

PHOENIX NORTH LIFE SCIENCES CLUSTER

NOVEMBER EXAMINATION – 2019

LIFE SCIENCES PAPER 1

GRADE 10

MARKING MEMORANDUM

SECTION A

QUESTION 1

- 1.1.1. C ✓✓
- 1.1.2. B ✓✓
- 1.1.3. A ✓✓
- 1.1.4. D ✓✓
- 1.1.5. D ✓✓
- 1.1.6. B ✓✓
- 1.1.7. A ✓✓
- 1.1.8. C ✓✓
- 1.1.9. D ✓✓
- 1.1.10. A ✓✓

- 1.2.1. Foramen magnum ✓
- 1.2.2. Tendons ✓
- 1.2.3. Diaphragm ✓
- 1.2.4. Diffusion ✓
- 1.2.5. Antagonistic ✓
- 1.2.6. Chlorophyll ✓
- 1.2.7. Cytokinesis ✓
- 1.2.8. Hydrostatic ✓
- 1.2.9. Spongy Mesophyll ✓
- 1.2.10. Cranium ✓

1.3.1. B only ✓

1.3.2. Both A and B ✓

1.3.3. A only ✓

1.4.1. Xylem is star/stellate shape / Phloem alternates with Xylem/
Phloem found within the arms of Xylem ✓

ANY 1 unicellular root hairs present

1.4.2. 1- Stele or vascular cylinder ✓

ANY 1

2- Cortex/ parenchyma of cortex ✓

ANY 1

3- Epidermis ✓

1.4.3. Transport manufactured food from the leaves to the root. ✓

1.5.1. Anaphase ✓

1.5.2.1. Spindle fibre ✓

1.5.2.2. Contracts and pulls the chromatids apart towards the opposite ends of the cell. ✓

1.5.3. 4 ✓

1.5.4. 4 ✓

1.5.5. Telophase ✓

1.5.6. a) It promotes/brings about growth in size of organism ✓

b) It repairs worn out or damaged cells ✓

c) It replaces dead cells ✓

d) It brings about asexual reproduction in certain plants and animals ✓

3

9

SECTION B

QUESTION 2

2.1.1. Fatty acids and glycerol / 3 Fatty acids and 1 glycerol ✓

ANY 1

2.1.2. Required for haemoglobin formation to transport oxygen ✓

2.1.3. Eggs - has the highest amount of Iron ✓

2.1.4. Saturated fats are solid at room temperature while unsaturated fats are liquid at room temperature / Saturated fats are formed from animal sources while unsaturated fats are formed from plant sources ✓

2.1.5. Required for bone and teeth formation ✓

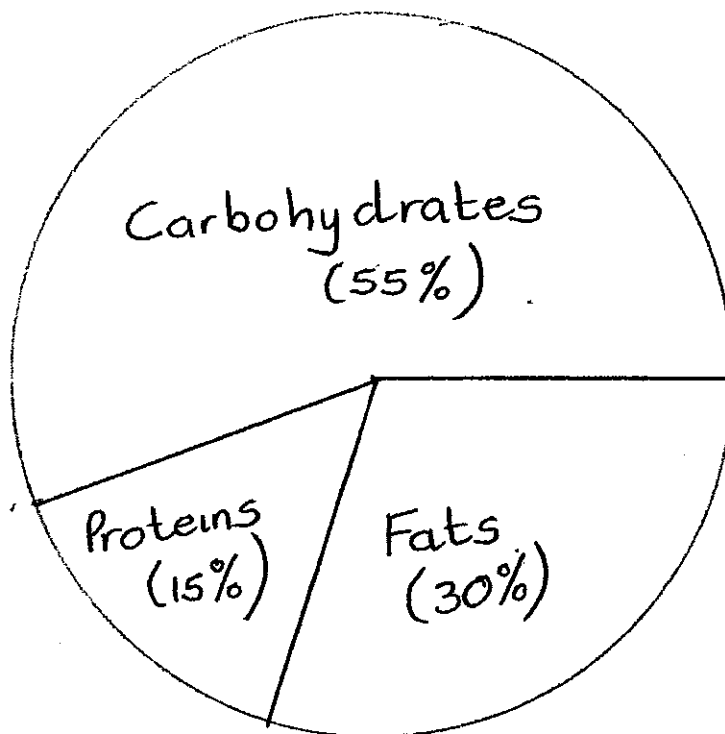
2.1.6. Calculation:

Carbohydrates: $55/100 \times 360^\circ = 198^\circ$

Fats: $30/100 \times 360^\circ = 108^\circ$

Proteins: $15/100 \times 360^\circ = 54^\circ$

Pie chart showing a recommended balanced diet consisting of 55 % carbohydrate, 30 % proteins and 15% fats



