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Province of the EASTERN CAPE EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

LIFE SCIENCES P1 MARKING GUIDELINE

MARKS: 150

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This marking guideline consists of 10 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 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 a whole process is given when only a part of it is required**
   Read all and credit the relevant part.

4. **If comparisons are asked for but descriptions are given**
   Accept if the 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 are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the 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 recognisable, accept the answer, 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 only the letter is asked for but only the name is given (and vice versa)**
    Do not credit.

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15. **If units are not given in measurements**
Candidates will lose marks. Marking guideline 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.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) 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 is applicable to all official languages.

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SECTION A

QUESTION 1

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	D ✓✓		
	1.1.4	D ✓✓		
	1.1.5	C ✓✓		
	1.1.6	C ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	A ✓✓		
	1.1.10	C ✓✓	(10 x 2)	(20)
1.2	1.2.1	Breathing ✓/ Ventilation		
	1.2.2	Aldosterone ✓		
	1.2.3	Pre-molars/Molars ✓		
	1.2.4	Pharynx ✓		
	1.2.5	Secretion ✓		
	1.2.6	Chyme ✓		
	1.2.7	Distal convoluted tubule ✓		
	1.2.8	Osmosis ✓		(8)
1.3	1.3.1	A ONLY ✓✓		
	1.3.2	B ONLY ✓✓		
	1.3.3	NONE ✓✓		
	1.3.4	NONE ✓✓		(8)
1.4	1.4.1	(a) F ✓ – Renal calyx ✓		(2)
		(b) B ✓ – Renal capsule ✓		(2)
		(c) C ✓ – Renal pelvis ✓		(2)
	1.4.2	Part D is darker because it contains more blood vessels. **OR** Part A is lighter because it has fewer blood vessels.		(1)
1.5	1.5.1	- The body's ability to maintain a stable internal environment ✓ - despite changes in the external environment ✓		(2)
	1.5.2	(a) Chemoreceptors of the carotid artery ✓		(1)
		(b) Intercostal muscles, ✓ diaphragm ✓ (respiratory muscles ✓), heart ✓	(Any 2 x 1)	(2)
	1.5.3	- The blood becomes increasingly acidic ✓ /cell death - Less aerobic respiration can take place ✓ /no ATP created		(2)
				[50]

TOTAL SECTION A: 50

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QUESTION 2

2.1 2.1.1 Chloroplast ✓ (1)

2.1.2
- Presence of thylakoid/grana/inter-grana disks/lamellae ✓
- Stroma present ✓
- Starch granules present ✓

(FIRST TWO ONLY) (MAX 2)
(Do not accept double membrane as it is not a distinct identifying characteristic as many organelles have this.) (2)

2.1.3

Light (dependent) Phase/B	Dark (light-independent) Phase/A
Requires light	Does not require light
Photolysis occurs	No photolysis occurs
CO_2 is not absorbed	CO_2 is absorbed
No glucose is produced	Glucose is produced

(FIRST TWO ONLY) ✓ per correct difference (MAX 4) + Table ✓
NOTE: Differences must match correctly to be awarded marks. (5)

2.1.4
- Produces food for heterotrophic organisms/Forms basis of food chains ✓
- Production of oxygen ✓
- Absorption and storage of carbon dioxide ✓
- Maintaining/balancing a constant level of oxygen in the environment (aquatic/terrestrial) ✓

(MARK FIRST TWO ONLY) (2)

2.1.5
- Presence of many grana/thylakoids/lamella ✓
  It holds a significant amount of chlorophyll (pigment) to maximise that rate of photosynthesis ✓
- Large surface area ✓
  To maximise the amount of radiant energy which can enter it ✓
- It has a (fluid)stroma ✓
  Allowing for chemical reactions to take place/products of the light phase can move into the dark phase ✓

(MARK FIRST ONE ONLY) (1 x 2) (2)

