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**GRADE 11**

**NOVEMBER 2023**

**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 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 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 national memo discussion meeting.
14. **If only the letter is asked for, but only the name is given (and vice versa)**  
Do not 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.

18. **Code-switching of official languages (terms and concepts)**

A single word or two that appear(s) in any official language other than the learner's 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.



## SECTION A

## QUESTION 1

- 1.1    1.1.1    B ✓✓  
       1.1.2    C ✓✓  
       1.1.3    C ✓✓  
       1.1.4    B ✓✓  
       1.1.5    B ✓✓  
       1.1.6    A ✓✓  
       1.1.7    B ✓✓  
       1.1.8    A ✓✓  
       1.1.9    B ✓✓  
       1.1.10   B ✓✓ (10 x 2)    (20)
- 1.2    1.2.1    Squamous epithelium ✓  
       1.2.2    Pleural membrane ✓/ Pleura  
       1.2.3    Medulla oblongata ✓  
       1.2.4    Glucagon ✓  
       1.2.5    Egestion ✓/ Defaecation  
       1.2.6    Amino acid ✓  
       1.2.7    Villi ✓  
       1.2.8    Greenhouse ✓  
       1.2.9    Renal capsule ✓ (9 x 1)    (9)
- 1.3    1.3.1    A only ✓✓  
       1.3.2    Both A and B ✓✓  
       1.3.3    None ✓✓ (3 x 2)    (6)
- 1.4    1.4.1    (a)    Aorta ✓ (1)  
       (b)    Inferior vena cava ✓ (1)
- 1.4.2    (a)    Renal artery ✓ (1)  
       (b)    Ureter ✓ (1)  
       (c)    Urinary bladder ✓ (1)
- 1.4.3    - Excretion ✓ (of metabolic wastes)  
       - Regulation of salt content of body ✓  
       - Regulation of blood pH ✓  
       - Regulation of water content of the body ✓/osmoregulation (Any 3 x 1)    (3)
- 1.4.4    Blood vessel **A** / aorta ✓ (1)

- |     |       |     |  |     |
|-----|-------|-----|--|-----|
| 1.5 | 1.5.1 | (a) | Chloroplast ✓                          | (1) |
|     |       | (b) | Photosynthesis ✓                       | (1) |
|     | 1.5.2 | A ✓ | – granum ✓                             | (2) |
|     | 1.5.3 | -   | Part A (granum) contains chlorophyll ✓ |     |
|     |       | -   | Chlorophyll absorbs light energy ✓     | (2) |

**TOTAL SECTION A: 50**



## SECTION B

## QUESTION 2

- 2.1 2.1.1 (a) Gall bladder ✓ (1)
- (b) Pyloric sphincter ✓/pylorus (1)
- 2.1.2 - Secretes bile ✓  
 - Converts glucose to glycogen ✓  
 - Converts excess glucose to fat ✓  
 - Stores minerals such as iron ✓  
 - Stores vitamin A, D and B<sub>12</sub> ✓  
 - De-amination of excess amino acids ✓  
 - Detoxifies certain harmful substances and make them harmless ✓  
**(Mark first THREE only)** (Any 3 x 1) (3)
- 2.1.3 - The mucus glands on the mucosa layer secretes thick mucus ✓  
 - that acts as a barrier between the acid and the wall of the stomach ✓ (2)
- 2.1.4 - Bile will not emulsify fat ✓  
 - therefore, (pancreatic) lipase will not be able to digest fat ✓  
 - Bile will not neutralise the acid chyme from the stomach ✓  
 - therefore, enzymes secreted by the pancreas ✓ and  
 - the intestinal glands ✓  
 - will not digest proteins and carbohydrates ✓ (Any 5 x 1) (5)
- 2.1.5 - Part **E** acts as an exocrine gland because it has a duct ✓  
 - to transport its secretion ✓ to the site of action  
 - It also acts as an endocrine gland because it secretes hormones ✓  
 - that are released directly into the blood ✓/ blood transports  
 - hormones to the target organ. (4)
- 2.2 2.2.1 (a) Part **A** – Malpighian corpuscle ✓/body (1)
- (b) Part **B** – Proximal convoluted tubule ✓ (1)
- 2.2.2 (a) Ultra-filtration ✓ (1)
- (b) Tubular re-absorption ✓ (1)
- 2.2.3 - Blood vessel **D** is wider than blood vessel **F** ✓  
 - the small diameter of blood vessel **F** resists the flow of blood ✓  
 - and causes high blood pressure at Part **E** ✓ that  
 - leads to the leakage of blood plasma into part **C** ✓ (4)
- 2.2.4 Blood cells ✓ and (large) protein molecules ✓ (2)

