BERGVLIET HIGH SCHOOL

Grade 11 **LIFE SCIENCES PAPER 1** **20 November 2023**
Time: 2½ hours **150 Marks**
Examiner: Mrs F Earl

MEMORANDUM

Section A

Question 1

1.1.1. B ✓✓
1.1.2. C
1.1.3. C
1.1.4. B
1.1.5. D
1.1.6. A
1.1.7. B
1.1.8. D
1.1.9. B **(18)**

1.2.1. Aldosterone ✓
1.2.2. Capsule
1.2.3. Epiglottis
1.2.4. Iodine solution
1.2.5. Secretion
1.2.6. Nephron
1.2.7. Villi
1.2.8. Tubular reabsorption **(8)**

1.3.1. Both ✓✓
1.3.2. B only
1.3.3. None
1.3.4. A only **(8)**

1.4.1. Oesophagus ✓ (1)

1.4.2. Peristalsis ✓ (1)

1.4.3. Gastric Juice. ✓ (1)

1.4.4. R ✓ (1)

1.4.5. Large intestine✓ (1)

1.4.6. Ingestion ✓ (1)

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1.5

1.5.1 1- calyx ✓

2 – pyramid ✓

7 – pelvis ✓ (3)

1.5.2 6 – Renal Artery ✓

Blood in 6 contains oxygen ✓ and blood in 5 is deoxygenated ✓

OR

Blood in 6 contains waste/nutrients ✓ and blood in 5 is waste/nutrient free ✓ (3)

1.5.3 Transports urine ✓ down to the bladder ✓ for storage (2)

1.5.4 a) 3 ✓ (1)

b) 4/2 ✓ (1)

/10/

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SECTION B

Question 2

2.1

2.1.1. To determine whether O_2 ✓ is released during photosynthesis ✓ (2)

2.1.2. The colourless Methylene blue turns Blue ✓ (1)

2.1.3. Keep the apparatus the same✓ but exclude the plant ✓ (2)

2.1.4. Solution would remain colourless ✓ as no photosynthesis occurs ✓ (2)

2.1.5. **(THREE**) Radiant energy / CO_2 / chlorophyll / H_2O ✓✓✓ (3)
(*sunlight energy*)

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2.2.

2.2.1 As temperature increases , the rate of photosynthesis increases ✓ ✓ (2)

OR

At low temperatures the rate of photosynthesis is low ✓✓

2.2.2 The rate decreases ✓ as enzymes denature ✓ at higher temperatures/

temperatures beyond the optimum ✓ (3)

2.2.3 35/36 °C ✓ (1)

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2.3

2.3.1. Chloroplast ✓ (1)

2.3.2. 2 - Stroma ✓
3 – Double membrane ✓
4 – Thylakoid ✓ (3)

2.3.3. Granum ✓ (1)

2.3.4. a) 1/4 ✓ (1)

b) 2 ✓ (1)

2.3.5. Light phase ✓ (1)

/8/

2.4

2.4.1 To determine whether CO2 ✓ is released during cellular respiration ✓ (2)

2.4.2 To indicate/show ✓ the presence of carbon dioxide ✓ (2)

2.4.3 Oxygen ✓ (1)

2.4.4 **Flask B** remains clear as all CO_2 is absorbed/removed by the sodium hydroxide & soda lime ✓

Flask D turns milky due to the presence of CO_2 ✓

Which must have come from the snails ✓ as it did not enter flask C

Snails therefore releasing it due to Cellular respiration ✓ (4)

2.4.5 Same apparatus ✓ but leave out the snails/add non-living material ✓ (2)

2.4.6 At all times ✓ (1)

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2.5

2.5.1 1- Glycolysis ✓
2 - Krebs cycle ✓
3 – Oxidative phosphorylation ✓ (3)

2.5.2 Phase 2 – Matrix ✓
Phase 3 - Cristae ✓ (2)

2.5.3 2 ✓ (1)

2.5.4 X = ATP ✓ (1)

2.5.5 1 ✓ (1)

2.5.6 a) Cristae ✓ increase the surface area ✓ for the reactions ✓ of CR (3)

b) Ribosome ✓ proteins made here ✓ specifically the enzymes ✓
involved in the reactions ✓ of CR **ANY 3** (3)

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Question 3

3.1

3.1.1 a) Concentration of carbon dioxide ✓ (1)

