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GRADE 11

NOVEMBER 2020

**LIFE SCIENCES P1
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 10 pages.

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 B ✓✓
 1.1.3 D ✓✓
 1.1.4 A ✓✓
 1.1.5 C ✓✓
 1.1.6 A ✓✓
 1.1.7 D ✓✓
 1.1.8 B ✓✓
 1.1.9 D ✓✓
 1.1.10 A ✓✓ (10 x 2) (20)
- 1.2 1.2.1 Excretion ✓
 1.2.2 Epiglottis ✓
 1.2.3 Pharynx ✓
 1.2.4 Osmoregulation ✓
 1.2.5 Medulla oblongata ✓
 1.2.6 ATP ✓/Adenosine triphosphate
 1.2.7 Peristalsis ✓
 1.2.8 Glycolysis ✓ (8 x 1) (8)
- 1.3 1.3.1 B only ✓✓
 1.3.2 None ✓✓
 1.3.3 A only ✓✓ (3 x 2) (6)
- 1.4 1.4.1 (a) Renal vein ✓ (1)
 (b) Urethra ✓ (1)
 1.4.2 (a) Inferior vena cava ✓ (1)
 (b) Aorta ✓ (1)
 1.4.3 (a) E ✓ – (Urinary) bladder ✓ (2)
 (b) C ✓ – Renal artery ✓ (2)
 (c) D ✓ – Ureter ✓ (2)
- 1.5 1.5.1 Villus ✓ (1)
 1.5.2 (a) Lacteal ✓ (1)
 (b) (Network of) blood capillaries ✓ (1)
 1.5.3 A ✓ (1)
 1.5.4 Diffusion ✓ and active transport ✓ (2)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 2.1.1 (a) A – Glomerulus ✓ (1)
- (b) B – Bowman's capsule ✓ (1)
- 2.1.2 (Ultra) filtration ✓ (1)
- 2.1.3 (a) Proteins ✓ (1)
- (b) Glucose ✓ (1)
- (c) Urea ✓ (1)
- 2.1.4 - The tubule is convoluted, ✓ to allow sufficient time for re-absorption of useful nutrients ✓ / increases surface area for maximum absorption
- The capillary network is in close contact with the tubule ✓ to facilitate faster re-absorption of nutrients ✓
- The cells of the inner wall of the tubule are richly supplied with many mitochondria ✓ to generate energy for active absorption ✓ (active transport) of nutrients back to the surrounding capillaries
- The cells of the tubule have microvilli ✓ to increase the surface area for maximum absorption ✓ (Any 2 x 2) (4)
- 2.1.5 Patient with untreated diabetes mellitus will have glucose in the urine ✓✓ (2)
- 2.2 2.2.1 Carbon dioxide/ oxygen is released during cellular respiration ✓✓ (2)
- 2.2.2 Carbon dioxide ✓ (1)
- 2.2.3 The clear lime water turns milky white in the presence of carbon dioxide ✓ (1)
- 2.2.4 - Germinating seeds are actively growing plant parts ✓
- therefore, the rate of respiration is higher ✓ than in any other parts of the plant
- since more energy ✓ is required for the active growth process (Any 2) (2)
- 2.2.5 - No cellular respiration takes place in the dead seeds ✓
- as a result, no carbon dioxide is released ✓ therefore, clear lime water remains clear ✓ (Any 2) (2)

- 2.2.6 - There are spaces between the fibres of the cotton plug ✓/ gases can diffuse through cotton wool ✓
 - allows the downward movement of carbon dioxide ✓
OR
 - The rubber block does not allow the downward movement of carbon dioxide ✓
 - hence no result would be obtained ✓ (2)

- 2.2.7 - Repeat the experiment several times ✓
 - use more seeds ✓/ increase sample size (Any 1) (1)

- 2.2.8 - Some of the cells in the seeds may contain chloroplasts ✓ and therefore
 - they perform photosynthesis ✓
 - and disrupt the end result ✓ (Any 1) (1)

- 2.2.9 - Temperature ✓
 - Light ✓ (2)

