

# BIOLOGY HG PAPER 1

## General

This report should be read in conjunction with the question paper. The document on “Potential problems in marking Biology HG and SG”, released by National Education last year, was strictly applied for the first time and had a marked effect on the marking and the performance of candidates. Candidates forfeited marks when not carrying out the instructions to certain questions, e.g. Questions 2.1.2, 2.1.3 and 3.2.3 where only the required number of answers were marked and Question 3.1.1 where they were asked to construct a table.

To prepare candidates more comprehensively for their final examination, it is recommended that the clauses in this document be applied in all internal examinations in Grades 10 to 12.

The questions testing the recall of knowledge were reasonably well answered. Candidates experienced problems with questions where they had to apply their knowledge in new situations e.g. 2.3.2, 2.3.3, 3.1.4, 3.3.3, 4.1.2, 4.3.2, 4.3.3 and 5.1.7.

## Section A

### Question 1

Except for the following, this section was very well answered by a large number of candidates.

- 1.2.1 - Mitochondrion was confused with chloroplast.
- 1.2.4 - territorial instead of territoriality
- 1.2.5 - Gaseous exchange was confused with diffusion.
- 1.4.1 - The label “ribs” was incorrectly identified as ribcage.
- 1.5 - Although candidates knew the aim of the experiment, many had problems with the setting up of a control. They mentioned the use of “beans” although the diagram clearly indicated “snails”. Candidates must be taught that in most investigations, only one variable should be changed at a time. It is important in this experiment for the control to have **dead, sterilized snails** so to prevent the influence of micro-organisms in the results obtained.
- 1.6 - This question caused problems to most candidates. Their inability to correctly identify the macro-molecule in 1.6.1 as starch, affected all their answers to the rest of this question.

### Question 2

- 2.1.2 Many candidates did not provide related differences between cells A and D. It is important when comparing two items, to compare or show the differences between similar characteristics.
- 2.1.3 Candidates provided more than the required number of answers where only the first two could be marked. Candidates mentioned structural features without explaining their related adaptations in photosynthesis.
- 2.2.1 to 2.2.4 were reasonably well answered by most candidates.

- 2.3.1 Most candidates correctly indicated the limits of the first range of the wavelength but had difficulty in determining the limits of the second range.
- 2.3.2 Most candidates were unable to explain why bacteria concentrated in these regions. They were not able to relate the higher production of oxygen as a product of photosynthesis within these ranges. Some candidates mentioned the red and blue colours of the spectrum although the data provided does not refer to colours.
- 2.3.3 Many candidates referred to either light or light intensity instead of the wavelength of light. Many candidates could not distinguish between a conclusion and a result.
- 2.3.4 The drawing of the chloroplast was a problem to some candidates, especially with regard to:
- Incorrect labelling – confusion between thylakoid and granum, stoma and stroma, double membrane and cell membrane.
  - Shape – in that many drawings were not spherical or elliptical.
  - Proportion – size, shape and structure of components.

### Question 3

- 3.1.1 Most tables drawn did not include headings in either rows or columns. Some candidates could not translate the information given in the diagrams into a table format. Some candidates included unnecessary information e.g. pH, temperature, etc.
- 3.1.2 Many candidates incorrectly referred to the acid being responsible for the hydrolysis of the egg white rather than pepsin working in an acid medium.
- 3.1.3 Few candidates answered this question correctly. Candidates incorrectly concluded that the pH of the stomach is 3 from the experimental design and results shown in the diagrams.
- 3.2 A large proportion of candidates answered this question reasonably well.
- 3.3 This question was poorly answered for the following reasons:
- Candidates did not read or pay attention to the note given that the seeds were grown in darkness and this vital information was the reason for their inability to answer 3.3.3.
  - Candidates were unable to distinguish between seeds and seedlings.

### Question 4

- 4.1.2 A large number of candidates erroneously referred to the process of diffusion being negatively affected by the presence of cartilage.
- 4.2 A majority of candidates answered this question reasonably well.
- 4.3.1 This question was well answered as many candidates knew how to apply the formula relating to the energy budget.
- 4.3.2 This question was poorly answered. Many candidates did not refer to the owl as being an active predatory animal, which therefore utilizes more energy.

4.3.3 Very few learners knew that plant matter is not easily digestible and therefore were unable to explain why the cow, a herbivore, absorbs a smaller percentage of its ingested food because plant matter consists mainly of cellulose.

4.3.4 and 4.3.5 were fairly well answered.

## Section C

### Question 5

A large proportion of candidates answered the question satisfactorily to very well.