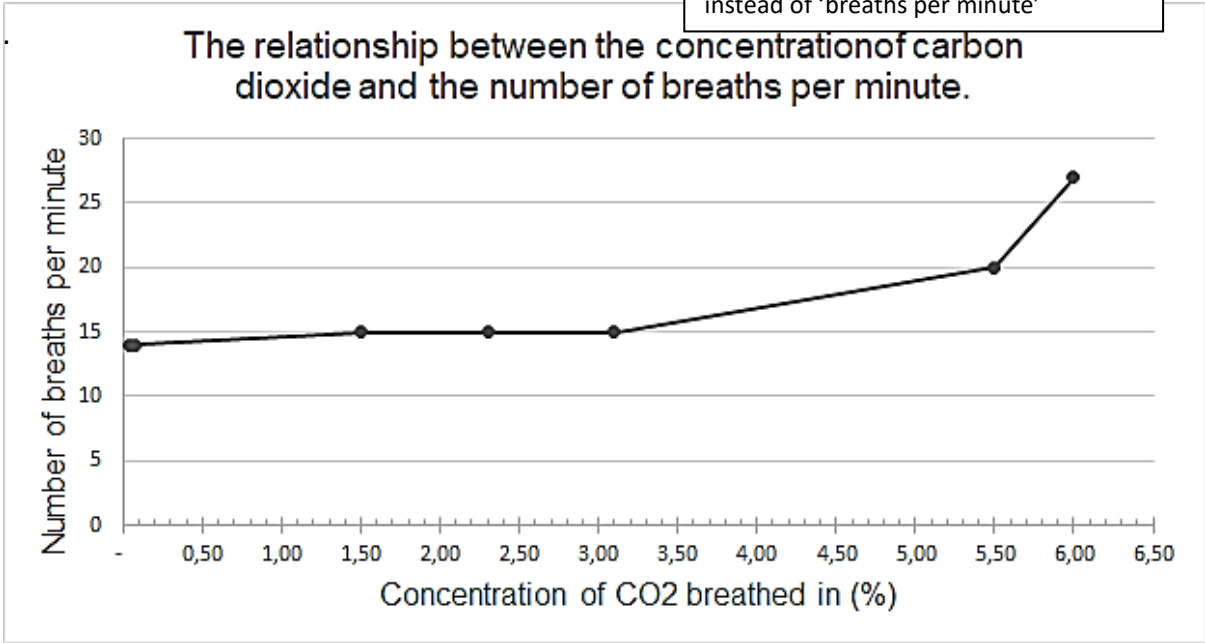
b) Rate / depth of breathing ✓ (1)

3.1.2 - Repeat the experiment / calculate an average reading ✓

- Increase the sample size ✓ (2)

Accept also Rate **& depth of breathing** instead of 'breaths per minute'

3.1.3



T – correct type of graph (line graph) ✓

H – heading with both variables ✓

L – X and Y axes correctly labelled with units ✓

S – correct scale on both X and Y axes ✓

P – all points plotted correctly ✓✓ (✓ if 1-6 plotted correctly) (6)

3.1.4 An increase in the concentration of carbon dioxide increased the rate and depth of breathing. ✓✓ (All or nothing) (2)

3.1.5
- When CO_2 levels in the blood increase above normal levels ✓
- Receptors in the carotid artery are stimulated ✓
- To send impulses to the medulla oblongata in the brain ✓
- Medulla oblongata stimulates breathing muscles ✓ (intercostal muscles and diaphragm) and heart ✓
- Breathing muscles contract more actively – increases the rate and depth of breathing ✓
- The heart beats faster. ✓
- More CO_2 is taken to and exhaled from the lungs ✓
- The CO_2 levels in the blood return to normal ✓ (ANY 6) (6)

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3.2

3.2.1 **Z**= Urine ✓

Reason: No Glucose / no Plasma proteins present in Fluid Z (2)

3.2.2 **Y** =Blood ✓

Reason: plasma proteins present ✓ (2)

3.2.3 **X** = Glomerular filtrate ✓

Reason for no plasma proteins: Too large to pass through capillary lining into filtrate. ✓ (2)

3.2.4 Osmoregulation ✓ (1)

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3.3

3.3.1 a) Gaseous exchange ✓ (1)

b) Ultrafiltration ✓ (1)

3.3.2 Alveolus lined with squamous epithelium ✓

which allows for *a minimal diffusion distance* ✓

Capillary lined with squamous epithelium ✓

which allows small substances to move through easily. ✓

Alveolus and capillary in very close contact ✓

facilitates diffusion/GE ✓

Diameter of capillary is narrow/blood cells in single file ✓

which slows blood down for Gaseous exchange ✓

ANY 2 (2x2 = 4)

3.3.3 Glomerulus ✓ (1)

3.3.4 Filtrate ✓ (1)

3.3.5 Haemoglobin ✓ (1)

3.3.6 Oxyhaemoglogin / attached to haemoglobin ✓

Dissolved in the plasma ✓ (2)

3.3.7 Podocytes ✓ D ✓ (2)

3.3.8 It increases the pressure of the blood in the glomerulus ✓

Causing small molecules to be forced out ✓ (not ' allows for ultrafiltration' etc) (2)

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3.4

3.4.1 Hepatic portal vein ✓✓ (2)

3.4.2 Higher ✓ (1)

3.4.3 Bile ✓ (1)

3.4.4 Gall bladder ✓ (1)

3.4.5 Deamination* ✓

Excess amino acids ✓ are broken down ✓ in the liver

The nitrogenous portion ✓ is converted into Ammonia ✓

Then into urea. MAX 3 (4)

3.4.6 The kidney ✓ (1)

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Grand total= 150