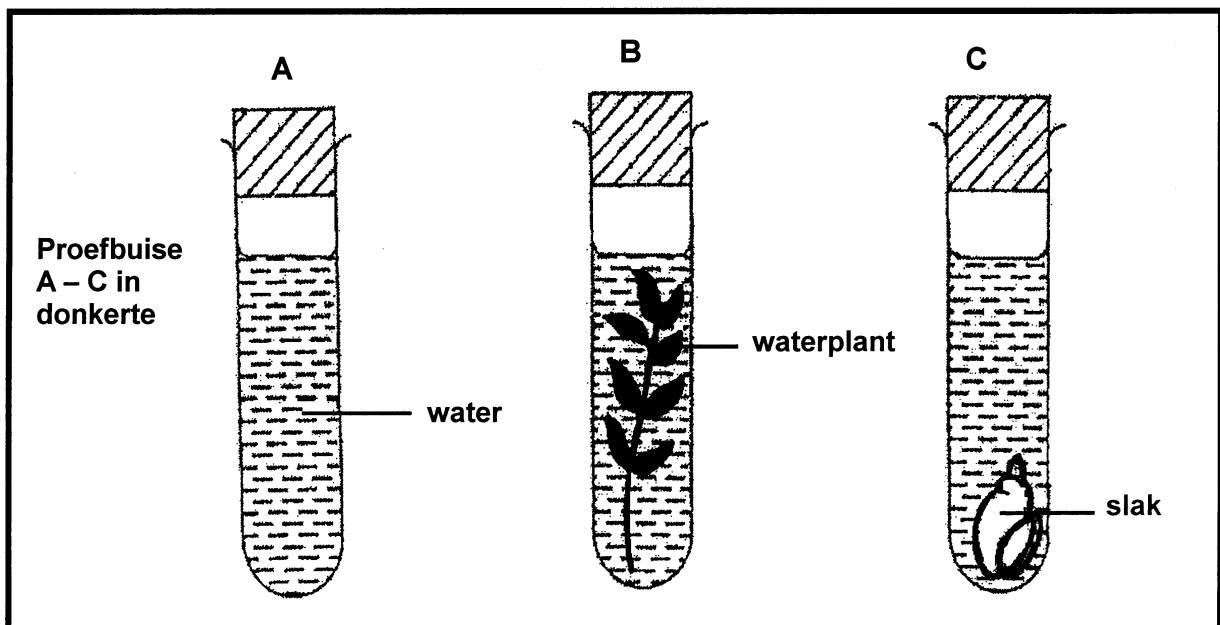
AFDELING C

VRAAG 5

5.1 Die onderstaande diagram stel die apparaat voor wat tydens 'n ondersoek gebruik is. Na 'n tydperk van 24 uur is rooi waterstofkarbonaatindikator by elke proefbuis gevoeg.

Wenk: Waterstofkarbonaatindikator word gebruik om die veranderinge in die koolstofdiksiedkonsentrasies soos volg aan te dui:

- * Dit kleur van rooi na pers as die CO₂-vlak daal.
- * Dit kleur van rooi na geel as die CO₂-vlak styg.



- 5.1.1 Stel EEN doel vir hierdie ondersoek voor. (2)
- 5.1.2 Tabuleer die resultate wat in proefbuis A, B en C waargeneem sal word. (4)
- 5.1.3 Wat is die doel van proefbuis A? (1)
- 5.1.4 Waarom word die proefbuis in die donkerte gehou? (2)
- 5.1.5 Maak 'n lys van TWEE redes waarom die proses, wat in proefbuis C plaasvind, biologies belangrik is. (2)