Marking grid for pie chart

Criteria	Mark allocation
Correct type of graph (pie chart) (T)	1
Title of graph (including both variables)	1
Calculations (C)	1: 1 to 2 calculations correct 2: All 3 calculations correct
Proportions accurate for each sector/ slice labelled (P)	1: 1 to 2 sectors drawn correctly 2: All 3 sectors drawn correctly

(6)

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2.2.1. Plant cell. Presence of cell wall/ fixed or rigid shape/ presence of chloroplast

Large vacuole present

ANY 2 REASONS

2.2.2. (a) C - cell wall

(b) B - nucleus

(c) A - vacuole

2.2.3. Width of cell = $\frac{\text{Measured width of cell (mm)} \times \text{length of scale line } (\mu\text{m})}{\text{Measure length of scale line (mm)}}$

$$= \frac{67 \text{ mm} \times 2 \mu\text{m}}{12 \text{ mm}}$$

$$= 11, 17 \mu\text{m}$$

- 2.2.4. - The double membrane is translucent which allows for light to pass through
- The double membrane is permeable to carbon - di - oxide and water which enters the chloroplast and oxygen which leaves the chloroplast
- The granum increases the surface area for the absorption of light
- Ribosomes in the stroma manufactures enzymes which controls the process of photosynthesis

ANY 3

2.3.1. Stem cells are undifferentiated or un specialised cells which have the potential to differentiate to form any tissue or organ in the body

2.3.2. Doctors hope the stem cells will help nerves in the newly damaged spinal cord regenerate before the disability becomes permanent.

2.3.3. Three to five day old fertilised embryos/ cord blood (blood from the umbilical cord and placenta) /bone marrow

ANY 1

2.3.4. Serious spinal injuries/ blindness/ cancer/ Parkinson's disease

ANY 2

2.3.5. Some people believe that a human embryo is a life and should be protected.

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3.4.1. As the temperature increases, the transpiration rate will increase

OR

As the temperature increases, the transpiration rate will decrease

OR

Change in temperature will have NO effect on the rate of transpiration

3.4.2. Cut the stem underwater to prevent air bubbles from blocking the xylem

Cut the stem at an angle to ensure no damage to the xylem

Ensure the twig fits securely into the rubber stopper and seal with vaseline

Make sure apparatus is air tight. Place the apparatus on a level surface.

3.4.3. a) Transpiration rate

b) Temperature

3.4.4. The speed of movement of the air bubble will be greatly reduced. Vaseline prevents transpiration at the ventral surfaces from taking place by blocking the stomata

3.4.5. To allow to acclimatise to the environment

QUESTION 4 (ESSAY)

a) Absorption of water by the roots (A)

Soil water/ capillary water has a high water potential while the cell sap has a low water potential due to its high concentration of solutes. Water moves along a water potential gradient, entering the cytosol/cytoplasm of the root hair through the cell membrane by osmosis. The water then enters the vacuole of the root hair.

Max: 5

b) Lateral transport of water across the root to the Xylem of the root (LT)

Water having entered the root hair may now follow two path ways on its journey to the stele before entering the xylem tissue:

Major pathway

Most water passes by diffusion, from the root hair, along the cell walls of the cortical cells, through the intercellular spaces along a water potential gradient, until it reaches the endodermis with the Casparian strip, which is impermeable to water. Water is then allowed to enter the stele by passing through the thin walled passage cells by osmosis. Water then enters the xylem of the root.

ANY 4

Minor pathway

Water moves along a water potential gradient, through the cortical cells by osmosis until it reaches the endodermis with the Casparian strip. Water passes through the thin walled passage cells and enter the stele by osmosis and then it enters the xylem of the root.

ANY 4

Max: 8

c) The difference between Transpiration (T) and Guttation (G)

Transpiration is the loss of water in the form of water vapour through the stomata while guttation is the loss of water in droplet form through the hydathodes.

Max: 4

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the topic	Ideas arranged in a logical sequence/ cause and effect	Answered all aspects required by the essay
Only information about: <ul style="list-style-type: none"> - Absorption of water by the root hair - Lateral transport of water across the root to the Xylem of the root - The difference between guttation and transpiration 	Information about: <ul style="list-style-type: none"> - Absorption of water by the root hair - Lateral transport of water across the root to the Xylem of the root - The difference between guttation and transpiration is given in a logical sequence 	At least <ul style="list-style-type: none"> - Absorption of water by the root hair =3/5 - Lateral transport of water across the root to the Xylem of the root = 6/8 - The difference between guttation and transpiration =2/4 are obtained
1 Mark	1 Mark	1 Mark

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