

**SECTION A**  
**QUESTION 1**

1.1

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

(10 x 2)

**[20]**

1.2

1.2.1 **Fermentation** ✓1.2.2 **Stroma** ✓1.2.3 **Homeostasis** ✓1.2.4 **Extinction** ✓1.2.5 **ATP** ✓1.2.6 **Carrying capacity** ✓1.2.7 **Iodine** ✓1.2.8 **Intraspecific competition** ✓1.2.9 **Pleura/pleural membrane** ✓1.2.10 **Egestion** ✓

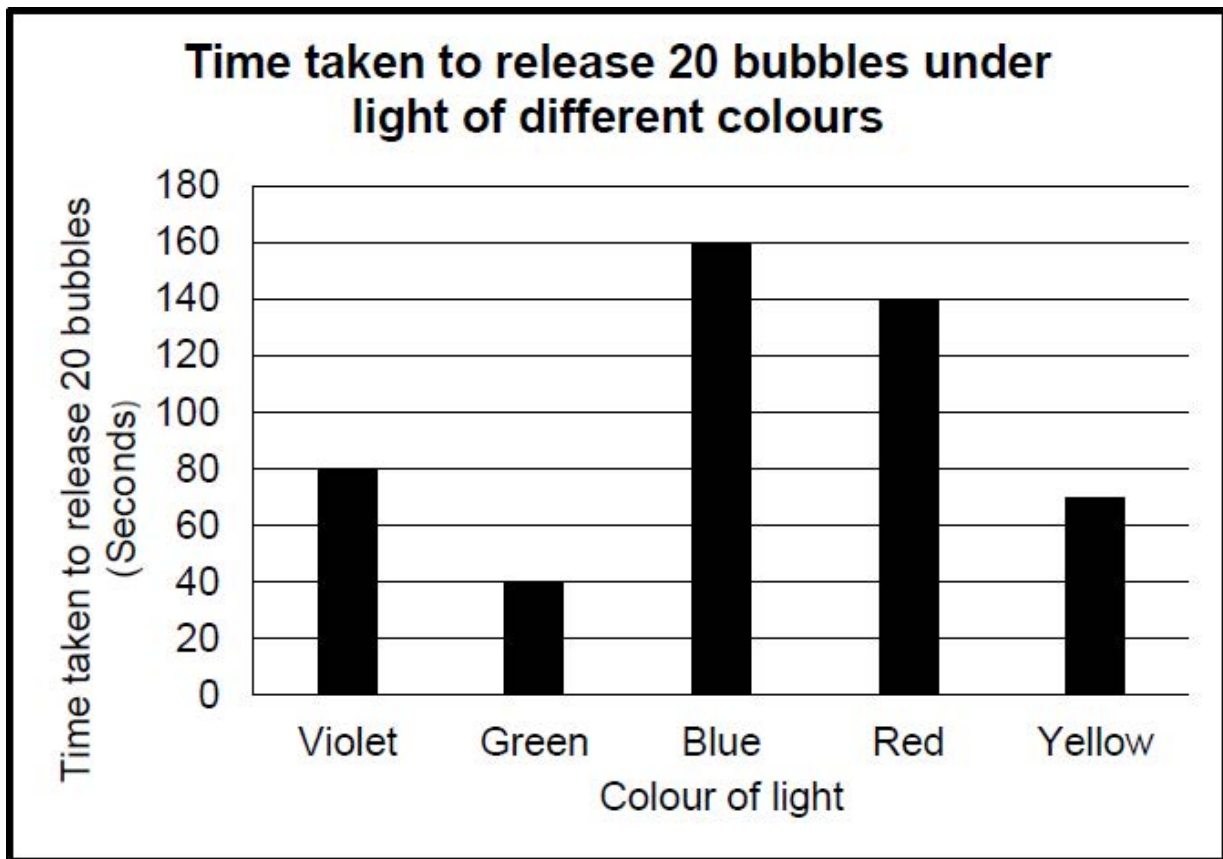
(10 x 1)

**[10]**

- 1.3
- 1.3.1 **Both A and B** ✓✓
- 1.3.2 **A only** ✓✓
- 1.3.3 **A only** ✓✓
- 1.3.4 **A only** ✓✓
- 1.3.5 **B only** ✓✓ (5 x 2)
- [10]
- 1.4
- 1.4.1 **Logistic/S-shaped/Sigmoid** ✓ (1)
- 1.4.1 **A – Lag phase** ✓ (1)
- B – Exponential/Accelerating growth phase** ✓ (1)
- C – Decelerating growth phase** ✓ (1)
- D – Equilibrium/stationary phase** ✓ (1)
- 1.4.2 (a) **D** ✓ (1)
- (b) **B** ✓ (1)
- (c) **B** ✓ (1)
- (d) **C** ✓ (1)
- 1.4.3 **Death phase** ✓ (1)
- [10]
- TOTAL SECTION A:50**