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2.2 2.2.1
- Greenhouses create jobs in rural areas and support the local economy. ✓
- Greenhouses help grow local vegetables, so people don't have to import food. ✓
- Greenhouses allow farmers to grow crops all year, even when it's cold. ✓

(MARK FIRST ONE ONLY) (1)

2.2.2
- Greenhouses use geothermal and solar energy, ✓ which reduces the need to use electricity from the local power grid and helps save costs. ✓ (2)

2.2.3 (a)
- Use of heaters ✓ powered by geothermal energy.
- Insulated material ✓ (like double walls or plastic layers) to keep the heat inside the greenhouse

(MARK FIRST TWO ONLY) (2)

(b) $\frac{-25-28}{-25}$ ✓ x 100 ✓ = 212 ✓% change

OR

$\frac{28-(-25)}{25}$ ✓ x 100 ✓ = 212 ✓% change (3)

2.2.4 (a)
- As light intensity increases, the rate of photosynthesis increases/light intensity is directly proportional to rate of photosynthesis ✓
- Up to a point ✓
- Beyond this point, further increases to light intensity do not affect the rate of photosynthesis ✓ (3)

(b)
- Chlorophyll is saturated/insufficient ✓
- Not enough enzymes/transfer chains to assist with photosynthesis ✓

(MARK FIRST ONE ONLY) (2)

2.3 2.3.1 (a) Glycolysis (1)

(b) Oxygen (1)

(c) Carbon dioxide (1)

2.3.2
- Catabolic ✓*

Glucose is broken down into pyruvic acid ✓

OR

A six-carbon glucose molecule is broken to form two three-carbon chain pyruvic acid molecules ✓

(Compulsory ✓* + ANY OTHER ✓) (2)

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2.3.3 - B ✓*
Because oxygen is used ✓ as the final electron acceptor, allowing the chain to function continuously **OR**
The process drives the production of about 36 ATP molecules, while glycolysis only produces 2 ATPs ✓ (2)

2.3.4 - Can only take place if oxygen is present ✓
- Occurs inside of the mitochondrion ✓
- Releases carbon dioxide and high energy hydrogen ions (H+) ✓
- Transports hydrogen atoms to the third stage ✓ (4)

2.3.5 - Not enough oxygen was available ✓ to his muscles to undergo aerobic respiration
- Pyruvic acid was converted into lactic acid/Lactic acid fermentation occurred ✓
- Lactic acid caused his muscles to cramp ✓ (3)

2.4 2.4.1 Carbon dioxide concentration ✓ (in arbitrary units) (1)

2.4.2 - Duplicating the experiment with all variables kept the same ✓
- Not including the pondweed and pond snail/independent variables ✓ (2)

2.4.3 - The amount of CO_2 released during cellular respiration ✓
- is utilised by the pondweed during photosynthesis ✓ (2)

2.4.4 - Photosynthesis could no longer take place ✓
- as no light was available ✓ (2)

2.4.5 - The environment was anoxic/lacked sufficient O_2 ✓*
- For cellular respiration to occur ✓
- The water became too acidic to support aquatic life ✓
(✓* plus any other ✓) (2)

2.4.6 Photosynthesis and cellular respiration are complementary processes ✓ regulating CO_2 concentration in the environment. ✓
OR
Photosynthesis removes carbon dioxide ✓ and produces oxygen. ✓
OR
When there is no light, photosynthesis stops ✓ and carbon dioxide increases due to respiration. ✓ (2)
[50]

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QUESTION 3

3.1 3.1.1 (a) Oesophagus ✓ (1)

(b) Hepatic portal vein ✓ (1)