- 2.3 2.3.1 Pancreas ✓/ Islets of Langerhans (1)

- 2.3.2 The glucose is a source of energy ✓ as it is oxidised (broken down) during cellular respiration (1)

- 2.3.3 - When a person develops insulin resistance,
 - the body cells become incapable of using insulin effectively ✓/ unable to absorb sufficient amounts of glucose
 - This leads to an increase in the level of glucose in the blood ✓
 - which stimulates the pancreas to secrete extra insulin ✓
 - to enable the cells to absorb sufficient amounts of glucose ✓
 - Over a period of time, the pancreas's ability to secrete extra insulin begins to decrease ✓
 - which leads to the development of type 2 diabetes (Any 4) (4)

- 2.3.4 - Glucose level in the blood increases 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 4) (4)

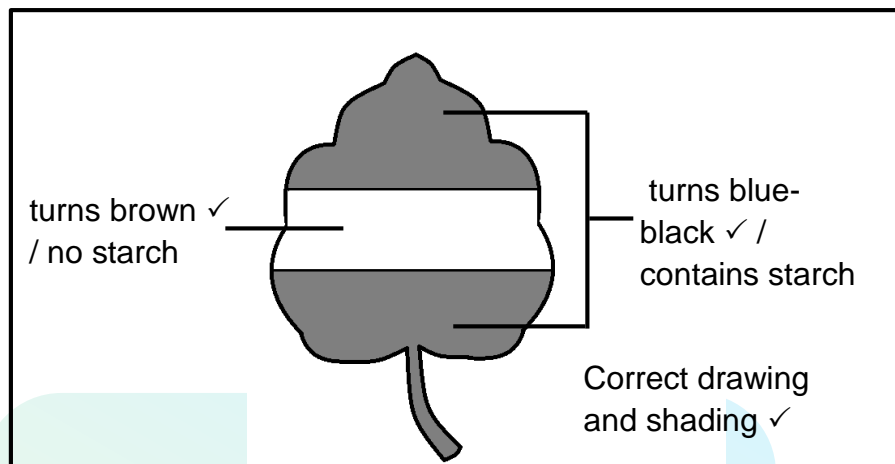
- 2.4 2.4.1 To destarch ✓ the plant / to allow plant to use up its starch reserves (1)

- 2.4.2 To check whether the leaf has been completely destarched ✓/ to confirm no starch (1)

- 2.4.3 (Diluted) iodine solution ✓ (1)

- 2.4.4 - To prevent light from falling on covered part ✓/ shade the part from light
 - to serve as a control ✓/ so as to compare part in light and dark (2)

2.4.5



(3)

- 2.5 - Surface area of the gas exchange organ must be large ✓ in order to allow sufficient oxygen to diffuse ✓
 - Surface must be moist ✓ gases diffuse through only in solution ✓
 - Surface must be thin ✓ to allow for rapid diffusion of gases across it ✓
 - A transport system/ blood system must be available ✓ to transport the gases to and from the gas exchange surfaces ✓
 - An adequate ventilating mechanism must be present ✓ to ensure that oxygen-laden air is brought in and carbon dioxide-laden air is driven out ✓
 - The gas exchange surface must be protected ✓ because the gas exchange system is thin and delicate ✓/ so that it does not dry out

(Mark first THREE only) (Any 3 x 2) (6)
[50]