- 2.2.5 The inner walls of region **B** consists of:
- large number of mitochondria ✓ to generate energy for active transport of nutrients into the blood capillaries ✓
  - large number of micro-villi ✓ to increase the area of absorption. ✓ (4)

- 2.3 2.3.1 (a) Palate ✓ (1)
- (b) Peristalsis ✓ (1)
- (c) Circular ✓ and longitudinal ✓ muscles (2)

- 2.3.2 - During swallowing, the bolus is pushed backwards into the pharynx ✓ and
- this stimulates the closure of the glottis by epiglottis blocking the flow of food into part D ✓ (2)

- 2.3.3 - The incomplete portion of the C-shaped cartilages of the trachea is in contact with the oesophagus ✓
- This allows the oesophagus to stretch and bulge into the trachea preventing the oesophagus from becoming blocked ✓/ prevents choking. (2)

- 2.3.4 - The bacterial infection causes inflammation of vocal cords ✓
- therefore, vocal cords will not be able to vibrate freely ✓ and
- no sound can be produced ✓ (Any 2 x 1) (2)

- 2.3.5 - Oxygen will not reach the lungs ✓
- Oxygen concentration drops in the blood ✓
- Oxygen will not be made available for cellular respiration ✓
- The energy production stops ✓
- therefore, all vital organs will stop functioning ✓

### OR

- CO<sub>2</sub> will not be removed /exhaled from the lungs ✓
- CO<sub>2</sub> concentration in the blood remains high ✓
- Blood pH drops/ blood becomes very acidic ✓
- Enzymes becomes functionless ✓
- therefore, all vital metabolic processes will stop ✓ (Any 4 x 1) (4)

- 2.4 - The salt level in the blood increases ✓
- Receptor cells in the afferent and efferent arterioles of the kidney detect the high salt level ✓
- The adrenal gland is stimulated ✓
- to stop secreting aldosterone ✓/ to secrete less aldosterone
- This decreases the re-absorption of sodium ions from the renal tubules ✓ in the kidney
- into the surrounding blood vessels ✓
- The salt level in the blood vessels decreases ✓
- and returns to normal ✓ (Any 6 x 1) (6)

[50]

