

**GIANCHERE FRIENDS SEC SCHOOL  
FORM TWO BIOLOGY SERIES EXAMINATIONS  
TERM TWO 2021**

**MARKING SCHEME**

1- Buccal cavity/ prank ✓

- Lungs ✓

- Skin ✓

2- Transpiration pull ✓

(1<sup>st</sup> 3 correct answers)

- Capillarity ✓

Adhesion /cohesion ✓

-Root pressure ✓

- Diffusion ✓

- Osmosis ✓

3- Collenchyma ✓

4.a) Diffusion ✓

b) – Visking tubing is semi-permeable ✓

- Iodine molecules Move from beaker into the visking tubing ✓

- Thus producing the blue-black colour with starch solution ✓

- Starch molecules are too large to pass through the walls of the visking tubing into solution in the beaker ✓

- therefore Iodine solution doesn't change colour ✓

(3first correct answers)

5a) – Sieve tubes /sieve tube element/ sieve element ✓

- companion cell/cytoplasmic strand/filaments ✓

b) Amino acids ✓

- Hormones ✓

- Lipids/oils ✓

- Resins ✓

6. - Biconcave shaped to provide a large surface area for absorption of oxygen/carbon (IV) oxide ✓  
 - Absence of nucleus hence more haemoglobin to carry sufficient oxygen/carbon (IV) oxide ✓  
 - Alter shape to enable to pass through the narrow lumen of capillaries to supply oxygen/  
 remove carbon (IV) oxide ✓  
 - Have haemoglobin with high affinity for oxygen/carbon (IV) oxide/uptake of more  
 oxygen/carbon (IV) oxide. ✓  
 - RBC are many/numerous to carry more oxygen/carbon (IV) oxide ✓

7. - light intensity

- wavelength/colour/quality of light ✓

8. -  $\frac{1}{3}$   $\frac{1}{3}$   $\frac{1}{3}$   $\frac{1}{3}$  ✓

3 1 3 3

- b) - Herbivorous ✓ reject herbivore  
 c) - Lack of canines/incisors on the on the lower jaw/presence of canines / Incisors on the  
 lower jaw only ✓

9. a) (Rate of) transpiration ✓

b) i) - Cut shoot under water ✓

- Apply petroleum jelly to cork-glass/Bung-glass/Bung-shoot connection ✓

- Open reservoir tap ✓

(mark any 1<sup>st</sup> 2 correct answers)

ii) - To ensure no air enters leafy shoot/xylem ✓

To ensure the apparatus is air tight ✓

To remove air bubbles from tubes ✓

10. Protein synthesis ✓

b) Secretion of substance/enzymes/polysaccharides/glycoprotein /synthesized proteins /synthesized /  
 carbohydrates/synthesized materials ✓

- Packaging of carbohydrates/proteins/glycoproteins /synthesized material ✓

- modification of carbohydrates/protein/formation of glycoproteins ✓

- Transport of carbohydrates/proteins/glycoproteins/lipids/synthesized materials; ✓
- Production of lysosomes ✓

11.(a) X – Guard cell;

W – Stoma; rej. Stomata

- (b)
- Have chloroplast that help in the process of photosynthesis;
  - Have thin outer wall and thick inner wall to enhance bulging during opening of stomata;

12.(a) Resolving power is the ability to distinguish two close parts as separate entities; (1mk)

- (b) Diameter of field of view = 3mm  
No of cells 20 cells

1mm = 1000µm

3mm = 3000µm;

Size of 1 cell =  $\frac{3000}{20} = 150\mu\text{m}$ ; (2mks)

20

13. - Botany;

- Zoology; (2mks)

14 (i) Attracts organisms using food as a bait; and traps them. (1mk)

(ii) Sucks small organisms from bark of a tree; (1mk)

15 - Presence of valves to prevent back flow of blood;

- Thin walled which are less muscular and have few elastic fibres and wide lumen for blood to flow under low pressure; (2mks)

Ultra filtration; (1mk)

16 Serum is blood plasma whose plasma proteins have been removed;

17. (a) A – Root hair;

B – Cortex;

C – Endodermis;

D – Xylem' (1mk)

(b) Absorbs water and mineral salts;

(c) - Has long tube which is continuous from roots to leaves;  
- Lignified making it very strong and prevent it from collapsing;  
- Has narrow lumen to increase capillarity; (3mks)

18. The set up was then placed in sunlight for five hours and leaves were tested for starch.

a) What scientific concept was being investigated? (1mk)

***Photosynthesis;***

b) i) Give the results likely to be obtained after starch test for A and B. A and B.

