**LIFE SCIENCES / Lewenswetenskappe GRADE / Graad 11**

**DURATION: 1 HOURS MARKS: 50**

**INSTRUCTIONS AND INFORMATION / Instruksies en Inligting**

1. Answer ALL the questions / *Beantwoord al die vrae*

2. Number the answers correctly / *Nommer die vrae korrek*

3. All drawings should be done in pencil and labeled in blue or black ink / *Alle sketse moet in potlood wees en die byskrifte in blou of swart ink*

4. The diagrams in this question paper are NOT necessarily drawn to scale / *Die diagramme in die vraestel is nie noodwendig volgens skaal nie*

**SECTION / Afdeling A**

**Question / Vraag 1**

* 1. **Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question (1.1.1 – 1.1.5). For example 1.1.6 D. / *Vier moontlike antwoorde word by elke vraag verskaf. Kies die beste antwoord en skryf die letter (A – D) langs die vraagnommer (1.1.1 – 1.1.5) bv. 1.1.5. D.***
		1. The organelle in a plant cell that converts the radiant energy into chemical potential energy is the … / *Die organel in 'n plantsel wat stralingsenergie omsit na potensiële energie is ...*

A mitochondria / *mitochondrium*

B chloroplast / *chloroplaste*

C golgi apparatus / *golgi apparaat*

D nucleolus / *kernliggaampie*

* + 1. The requirements (things needed) for and the products of photosynthesis are … / *Die benodigdhede (dinge benodig) vir en die produkte van fotosintese is ...*

V and/*en* W = requirements / *benodigdhede*

Y and/*en* Z = products / *produkte*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | V | W | Y | Z |
| A | Water | Sunlight / Sonlig | CO2 | Oxygen |
| B | CO2 | Water | Oxygen | Carbohydrate |
| C | Oxygen | CO2 | Water | Carbohydrate |
| D | Sunlight / Sonlig | Oxygen / Suurstof | Water | carbohydrate |

* + 1. Which two substances are needed during the Calvin cycle? / *Watter twee stowwe word benodig tydens die Calvin siklus?*

A light and CO2 / *lig en CO2*

B CO2 and H+ /  *CO2 en H+*

C CO2 and water / *CO2 en water*

D oxygen and H+ / *suurstof en H+*

* + 1. Which one if the following is the main energy carrier in a cell? / *Watter een van die volgende is die hoof energie draer in 'n sel?*

A mitochondria / *mitochondrium*

B ADP

C DNA / *DNS*

D ATP

(4x2=8)

1.2 **Each of the following statements can be replaced by a biological term. Write only the term beside the appropriate number on the answer sheet. / *Elkeen die volgende stellings kan vervang word met 'n biologiese term. Skry slegs die term langs die gepaste nommer neer.***

1.2.1 Organisms that produce their own food are known as ... / *Organismes wat hul eie kos kan produseer, staan bekend as ...*

1.2.2 The first phase of photosynthesis is known as … / *Die eerste fase van fotosintese staan bekend as ...*

1.2.3 The waste product of the first phase of photosynthesis is … / *Die afvalproduk van die eerste fase van fotosintese is ...*

 (3)

**1.3 Choose a description from COLUMN B that best matches an item in COLUMN A. Write only the letter (A – H) next to the question number (1.3.1 – 1.3.4), for example 1.3.6 J. / *Kies uit kolom B 'n beskrywing wat die beste pas by die item in kolom A. Skryf slegs die letter langs die vraagnommer, bv. 1.3.6 J.***

|  |  |  |  |
| --- | --- | --- | --- |
| **Question** | **COLUMN A** | Answer Antwoord | COLUMN B |
|  1.3.1 | Cuticle / *Kutikula* | A | Iodine test / *Jodium toets* |
| 1.3.2 | Chlorophyl / *Chlorofil* | B | Absorbs vibrations / *Absorbeer vibrasies* |
| 1.3.3 | Starch / *Stysel* | C | Waxy / *Wasagtig* |
| 1.3.4 | Glucose / *Glukose* | D | ADP |
|  |  | E | Green / *Groen* |
|  |  | F | Simple sugar / *Eenvoudige suiker* |

(4)

**SECTION A TOTAL: 15**

**SECTION / Afdeling B**

**Question / Vraag 2**

2.1 In an investigation to determine whether light is necessary for photosynthesis

a leaf was obtained from a plant that was first placed in a dark cupboard for

48 hours before it was again exposed to light.