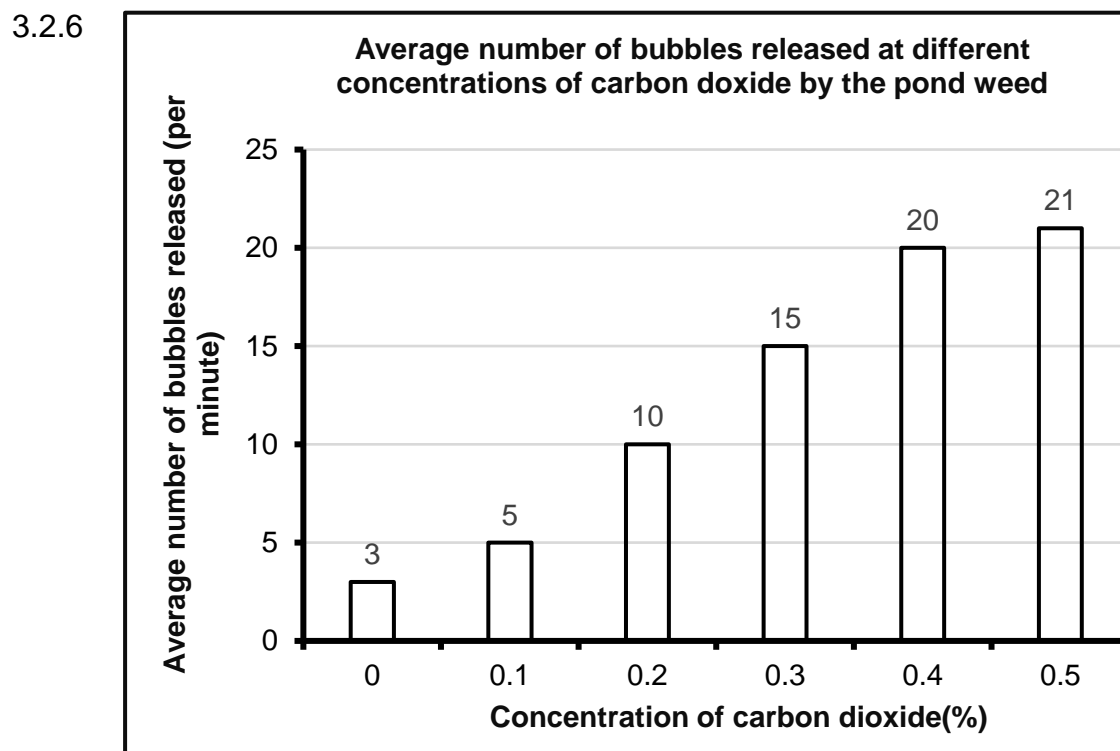


**QUESTION 3**

- 3.1 3.1.1 Carbon dioxide ✓ (1)
- 3.1.2 - Bicarbonate ions ✓  
 - In solution in the blood plasma ✓  
 - Carbaminohemoglobin ✓  
**(Mark first TWO only)** (Any 2 x 1) (2)
- 3.1.3 Pulmonary vein ✓ (1)
- 3.1.4 The direction of arrow indicates the outward flow of blood ✓ (1)
- 3.1.5 - The red blood cells/ erythrocytes contain haemoglobin ✓ for the transportation of oxygen to the tissues and carbon dioxide from the tissues. ✓  
 - Red blood cells/erythrocytes are biconcave discs ✓ to increase the surface area for the maximum absorption of oxygen ✓  
**(Mark first TWO only)** (2 x 2) (4)
- 3.1.6 - The heater warms the air and removes the moisture from the air ✓/ humidity in the room  
 - The person sleeping in the room will continuously inhale dry air ✓  
 - causing the lungs (the moist lining of alveoli) to become dry ✓ and  
 - this prevents diffusion of gases between the atmospheric air and the blood in the alveolar capillaries ✓  
 - the low concentration of oxygen / high concentration of carbon dioxide in the blood stops metabolic processes in the cell/tissues causing possible death ✓ (Any 3 x 1) (3)
- 3.2 3.2.1 (a) Rate of photosynthesis ✓ (1)  
 (b) Concentration of carbon dioxide ✓ (1)
- 3.2.2 By counting the number of bubbles in unit time ✓ (in one minute) (1)
- 3.2.3 - Water temperature ✓  
 - Plant species ✓  
 - Person counting the bubbles ✓  
 - Age of plants ✓  
 - Light intensity ✓  
 - Number of leaves ✓  
 - Length of light exposure ✓  
 - Quality of baking powder ✓  
**(Mark first THREE only)** (Any 3 x 1) (3)

3.2.4 - The student repeated the investigation three times at each concentration ✓ (1)

3.2.5 - To act as a baseline ✓  
- to see if the concentration of CO<sub>2</sub> causes the change in rate of photosynthesis ✓ (2)



**Criteria for marking graph:**

Criteria	Mark allocation
Bar graph is drawn <b>(T)</b>	1
Caption of the graph includes both variables <b>(C)</b>	1
Correct labels on <i>x</i> -axis and <i>y</i> -axis <b>(L)</b>	1
Correct scale for <i>y</i> -axis Equal spaces between bars and equal width of bars for <i>x</i> -axis <b>(S)</b>	1
Plotting: <b>(P)</b> 1 – 5 co-ordinates are plotted correctly	1
All 6 co-ordinates are plotted correctly	2

**Histogram or line graph** drawn:

- Lose marks for type of graph and for scale

**Transposed axes:**

- Can get full credit if axes labels are also swapped and bars are horizontal
- if labels are not corresponding, then lose marks for labels and scale
- Check that the plotting is correct for the given labels

(6)

- 3.2.7 As concentration of carbon dioxide increases the rate of photosynthesis increases ✓✓ (2)
- 3.3 3.3.1 (a) 20 ✓ Brix (1)
- (b) 7% ✓ v/v (1)
- 3.3.2 Carbon dioxide ✓ (1)
- 3.3.3 - During fermentation process, the lactic acid bacteria creates an acid medium ✓ (produce lactic acid while breaking down sugar)
- favourable for the multiplication/ breeding of yeast cells ✓
- The yeast produces vitamins and increase other nutritional components such as amino acids ✓
- for the growth of lactic acid bacteria ✓ (4 x 1) (4)
- 3.3.4  $17 - 7 = 10$  ✓
- $\frac{10}{17} \times 100 \checkmark = 58,82 \checkmark \%$  (3)
- 3.3.5 The completion of fermentation is indicated by the levelling of the sugar concentration ✓ (Brix level) (1)
- 3.3.6 - The micro-organisms/lactic acid bacteria and yeast derive energy ✓
- from the decomposition of sugar ✓ in the banana juice and sorghum mix
- As fermentation progresses, more sugar will be broken down ✓ and this will lead to the decrease in the sugar content (3)
- 3.4 - Glucose levels in the blood increase above the normal levels ✓
- the pancreas is stimulated ✓
- to secrete insulin into the blood
- insulin travels in the blood to the liver ✓
- where it stimulates the conversion of excess glucose to glycogen ✓
- which is then stored ✓
- the glucose level in the blood now decreases ✓
- and returns to normal ✓ (Any 7 x 1) (7)

**[50]**

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