EKURHULENI NORTH DITRICT
JUNE EXAM
2023

LIFE SCIENCES
GR 11
MARKING GUIDELINE

TIME: 2 ½ HOURS
MARKS: 150
08 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2020

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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized 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 Life Sciences or if it is out of context**.**

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.

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	A ✓✓		
	1.1.6	B✓✓	(6 x 2)	**(12)**
1.2	1.2.1	Eukaryotic ✓		
	1.2.2	Stolon ✓		
	1.2.3	Asexual ✓		
	1.2.4	Radial ✓		**(4)**
1.3	1.3.1	A only ✓✓		
	1.3.2	Both A and B ✓✓		
	1.3.3	B only ✓✓		
	1.3.4	B only ✓✓		
	1.3.5	B only ✓✓	(5 x 2)	**(10)**
1.4	1.4.1	Pteridophyta ✓		(1)
	1.4.2	A – pinna✓		
		B - sporangium✓		(2)
	1.4.3	C – protects✓ the sporangia		(1)
	1.4.4	a) sporophyte✓		(1)
		b) produces spores✓		(1)
				(6)
1.5	1.5.1	1 – ectoderm✓		
		2 – coelom✓		
		3 – endoderm✓		
		4 – gut✓		
		5 -- mesoderm✓		(5)
	1.5.2	a) A ✓		(1)
		b) has a coelom✓		(1)
				(7)
1.6	1.6.1	1 – Porifera✓		
		2 – Cnidaria✓		
		3 – Platyhelminthes✓		
		4 - Annelida✓		
		5 – Arthropoda✓		
		6 – Chordata✓		**(6)**
1.7	1.7.1	a) Glycolysis✓		
		b) Oxidative phosphorylation✓ / terminal oxidation		
		c) glucose✓		
		d) carbon dioxide✓		(4)
	1.7.2	a) cytoplasm✓		(1)
				(5)
			TOTAL SECTION A:	**50**

SECTION B

QUESTION 2

2.1 2.1.1 Fungi✓ (1)

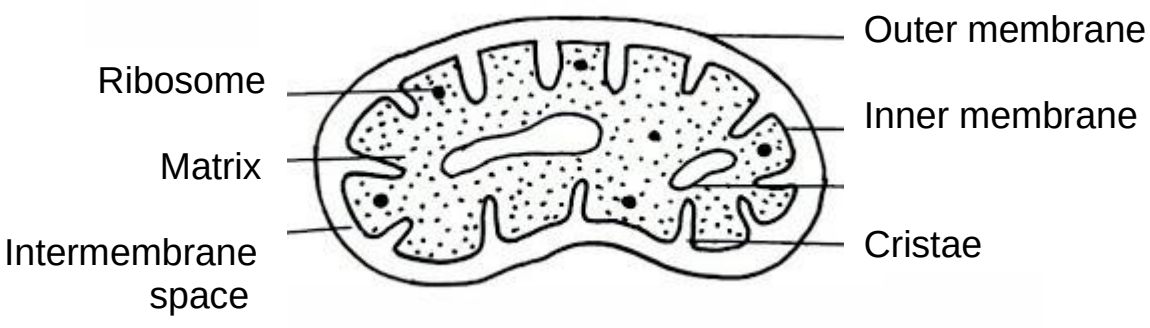
2.1.2 The higher/warmer the temperature the more the bread rises. ✓✓ (2)

2.1.3 a) Amount that the bread rises. ✓ (1)
b) The recipe✓/ storage location/ temperature during proofing (1)

2.1.4 Loaf A is the control ✓– to compare with the other loaves✓ OR to show that it is temperature that makes the bread rise and nothing else. (2)

2.1.5 a) Anaerobic respiration✓ (1)
b) Carbon dioxide✓ and ethanol/ alcohol. ✓ (2)

c) Diagram of a mitochondrion.



