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education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

LIFE SCIENCES

JUNE 2024

MARKING GUIDELINES

MARKS: **150**

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These marking guidelines consist of 8 pages.

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PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are 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 the whole process is given when only part of it is required**
   Read all and credit relevant parts.

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 the sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If the sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in the answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of the answer if correct.

10. **Wrong numbering**
    If the answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If the 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.

13. **If common names are given in terminology**
    Accept provided it was accepted at the Provincial memo discussion meeting.

14. **If units are not given in measurements**
    Candidates will lose marks. Memorandum will allocate marks for units separately

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15. Be sensitive to the sense of an answer, which may be stated in a different way.

16. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

17. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This applies to all official languages.

18. No changes must be made to the marking memoranda without consulting the Provincial Internal Moderator who in turn will consult with the Provincial Internal Moderator.

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SECTION A

QUESTION 1

1.1	1.1.1		B✓✓	(2)
	1.1.2		C✓✓	(2)
	1.1.3		B✓✓	(2)
	1.1.4		D✓✓	(2)
	1.1.5		A✓✓	(2)
	1.1.6		C✓✓	(2)
	1.1.7		D✓✓	(2)
	1.1.8		C✓✓	(2)
	1.1.9		C✓✓	(2)
1.2	1.2.1		Capsid✓/Protein capsule	(1)
	1.2.2		Xylem✓/vascular tissue	(1)
	1.2.3		Flagella✓	(1)
	1.2.4		Vector✓	(1)
	1.2.5		(B) Lymphocytes✓ NOT T-lymphocytes	(1)
	1.2.6		Electro transport chain✓/ oxidative phosphorylation	(1)
	1.2.7		Photolysis✓	(1)
	1.2.8		Taxonomy✓	(1)
	1.2.9		Gametophyte✓	
1.3	1.3.1		NONE✓✓ (Glycolysis occurs in cytoplasm)	(2)
	1.3.2		Both A and B✓✓	(2)
	1.3.3		B only✓✓	(2)
1.4	1.4.1		a) F✓/Fern	(1)
			b) D✓/Club Mosses	(1)
	1.4.2		ferns have vascular tissue / true leaves, while mosses lack these features✓ (MUST GIVE THE **COMPARISON** FOR ONE MARK)	(1)
	1.4.3		Bryophytes✓/liverwort/moss/hornwort	(1)
	1.4.4		adaptations for high humidity✓/ consistent rainfall (Any 1)	(1)
	1.4.5		- by providing a more efficient way to transport water and nutrients✓ throughout the plant body✓ **OR** - compete more effectively for resources✓ - in dry environments✓	(2)
1.5	1.5.1	(a)	Anus✓	(1)
		(b)	Large intestine✓/ descending colon	(1)
	1.5.2	(a)	H✓	(1)
		(b)	E✓	(1)
	1.5.3	(a)	A ✓– STOMACH✓	(2)
		(b)	I ✓– GALBLADDER ✓	(2)
	1.5.4	(a)	- EXOCRINE GLAND ✓/release enzymes - ENDOCRINE GLAND✓/release hormones (Any 1)	(1)
		(b)	egestion✓/water absorption/Vitamin K production	(1)
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SECTION B

QUESTION 2

2.1 2.1.1 Fungi✓ (1)

2.1.2 a) sporangiophore✓ (1)

b) hyphae✓/ stolon (1)

2.1.3 Mycorrhiza is:
- a symbiotic association✓
- between fungi and plant roots✓
- The fungi help in nutrient/ water absorption✓ for the plants
- the plant provides the fungi with organic compounds✓ formed through photosynthesis. (4)

2.1.4
- acting as a network of hyphae✓ / its extensive branching structure
- responsible for nutrient **absorption** ✓ / maximizes the surface area for nutrient uptake✓ (2)

2.1.5 Within the sporangium
- numerous spores develop✓
- through mitosis✓
- it eventually bursts✓/release the spores into the environment
- spores can then germinate ✓/develop into new fungal individuals. (Any 3) (3)

2.2 2.2.1 a) Anther✓ (1)

b) Fertilisation✓ (1)

2.2.2
- the transfer of pollen ✓
- from the anther of a flower on one plant ✓
- to the stigma of a flower on another plant ✓
- of the same species. ✓ (4)

2.2.3
- Presence of Nectar✓/sugary reward
- attracts insects✓/ encourages repeated visits by pollinators.
- Bright Colours✓ / Patterns
- attract the attention of insects✓ / aids in the recognition of the flower/facilitate pollination.
- Large petals✓
- Form a landing platform for insects visiting the plant✓(Any 2 x 2) (4)

MARK FIRST TWO ONLY

2.3 2.3.1 A - ectoderm✓ (1)

D - endoderm✓ (1)

2.3.2 B✓ (1)

2.3.3 Flatworms✓ (1)

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2.3.4
- pollinators✓
- decomposers✓
- contributors to nutrient cycling✓
- serve as a food source✓ for various animals
- contribute to biodiversity ✓

MARK FIRST THREE ONLY (3)

2.3.5
- Efficient Nutrient Absorption: ✓
- specialized regions for digestion and absorption✓
- Continuous Feeding✓
- allowing them to extract nutrients from food as it passes through different digestive compartments. ✓

MARK FIRST TWO ONLY (4)

2.4.1 An herbivore is an animal that primarily consumes plant material✓ as its main source of nutrition. (1)

2.4.2 **Herbivores** have flat molars✓ for grinding✓ plant material
Carnivores have sharp molars✓ for shearing✓

OR

Herbivore incisors may be adapted✓ for cropping✓
Carnivores pointed canines✓ for tearing flesh ✓