A – ***Negative test / starch absent;*** (1mk)

B – ***Positive test / starch present;*** (1mk)

ii) Account for the results in leaf A in b (i) above. (1mk)

***Sodium hydroxide absorbed all the Carbon (IV) Oxide hence no photosynthesis;***

c) Why was leaf C included in the set-up? (1mk)

***Control experiment;***

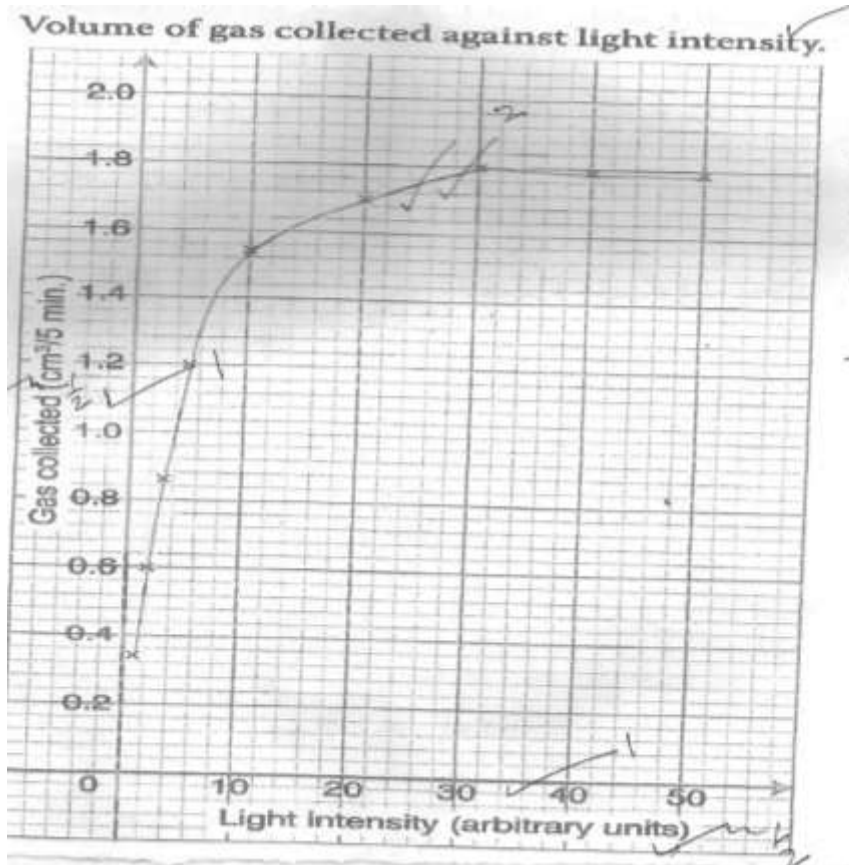
19.a) Explain the importance of transport in plants.

(2mk)

***Supplies water and mineral ions to the (photosynthetic) cells; conduct products of photosynthesis / nutrients to all parts of the plant / translocation;***

b) What is the role of root hairs in plants? (1mk)

***Absorption of water and mineral ions from the soil;***



**SECTION B**

6. (a) see the graph  
(6mrks)
- light provide  
(2mrks)
- intensity has  
(2mrks)
- (c) - it is used to release carbon (IV) oxide, which is needed for photosynthesis;  
(1mrk)
- (d) (i) ATP; (ii) Hydrogen atoms ; (iii) Oxygen gas;  
(2x1=2mrks)
- (e) (i) – **Carbohydrates**;
- They are used to provide energy.
- (ii) - **Proteins**;
- They are needed for growth and repair
  - They provide energy during starvation/long period of ailment.
  - For releasing metabolic regulators e.g. hormones and enzymes.