5.1.1 - The calculation was done incorrectly by most candidates. This answer also influenced the calculation required in 4.1.2.

5.1.3 - Few candidates knew that ingested food also contained water or that water is formed during certain metabolic processes.

5.1.7 - That digestive enzymes are also proteins was seldom mentioned as an answer.

5.1.9 - Few candidates knew the structural adaptations of the stomach. They either gave functional adaptations or mentioned the adaptations of the small intestine.

5.2 Most candidates answered this question on the control of blood-glucose very well. It was noticeable that candidates who scored well, had mastered the technique of presenting their facts in a logical and orderly manner. Educators must ensure that their learners develop this skill, especially when explaining processes and mechanisms.

Although most candidates mentioned that insulin decreases blood glucose levels by converting glucose into glycogen, few mentioned that insulin also decreases blood sugar level by

- Increasing the oxidation of glucose in muscle cells.
  - Increasing the conversion of glucose into fats/decreasing fat metabolism.
- Still too many candidates confuse glycogen with glucagon and the functioning of insulin with that of glucagon.

# BIOLOGIE HG VRAESTEL 1

## Algemeen

Hierdie verslag moet saam met die vraestel gelees word. Die dokument oor “potensiële probleme met die nasien van Biologie HG en SG”, beskikbaar gestel deur Nasionale Onderwys verlede jaar is vir die eerste keer streng toegepas en het 'n beduidende effek op die nasien en prestasie van die kandidate gehad. Kandidate het punte verbeur deur nie die instruksies van sekere vrae, bv. vrae 2.1.2, .2.1.3, en 3.2.3 waar slegs die gevraagde aantal antwoorde bepunt was, asook Vraag 3.1.1. waar 'n konstruksie van 'n tabel gevra is, uit te voer nie. Om kandidate meer doeltreffend vir hul finale eksamen voor te berei, word daar aanbeveel dat die dokument ook gebruik word in alle interne eksamens in grade 10 tot 12.

Die vrae wat herroeping van kennis getoets het, is goed beantwoord. Kandidate het egter probleme ondervind met die vrae wat die toepassing van kennis in nuwe situasies vereis het bv. 2.3.2, 2.3.3, 3.1.4, 3.3.3, 4.1.2, 4.3.2, 4.3.3 en 5.1.7.

## Afdeling A

### Vraag 1

Behalwe vir die volgende, is hierdie afdeling goed deur die meerderheid kandidate beantwoord.

- 1.2.1 - Mitochondrion is verwar met chloroplast
- 1.2.4 - Territoriaal in plaas van territorialiteit
- 1.2.6 - Gaswisseling is verwar met diffusie
- 1.4.1 - Die “ribbe” etiket is foutiewelik as borskas/ribbekas geïdentifiseer.
  
- 1.5 - Hoewel kandidate die doel van die eksperiment geken het, het baie probleme met die opsetting van 'n kontrole gehad. Hulle meld die gebruik van “sade” alhoewel die diagram duidelik “slakke” aandui. Kandidate moet bewus gemaak word dat in die meeste ondersoeke slegs een veranderlike op 'n slag verander word. Dit is belangrik in hierdie eksperiment dat die kontrole **dooie, gesteriliseerde** slakke moet hê, om die invloed wat mikro-organismes op die resultate kon hê, uit te sluit.
  
- 1.6 - Hierdie vraag het probleme vir die meeste kandidate gegee. Hulle vermoë om die makro-molekuul in 1.6.1 korrek as “stysel” te identifiseer, het al hul antwoorde op die daaropvolgende vrae geaffekteer.

### Vraag 2

- 2.1.4 Baie kandidate het nie verwante verskille tussen selle A en D gegee nie. Dit is belangrik dat wanneer twee items vergelyk word, dieselfde kenmerke gebruik word.
  
- 2.1.5 Kandidate het meer as die gevraagde aantal antwoorde verskaf, waar slegs die eerste twee bepunt kon word. Kandidate verskaf strukturele kenmerke sonder om hul ooreenstemmende aanpassings vir fotosintese te verduidelik.
  
- 2.1.6 2.2.1 to 2.2.4 was redelik goed deur die meerderheid kandidate beantwoord.
  
- 2.3.1 Die meerderheid kandidate het die grense vir die eerste golflengtereeks korrek aangedui maar het gesukkel om die grense van die tweede reeks te bepaal.
  
- 2.3.5 Die meerderheid kandidate was onbevoeg om te verklaar waarom bakterieë in hierdie areas gekonsentreerd was. Hulle kon nie die hoër produksie van suurstof as 'n produk

van fotosintese binne hierdie grense aflei nie. Sommige kandidate meld die rooi en blou kleure van die spektrum alhoewel die gegewe data geen kleure verskaf nie.