3.1.2
- The small intestine is long ✓*
  Increasing surface area for absorption ✓
- It has circular folds ✓*
  Increasing surface area for absorption ✓
- It is lined with millions of villi ✓*
  Increasing surface area for absorption ✓
- It is richly supplied with blood vessels ✓*
  Allowing for an efficient transport system of nutrients from the gut to the body ✓
- It has smooth muscle tissue (circular and longitudinal) ✓*
  To efficiently move food and indigestible matter through the gut ✓
- Has a mucus rich layer on its surface ✓*
  To allow for nutrients to dissolve into and to be absorbed into the body ✓ / to lubricate / act as a medium for chemical reactions

(MARK FIRST THREE ONLY) (✓* compulsory mark) (3 x 2) (6)

3.1.3 **Physical digestion**
- Occurs due to the churning movements ✓ of the stomach.
- Smooth muscle layers involuntarily contract, mixing the bolus of food with gastric juices ✓

Chemical digestion
- occurs as gastric juices/enzymes react with exposed surface ✓ of bolus/chyme
- Breaking insoluble macroscopic molecules into their soluble forms✓/ (accept suitable example). (4)

3.1.4
- Bile is produced by the liver ✓
- Bile will still enter the duodenum and fat emulsification will take place ✓ (2)

3.2 3.2.1
- Digestion ✓*
- Proteases ✓ (2)

3.2.2 Stomach ✓ (1)

3.2.3 Assimilation ✓ (1)

3.2.4
- Egestion ✓*
- Undigested materials and waste products are transported through the colon ✓ where most water and mineral salts are absorbed ✓
- Undigested material is temporarily stored in the rectum ✓ until it is excreted through the anus ✓

(✓* COMPULSORY + ANY OTHER TWO) (3)

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3.3 3.3.1 Breaking of larger food pieces into smaller pieces ✓ making it easier to swallow increases the surface area of the food so that digestive enzymes can work more effectively. ✓ (2)

3.3.2
- Bread contains starch.
- During chewing, an enzyme in saliva called amylase breaks down starch ✓ into sugar (maltose), ✓ which tastes sweet. (2)

3.4 3.4.1 Diffusion ✓ (1)

3.4.2
- Mucus layer present inside the alveolus ✓*
  Allowing for O_2 and CO_2 to be dissolved as diffusion occurs ✓
- Alveolus is only one squamous epithelium layer thick ✓*
  Promoting easy diffusion into/out of the wall of the alveolus ✓
- Blood capillary is only one cell layer thick ✓*
  Promoting easy diffusion into/out the wall of the alveolus ✓
- Richly supplied with blood vessel(s) ✓*
  Allowing for efficient gaseous exchange (of CO_2 and O_2) to occur ✓

(ANY TWO ✓* with corresponding reasoning ✓) (2 x 2) (4)

3.4.3
- As oxyhaemoglobin ✓
- Dissolved within blood plasma ✓ (2)

3.4.4
- Blood would move into the lung/alveoli ✓
  Limiting/preventing efficient gaseous exchange ✓
- Pressure would no longer be effectively regulated/ Lung will collapse ✓
  Impeding the processes of inhalation and exhalation as pressure is required to pull air into the lung/force air out ✓
- Lung tissue/alveoli/ bronchioles would be damaged ✓
  Limiting/preventing gas pathways through the lung ✓

(MAX. 5) (5)

3.5 3.5.1
- A ✓ B ✓ C ✓

(MARK FIRST TWO ONLY) (2)

3.5.2
- Tubular reabsorption ✓*
  (Useful) solutes and water are moved from the renal tubule back into the peritubular capillary network/F
- Tubular secretion ✓*
  Waste products and toxins are moved from F into the renal tubule ✓

(✓* with its corresponding ✓) (4)

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3.5.3 (a) D ✓ - Ascending limb of Henle/loop of Henle ✓ (2)

(b)
- The renal medulla will no longer be hypertonic in its sodium concentration ✓
- No osmotic water potential gradient would be created ✓
- Between the filtrate/medulla tissue fluid/blood ✓
- Less/no water will be drawn in the renal medulla ✓
- Less water would be reabsorbed back into the blood ✓ (5)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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