(6)

Rubric for assessing a diagram

Criteria	Mark
Heading provided (H)	1
Diagram drawn correctly (D)	1
Any 4 correct labels (L)	4
Total	**6**

2.1.6 Table to compare Aerobic and Anaerobic respiration. (can be inverse)

	Aerobic respiration	Anaerobic respiration
Raw materials required	Glucose and oxygen	glucose
Energy released	38 ATP	2 ATP

(7)

Rubric for assessing a table

Criteria	Mark
Heading – **(H)**	1
Table headings **(T)** – both horizontal - both vertical	1 1
Correct values **(V)**	4
Total	**7**

(23)

2.2 2.2.1 Bacteria in the root nodules of legumes✓ – they convert atmospheric nitrogen into nitrates, which the plant can use to make protein✓. In return the bacterium gets nutrients from the plant. ✓

E. coli in the intestines of humans ✓– the bacterium produces vitamins which are then absorbed into the blood system✓. The bacterium receives nutrients. ✓

In the gut of ruminants✓ – the bacteria assist in digesting cellulose so that the ruminant can get nutrition. ✓ The bacteria will also get nutrition. ✓

Any 2 x 3 (6)

2.2.2 Autotrophic bacteria produce food✓ for consumers. ✓
Saprophytic bacteria decompose dead organic food✓ and return the nutrients to the soil. ✓ (4)
(10)

2.3 2.3.1 a) G✓
b) A✓
c) E✓
d) D✓ (4)

2.3.2 The transfer of pollen grains from the anther✓ to the stigma ✓of a flower. (2)

2.3.3 Petals not brightly coloured/ inconspicuous flowers✓
No nectar✓
Filament and anther dangle outside the flower✓
Large feathery stigma that dangles outside the flower✓ (4)

2.3.4 a) Sexual reproduction✓ (1)
b) **Advantages:**

- Offspring show genetic variation. ✓
- May allow for the formation of a new species under changing environmental conditions. ✓
- Diseases and parasites carried by the parent will possibly not be passed on to the offspring. ✓ **Any 2 x 1**

Disadvantages:

- It is a slow process as suitable gametes are required. ✓
- Mutations occur which can produce a lethal or disadvantageous gene. ✓
- Involves pollination and seed dispersal which requires agents such as wind, water or birds and insects. ✓ **Any 2 x 1** (4)

c) Should environmental changes occur, the Angiosperms can make seeds✓ that remain dormant during unfavourable conditions. ✓ (2)
(17)
[50]

QUESTION 3

3.1 3.1.1 Blue ✓ (1)

3.1.2 Oxygen✓ (1)

3.1.3 It will increase the rate of photosynthesis✓ as it will increase the amount of carbon dioxide in the water ✓ (2)

3.1.4 Ask permission to do the survey/investigation ✓
Decide how are you going to record the data collected ✓
Decide when /arrange a time for the experiment/survey to take place. ✓
Decide what - select specific questions to address the research question. ✓
Decide where - select suitable areas for the experiment/survey. ✓
Decide who/how many - identify a sample of the population to question
Mark first 3 only (3)

3.1.5 Repeat the investigation ✓ / use more Elodea plants. (1)

3.1.6 $\frac{\text{New value – old value}}{\text{Old value}} \times \frac{100}{1} = \frac{80 - 20}{20}$ ✓x 100 ✓ = 300% ✓ (3)