*In 'n ondersoek om te bepaal of lig benodig word vir fotosintese was 'n blaar gepluk van 'n plant wat vir 48 uur in 'n donker kas was voordat dit weer aan lig blootgestel was.*

Refer to the diagram below to answer the questions that follow.

*Verwys na die onderstaande diagram en beantwoord die volgende vrae:*



**Cardboard**

**Karton**

***Leaf subjected to test to determine whether light is necessary for photosynthesis***

***Blaar wat gebruik is om te toets of lig tydens***

***fotosintese benodig word.***

 2.1.1 Why was the plant placed in a dark cupboard? / *Waarom was die plant in 'n donker kas geplaas?*  (2)

* + 1. Why is only part of the leaf covered with cardboard? / *Hoekom was slegs 'n gedeelte van die blaar met karton bedek?*  (2)

2.1.3 The presence of which substance indicates that photosynthesis did occur? / *Die teenwoordigheid van watter stof dui daarop dat fotosintese plaas gevind het?* (1)

2.1.4 Name the independent variable. / *Noem die onafhanklike veranderlike.*

 (1)

2.1.5 Which part of the leaf does one expect to test positive for the presence of the product of photosynthesis? / *Watter deel van die blaar sou 'n mens verwag, moet positief toets vir die teenwoordigheid van die produk van fotosintese?*  (1)

 **(7)**

2.2 A tomato farmer was able to produce crops in greenhouses which were

heated to between 15oC and 22oC. In addition, the carbon dioxide level was

increased from its normal 0,03% to 0,1%.

*'n Tamatieboer het tamaties gekweek in kweekhuis tonnels wat tussen 15oC en 22oC verhit was. Die koolstofdioksiedvlakke in die tonnels was verhoog van 0,03% tot 0,1%*.

2.2.1 State ONE way in which the farmer could have enriched the air inside

the greenhouse with carbon dioxide, without burning any fuel. / *Gee een manier waarmee die boer die lug in die tonnels kom verryk met koolstofdioksied sonder om brandstof te brand.*  (1)

* + 1. Explain how increasing the carbon dioxide levels up to 0,1% can lead

to an increased production of tomatoes. / *Verd uidelik hoe die toename in koolstofdioksied vlakke kan lei tot 'n verhoogde oes opbrengs.*  (3)

2.2.3 What will happen to the tomato yield if the temperature was increased to 35 oC ? Explain briefly. / *Wat sal met die tamatie oes opbrengs gebeur as die temperatuur verhoog word tot 35 oC ? Verduidelik kortliks.* (3)

* + 1. Name ONE other factor (other than temperature and CO2 level) which might have to be increased to obtain an even greater yield. / *Noem EEN ander faktor (anders as temperatuur en CO2 vlak) wat die oes opbrengs kan verhoog.* (1)

**(8)**

**TOTAL QUESTION 2: 15 marks**

**QUESTION / Vraag 3**

The following graph was obtained from results of the experiment / *Die onderstaande grafiek was verkry vanaf die resultate van die boonste eksperiment.*

 **A** **B**

 **C**

 Rate at which gas bubbles are formed

 Tempo waarteen gasborrels vorm

3.6 What relationship exist between the light intensity and the rate at which the bubbles are formed? / *Watter eweredigheid (verhouding) bestaan tussen die ligintensiteit en die tempo waarteen die borrels vorm? (2)*

3.7 What does the shape of the graph between A and B suggest regarding the rate of photosynthesis? / *Wat kan afgelei word uit die grafiek se vorm tussen punte A en B rakende fotosintese tempo? (2)*

3.8 What happened from B to C? Explain one reason for the shape of the graph between points B and C. / *Wat het gebeur tussen die punte B en C? Verduidelik een rede vir die vorm van die grafiek tussen punte B en C. (4)*

 **TOTAL QUESTION 3: 15**

**QUESTION / Vraag 4**

 Testing for the presence of the product(s) of photosynthesis. / *Toets vir die aanwesigheid van die produk(te) van fotosintese*

 4.1 When we want to test a leaf for the presence of the product(s) of photosynthesis we first boil the leaf in water. Why? / *Wanneer ons 'n blaar wil toets vir die aanwesigheid van die produk(te) van fotosintese word die blaar eers in water gekook. Hoekom? (2)*

4.2.1 In the next step one then puts the leaf in boiling ethanol. Why? / *In die volgende stap word die blaar in kokende etanol geplaas. Hoekom? (2)*

4.2.2 What colour will the ethanol be after a while? / *Watter kleur sal die etanol wees na 'n rukkie?* (1)

 **TOTAL QUESTION 4: [5]**

**SECTION B TOTAL: 35**

**GRAND TOTAL: 50**