- For formation of antibodies that destroy pathogens.
- Formation of structural proteins e.g. cartilage.

(iii) **Lipids;**

- Provide energy in the absence of glucose
- form cell membrane.
- Provide metabolic water.
- Making insulator surface e.g. cuticle

**NB: Award 1mark for each use of each product**

**(Total**

**3mrks)**

(f) They are able to transform light energy into chemical energy in organic substances used by

other organisms (consumers); **(1x1=1mrk)**

(g) - Carbon (IV) oxide concentration (RJ. Carbon (IV) oxide alone)

- Temperature ;

- Presence of chlorophyll ;

- Availability of water;

**(2x1=2mrks)**

22.The heart has the cardiac muscles; that contracts and relax rhythmically without nervous stimulation / myogenic; and does not fatigue throughout life; The cardiac muscles have intercalated disc between its cells to enable the spread of waves of contractions throughout whole muscle;

Presence of coronary arteries ; that supply blood with oxygen and nutrients to the heart tissues / cells; The coronary veins drains blood away from the heart rich in carbon IV oxide and other metabolic waste from the heart tissues;

Presence of septum; which divides the heart into two halves, thus preventing the mixing of oxygenated blood and deoxygenated blood;

Presence of Sino atrial node; in the right atrium which acts as a pace maker for the heart beat; Atrio-ventricular node; receives waves of contractions from SAN and spreads to the purkinje tissues;

The left ventricle is thicker than the right; to enable it generate a higher pressure needed to pump blood to the rest of the body;

Presence of atrio-ventricular valves; to prevent the back flow of blood into the ventricles;

The presence of semilunar valves; at the base of pulmonary artery and aorta; to prevent the back flow of blood to the auricles;



**[25 points = max. 2**

The heart is enclosed by a translucent membrane / pericardium which prevents on its over dilation; the pericardium membrane secretes pericardial fluid; that lubricates the heart; The heart is covered by a layer of fat; that acts as a shock absorber

23..(a) Discuss factors that affect the rate of photosynthesis. (8 mks)

- *High light intensity increases the rate of photosynthesis. This continues up to a certain level when it slows down and finally levels off. Very bright sunshine may actually damage the plants because of the high amount of ultra-violet light. Low light intensity slows the process of photosynthesis.*
- *Increase in carbon (IV) oxide concentration results in a linear increase in the rate of photosynthesis up to a certain level when it slows down and finally levels off. Decrease in carbon (IV) oxide concentration slows the process of photosynthesis.*
- *At low temperature, rate of photosynthesis is slow. This is because enzyme activity is lowered. A rise in temperature increases the rate of photosynthesis up to about 40<sup>0</sup>C where further increase in temperature decreases rate of photosynthesis and finally stops. This is because high temperature denatures the enzymes.*

(b) Discuss the environmental factors that affect the rate of transpiration. (12 mks)

- *High light intensity increases the rate of photosynthesis in the guard cells resulting in the opening of the stomata. More water vapour is lost to the surrounding atmosphere thus a higher rate of transpiration.*
- *Increase in atmospheric temperature increases the internal temperature of the leaves. Latent heat thus a higher rate of transpiration.*
- *In windy conditions, moist air around the leaf is blown away thus increasing the saturation deficit which increases the diffusion gradient hence higher rate of transpiration.*
- *Low humidity occurs when the atmosphere is dry and has less water vapour. The concentration of water vapour in the intercellular air spaces is higher than in the air surrounding the leaves. This increases the diffusion gradient which in turn increases the rate of transpiration. High relative humidity occurs when the atmosphere is saturated with water vapour and the diffusion gradient is lowered thereby reducing the rate of transpiration.*
- *Low atmospheric pressure at high altitude decreases the saturation of water vapour in the intercellular air spaces causing an increase in rate of transpiration. Higher atmospheric pressure at low altitude increases saturation of water vapour in the intercellular air spaces and reduces diffusion rate causing a decrease in the rate of transpiration.*

*When more water is available from the soil, the mesophyll cell walls in the leaves are moist and avail more water to intercellular spaces. This increases the diffusion gradient hence a higher rate of transpiration. The guard cells become turgid and stomata remain*