3.1.7 Calculations:
Violet light: $\frac{40 \times 360}{245} = 59^{\circ}$

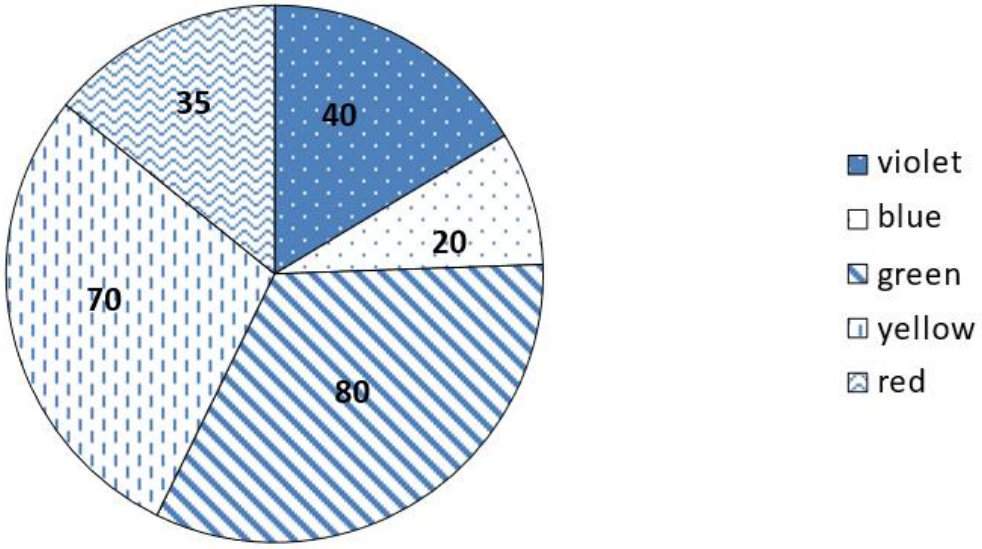
Blue light: $\frac{20 \times 360}{245} = 29^{\circ}$

Green light: $\frac{80 \times 360}{245} = 118^{\circ}$

Yellow light: $\frac{70 \times 360}{245} = 103^{\circ}$

Red light: $\frac{35 \times 360}{245} = 51^{\circ}$

A pie chart showing the time taken to release 10 bubbles (in minutes) at different colours of light



Guidelines for assessing a Pie Chart

Criteria	Elaboration	Mark
Correct type of graph **(T)**	Pie chart drawn	1
Caption **(C)**	Both variables included	1
Calculations **(S)**	Three correct All correct	1 2
Drawing of sectors **(D)**	Three sectors drawn correctly All sectors drawn correctly	1 2

(6)
(17)

3.2 **Light:** ✓ The amount of light in a greenhouse can be adjusted so that the plants receive the optimum light to maximise the rate at which photosynthesis occurs. ✓ Artificial lighting may be used to enhance the light conditions, while shade cloths are used to reduce the amount of light that gets to the plants.

Temperature: ✓ The temperature within the greenhouse is kept at the optimum temperature for maximum plant growth. ✓ On cold days, heaters are used, while on hot days, fans are used. In this way, the plants in the greenhouse grow in an ideal temperature to improve crop yield.

Carbon dioxide✓ enrichment: Additional carbon dioxide can be released into the greenhouse, which increases the rate of photosynthesis. ✓ This will result in an increase in plant growth and crop yield.

(6)

3.3 3.3.1 **Mechanical digestion** starts as we chew our food using our teeth. Food is physically broken down. ✓ by using teeth / muscles/ peristalsis. ✓

Chemical digestion:
Food is chemically broken down✓ by enzymes. ✓ **(2 x2)** (4)

3.3.2 a) H ✓ – epiglottis ✓ (2)
b) C ✓ – stomach ✓ (2)
c) D ✓ – colon ✓ / large intestine (2)

3.3.3 Has many folds✓ – to increase the surface area✓
Surface is thin ✓– diffusion distance is short to absorb small molecules✓
Has a good supply blood supply ✓– to absorb and transport nutrients through the body**.** ✓
Surface is moist/ has mucous✓ to allow nutrients to dissolve and be absorbed. ✓ (6)
Has villi✓ to increase the surface area for absorption of nutrients✓
Is very long✓ for efficient absorption of nutrients over a long distance✓

Mark FIRST THREE only

3.3.4 a) peristalsis✓ (1)
b) intestinal juice✓ (1)

3.3.5 The **liver** ✓converts **excess amino acids to urea**✓ **and glucose**✓ in a process called **deamination**. ✓ Urea moves in the blood to the kidneys, which secrete it in the urine. ✓ **Any 3** (3)
(21)

3.4 3.4.1 a) Pancreas✓ (1)
b) Glucagon✓ (1)

3.4.2 a) Diabetes✓
b) If less insulin is secreted, the glucose levels will remain high✓ and less glucose will be converted to glycogen in the liver✓ and an excess glucose will be in the blood steam✓ resulting in higher than normal blood glucose levels. ✓ (3)
Any 3 **(6)**
[50]

TOTAL SECTION B: 100
TOTAL 150