(4)

2.4.3
- a reduction in tooth wear ✓
- a decrease in the size of chewing surfaces✓
- a reduction in the development of jaw muscles due to decreased chewing effort✓
- canines may reduce in size/length✓ (4)

2.4.4
- less energy would be required/ expended for chewing✓/ mastication
- allowing for more efficient digestion✓ (2)

2.4.5
- mitochondria✓
- cristae✓/folded inner membranes
- a fluid-filled matrix✓ (3)

2.4.6 inner membrane /cristae
- increase/provide a large surface area✓ for reactions
- optimizing ATP synthesis ✓ /provides ample space for electron transport chain proteins✓/ facilitates ATP production through oxidative phosphorylation (Any 2)

The fluid-filled matrix
- contains ribosomes that produce specific enzymes for the Krebs cycle✓/supports the tricarboxylic acid (TCA) cycle / causing the efficient breakdown of glucose (Any 1) (3)

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QUESTION 3

3.1	3.1.1	hydrodynamic efficiency✓ of the aquatic organisms	(1)
	3.1.2	- Control✓ - to compare a non-fusiform to a fusiform✓	(2)
	3.1.3	- Using the same water tunnel✓ - Using the same flow rates✓ **MARK FIRST TWO ONLY**	(2)
	3.1.4	Conducting five trials✓ for each type of fish **MARK FIRST ONE ONLY**	(2)
	3.1.5	Decide on - WHO – the scientists/fish specialists/ichthyologists are going to be - WHAT- Species Selection: Choose representative species with distinct body plans - WHEN – The optimum season for the fish - WHERE – the laboratory setting/ tank to be used - HOW – working protocol and measurements/ apparatus used **(any reasonable interpretation of planning)** **MARK FIRST THREE ONLY**	(3)
	3.1.6	- To ensure natural/consistent behaviour in fish✓ - to reduce stress ✓	(2)
	3.1.7	- it enhances their survival✓ in their specific habitat - camouflaging✓ itself in the sand /serves as a form of natural concealment/hiding from predators **OR** - improved depth perception ✓in the flatfish's horizontal orientation - aiding in effective hunting✓ / capturing prey (Any 1 x 2)	(2)
3.2	3.2.1	a) Iodine solution✓	(1)
		b) Alcohol✓/ ethanol (NOT Methanol)	(1)
	3.2.2	a) Part **F** ✓/green part of leaf open to light	(1)
		b) Part **E** ✓/ white part of leaf open to light Part **H**✓/ white part of leaf covered with cardboard Part **G**✓/ green part of leaf covered with cardboard	(3)
	3.2.3	**C – B – D - A**✓✓	(2)
	3.2.4	- Solution **B** (alcohol) was used to remove chlorophyll✓ - Alcohol breaks down cell membranes✓ and extracts pigments	(2)
	3.2.5	- To Compare✓ - the effect of presence and absence of chlorophyll/ Green part with chlorophyll and White parts with no chlorophyll✓ - To isolate the effect of light (independent variable) ✓	(2)
	3.2.6	Increase in Light Intensity - Leads to higher rate of photosynthesis✓ - Saturation of photosynthetic pigments✓/chlorophyll - cause the rate of photosynthesis to plateaus✓ as all available chlorophyll molecules are already engaged in light absorption. (Any2)	(2)

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3.3 3.3.1 the speed✓/frequency at which cells extract energy from the nutrients✓/glucose (2)

3.3.2 performing the same experimental setup and conditions but without the presence of living larvae✓ (1)

3.3.3 Absorbs carbon dioxide ✓ (1)

3.3.4 is related to the metabolic activity of the larvae✓ because it indicates the production of carbon dioxide✓ by larvae providing a measure of the larvae's respiration rate✓ (2)

3.3.5

Characteristic	Photosynthesis	Aerobic Respiration
Location in Cells	Chloroplasts/ (mainly in plant cells)	Mitochondria/ (found in both plant and animal cells)
Purpose	Conversion of light energy into chemical energy	Harvesting chemical energy from organic molecules
Reactants	Carbon dioxide, water, and light energy	Oxygen and organic molecules (e.g., glucose)
Products	Glucose and oxygen	Carbon dioxide, water, and energy (ATP)
Energy Input/Output	Requires light energy as an input	Releases energy (ATP) during the process
Processes Involved	Light-dependent reactions and Calvin cycle	Glycolysis, Krebs cycle, and Electron Transport Chain
Byproducts	Oxygen is released as a byproduct	Water and carbon dioxide are released as byproducts
Occurs in...	Autotrophs (plants and some bacteria)	All living cells, both autotrophs and heterotrophs

Tabulate x 1 (**MARK FIRST TWO ONLY**) (5)

3.3.6 Alternative ✓/ a rapid/temporary pathway
For ATP production✓
during periods of high energy demand✓/ low oxygen preventing muscle fatigue✓ (Any 3) (3)

3.4 3.4.1 Fermentation is:
- a metabolic process✓
- in which microorganisms✓ / bacteria / yeast
- convert organic compounds/carbohydrates✓
- into simpler compounds✓ /alcohol/lactic acid (2)

3.4.2
- alcohol
- lactic acid (2)

3.4.3
- to change the nature of food products for centuries
- by changing the flavour✓ /texture /using it to preserve food (prevent spoilage) for longer✓/changing the nutritional value (2)

3.4.4
- Biogas/Biofuel
- Vinegar
- Biopolymers/bioplastic
- Enzyme/antibiotic production

MARK FIRST TWO ONLY (2)

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TOTAL SECTION B **100**
GRAND TOTAL **150**

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