2.3.6 In plaas van golflengtes van lig, verwys baie kandidate na lig of ligintensiteit. Baie kandidate kon nie tussen 'n gevolgtrekking en 'n resultaat onderskei nie.

2.3.7 Die tekening van die chloroplast was vir baie kandidate 'n probleem, veral met betrekking tot:

- Foutiewe byskrifte – hulle verwar tilakoïed met granum, stoma met stroma en dubbele membraan met selmembraan.
- Vorm – deurdat baie tekeninge nie sferies of ellipties was nie
- Verhouding – grootte, vorm en struktuur van komponente

### Vraag 3

3.3.1 Die meeste tabelle wat getrek is, het nie opskrifte vir rye en kolomme gehad nie. Sommige kandidate kon nie die informasie in die diagramme vervat, in 'n tabelvorm transleer nie. Sommige kandidate het onnodige informasie soos pH, temperatuur, ens. aangedui.

3.3.2 Baie kandidate het foutiewelik genoem dat die suur verantwoordelik vir die hidrolise van die eierwit is, pleks van pepsien wat in 'n suurmedium werk.

3.3.3 Min kandidate het hierdie vraag korrek beantwoord. Kandidate het vanuit die eksperiment en die resultate soos in die diagramme vervat, foutiewelik tot die slotsom gekom dat die pH van die maag 3 is.

3.4 'n Groot aantal kandidate het hierdie vraag redelik goed beantwoord.

3.5 Hierdie vraag was swak beantwoord om die volgende redes:

- Kandidate het nie aandag aan die leesstuk gegee waar gemeld is dat die sade in donkerte gekweek is nie. Die gebrek aan hierdie belangrike informasie was dan ook die rede vir hul onvermoë om 3.3.3 te beantwoord.
- Onvermoë van kandidate om tussen sade en saailinge te onderskei

### Vraag 4

4.2.2 'n Groot aantal kandidate het foutiewelik gemeld dat die proses van diffusie deur die teenwoordigheid van kraakbeen negatief beïnvloed word.

4.3 Die meerderheid kandidate het hierdie vraag redelik goed beantwoord.

4.3.5 Hierdie vraag is goed beantwoord deurdat baie kandidate geweet het hoe om die formule vir die energiebegroting te gebruik.

4.3.6 Hierdie vraag is swak beantwoord. Baie kandidate het nie genoem dat die uil, vanweë sy aktiewe, predatoriese leefwyse, 'n groter energieverbruik het.

4.3.7 Baie min kandidate het geweet dat plantmateriaal nie maklik verteerbaar is nie en gevolglik was hulle onbevoeg om te verduidelik waarom 'n koei, as 'n herbivoor, 'n kleiner

persentasie van die voedsel wat hy inneem, absorbeer aangesien plantmateriaal grotendeels uit sellulose bestaan.

4.3.8 En 4.3.5 was redelik goed beantwoord

## Afdeling C

### Vraag 5

'n Groot aantal kandidate het hierdie vraag bevredigend tot baie goed beantwoord.

- 5.1.1 - die berekening is foutief deur die meerderheid kandidate gedoen. Hierdie antwoord het ook die berekening in 5.1.2 beïnvloed.
- 5.1.3 - min kandidate het kennis gedra dat voedsel ingeneem ook water bevat of dat water tydens sekere metaboliese prosesse gevorm word.
- 5.1.7 - dat verteringsensieme ook proteïene is, was weinig as antwoord verstrekkend.
- 5.1.9 - min kandidate het die strukturele aanpassings van die maag geken. Hulle het of funksionele aanpassings of die aanpassings van die dunderm as antwoord gegee.
- 5.2 Die meerderheid kandidate het hierdie vraag oor die beheer van bloedsuiker goed beantwoord. Dit was opmerklik dat kandidate wat goed presteer, die tegniek bemeester het om feite in 'n geordende en logiese wyse aan te bied. Opvoeders moet verseker dat hul leerders hierdie vaardigheid ontwikkel, veral wanneer meganismes of prosesse beskryf word. Hoewel die meeste kandidate meld dat insulien die bloedsuikervlak verlaag deur glukose tot glikogeen te verander, het min gemeld dat insulien ook die vlak verlaag deur
- die oksidasie van glukose in spierselle te verhoog
  - die omsetting van glukose in vette die metabolisme van vette verhoog/verlaag.
- Nog steeds te veel kandidate verwar glikogeen met glukagon en die funksionering van insulien met dié van glukagon.