QUESTION 3

- 3.1 3.1.1 Between 0 – 2 ✓ arbitrary units ✓ (2)
- 3.1.2 Photosynthesis ✓ (1)
- 3.1.3 - No photosynthesis is taking place ✓
- only respiration is taking place ✓ (2)
- 3.1.4 6 mg ✓/50 cm³ ✓ (2)
- 3.1.5 - The rate of photosynthesis equals ✓
- the rate of respiration ✓
- OR**
- Amount of CO₂ being produced during respiration is equal ✓ to the amount of CO₂
- taken up ✓ during photosynthesis (2)
- 3.1.6 - The rate of photosynthesis remains constant ✓
- because the optimum ✓ concentration of CO₂ ✓ for photosynthesis
- has been taken up /
- because chlorophyll molecules were saturated ✓
- Enzymes are the limiting factor ✓ (4)
- 3.2 3.2.1 (a) D – intercostal muscles ✓ (1)
- (b) E – diaphragm ✓ (1)
- 3.2.2 Ciliated ✓ epithelial tissue (1)
- 3.2.3 The C- shaped cartilage rings keep the trachea open at all times ✓ (1)
- 3.2.4 - Diaphragm contracts and becomes flattened ✓
- The length of the thoracic cavity (i.e. top to bottom distance) is increased ✓
- The external intercostal muscles contract and the rib cage is lifted ✓
- This causes the thoracic cavity to be enlarged ✓
- The total volume of the thoracic cavity increases ✓ and
- the pressure on the lungs decreases ✓
- since the atmospheric pressure is greater than the pressure on the lungs ✓
- Air rich in oxygen is drawn in through the air passages into the lungs ✓ (Any 5) (5)

3.2.5 (a) Alveolus (1)

- (b)
- The corona virus infection causes
 - the squamous epithelium ✓ to become scarred and thickened
 - This prevents gaseous exchange ✓
 - between the alveolus and surrounding blood capillaries ✓
 - The accumulation of fluids in the pulmonary tube (bronchiole) prevents air flow to the alveolus ✓
 - Therefore, less oxygen is made available ✓
 - for cellular respiration ✓
 - resulting in organ failure due to lack of energy ✓ (Any 4) (4)

3.3 3.3.1 (a) A – Duodenum ✓ (1)

(b) C – Gall bladder ✓ (1)

- 3.3.2
- Secretes bile ✓
 - Is able to convert excess glucose to glycogen ✓/ stores glycogen
 - Stores minerals such as iron ✓
 - Stores vitamins such as A, D and B₁₂ ✓
 - Deamination of excess amino acids takes place in the liver ✓
 - Able to detoxify certain harmful substances and make them harmless ✓
- (Mark first THREE only) (Any 3) (3)

- 3.3.3
- The bile will not be released into the duodenum, ✓
 - therefore, no emulsification of fat is possible ✓/not broken down into tiny droplets
 - This means that the enzyme lipase cannot digest fats into fatty acids and glycerol ✓/ lipase action is less effective (3)

- 3.3.4
- Very long ✓ intestine/Part **E** ensures that the food remains in the alimentary canal for a long period for maximum absorption. ✓
 - The millions of villi ✓ in the small intestine/Part **E** increase the surface area ✓ for absorption
 - The walls of the villi are made up of a single row of columnar epithelial cells ✓(thin walls) for easy absorption of digested nutrients ✓
 - The lacteal and capillaries ✓ transport the absorbed food away quickly ✓
 - The columnar epithelial cells of the villi have microvilli ✓ to increase the surface area for absorption ✓
 - The columnar epithelial cells have a high concentration of mitochondria ✓ to provide energy ✓ for active absorption of food
- (Any 4) (4)

- 3.4 3.4.1 Chloroplast ✓ (1)
- 3.4.2 Stroma ✓ (1)
- 3.4.3 - Light phase ✓/ Light dependent phase
- Dark phase ✓/ Light independent phase (2)
- 3.4.4 - The light phase takes place in the grana of the chloroplast ✓
- which contain chlorophyll ✓
- the chlorophyll absorbs light energy ✓
- Part of the light energy is used to form ATP ✓
- Part of the light energy is used for splitting water ✓ (photolysis)
- into high energy hydrogen atoms ✓ and
- oxygen gas ✓ which is released into the atmosphere as a by-product (Any 5) (5)
- 3.4.5 - At high temperatures, the protein molecules of the enzymes become denatured ✓
- Therefore, the enzymes become functionless ✓
- causing the metabolic process (photosynthesis) to stop ✓
- Very low temperatures ✓ slow down the rate at which photosynthesis takes place ✓ (Any 2) (2)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