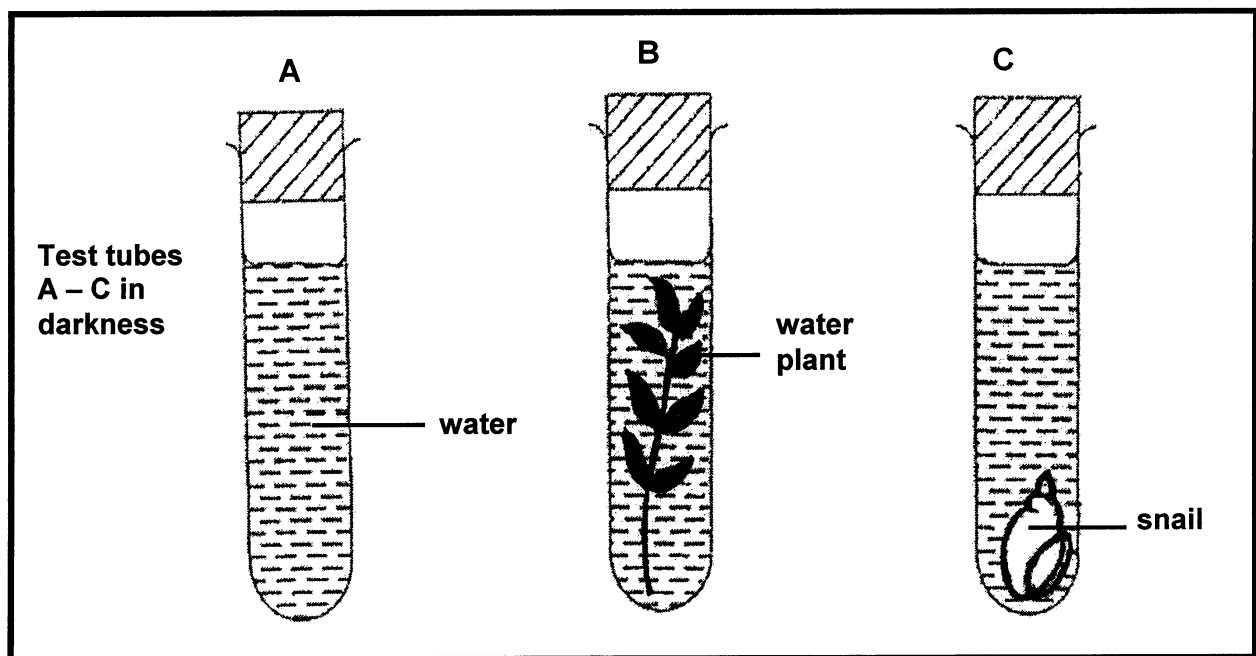
SECTION C

QUESTION 5

5.1 The diagram below represents the apparatus which was used in an investigation. After a period of 24 hours red hydrogen carbonate indicator was then added to each test tube.

Hint: Hydrogen carbonate indicator is used to show the changes in carbon dioxide concentrations as follows:

- * It turns from red to purple when the CO_2 level decreases.
- * It turns from red to yellow when CO_2 level increases.



- 5.1.1 Suggest ONE aim for this investigation. (2)
- 5.1.2 Tabulate the results that will be observed in test tubes A, B and C. (4)
- 5.1.3 What is the purpose of test tube A? (1)
- 5.1.4 Why were the test tubes kept in the dark? (2)
- 5.1.5 List TWO ways in which the process taking place in test tube C is biologically important. (2)



5.1.6 Beskryf die verwagte resultate/waarnemings en verduidelik die waarneming in elk van die volgende situasies:

- (i) Proefbuis B, as 'n slak bygevoeg en dit in die lig geplaas sou word (3)
 - (ii) Proefbuis C, as dit in lig geplaas word (3)
- (17)**

5.2 Beskryf die proses van fotosintese vanaf die oomblik dat lig geabsorbeer word totdat koolhidrate gevorm word.

Feite-inhoud: (15)
Sintese: (3)
(18)

Totaal Vraag 5: 35

TOTAAL AFDELING C: 35

GROOTTOTAAL: 200



- 5.1.6 Describe the expected results/observation and give an explanation for the observation in each of the following situations:
- (i) Test tube B if the snail was added to it and then placed in the light (3)
 - (ii) Test tube C if it was placed in light (3)
- (17)**

5.2 Describe the process of photosynthesis from the time light is absorbed until carbohydrates are formed.

Factual content : (15)
Synthesis: (3)
(18)

Total Question 5: 35

TOTAL SECTION C: 35

GRAND TOTAL: 200