**SECTION B**  
**QUESTION 2**

- 2.1.1 **Phase 1 – Glycolysis** ✓  
**Phase 2 – Kreb’s cycle** ✓  
**Phase 3 – Oxidative phosphorylation** ✓ (3)
- 2.1.2 **X – Glucose** ✓  
**Y – Oxygen** ✓ (2)
- 2.1.3 **X – intake of food.** ✓ (*end-product of carbohydrate digestion*)  
**Y – Inhalation of oxygen** ✓ (2)
- 2.1.4 **Product 1 – CO<sub>2</sub>** ✓  
**Product 2 – Highly energised hydrogen atoms** ✓  
**Product 3 – Water** ✓ (3)
- [10]**
- 2.2.1 **Blue** ✓ (1)
- 2.2.2 (a) **Colour of light** ✓ (1)  
(b) **Rate of photosynthesis** ✓ (*Time taken to release 20 bubbles*) (1)  
(c) **The light intensity** ✓ / *the pondweed* ✓ / *the time exposed* / ✓ (any 2) (2)
- 2.2.3 **(80+40+160+140+70)/5 OR 490/5** (2)  
**= 98** ✓ **seconds**



Criteria for marking the graph

Title of the graph (both variables) (C)	1
Correct type of graph is drawn (T)	1
Correct labels for X- and Y-axes + correct units (L)	1
Appropriate scale for both axes (S)	1
Plotting of the graph (P)	1: 1 to 4 bars plotted correctly
	2: all 5 bars plotted correctly

(6)

NOTE: If a line graph is drawn – marks will be lost for ‘type of graph and correct scale’.  
If a histogram is drawn – marks will be lost for ‘type of graph and correct scale’.

2.3.1 **A – Larynx** ✓

**B – trachea** ✓

**C – bronchioles** ✓

2.3.2 **Process 1** ✓

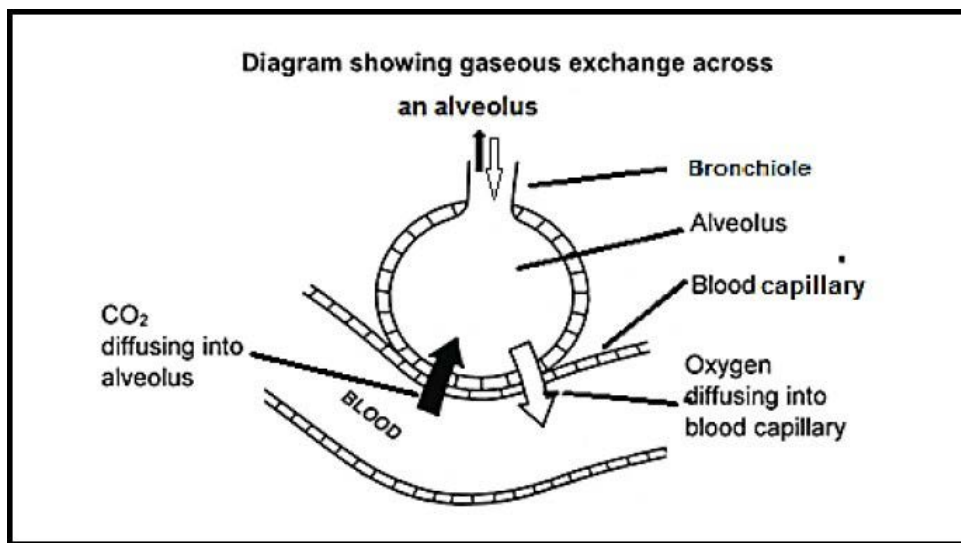
2.3.3 **Ribs are lifted/chest cavity expands/moves outwards Thoracic cavity expands/lungs are larger ✓ Diaphragm contracts/flattens/moves downwards ✓**

(Mark first TWO only)

2.3.4 **D ✓ - intercostal muscles ✓**

**E ✓ - diaphragm ✓**

2.3.5



(5)

Marks:

5

Diagram:

1

Oxygen diffusion into blood:

1

Carbon dioxide diffusion out of blood: 1 Any 2 labels:

2

2.3.6 - **Cannot breathe/inhale/exhale/lungs collapse ✓**

- **No pressure difference between exterior and thoracic cavity ✓**

(2)

(17)

**TOTAL QUESTION 2:[40]**

### QUESTION 3

- 3.1.1 **A – Renal vein** ✓  
**B – ureter** ✓  
**C – inferior vena cava** ✓ (3)
- 3.1.2 **The kidney has the important function in the removal of nitrogenous wastes/excess salts from the blood.** ✓ (1)
- 3.1.3 **No\*** ✓ (compulsory mark)  
 - **If the person suffers from diabetes, there would be a certain percentage of contentment in structure B** ✓  
 - **a diabetes sufferer will have a certain pertain of glucose content in the blood.** ✓  
 - **because the insulin content in the blood is abnormal.** ✓  
 - **therefore glucose is not converted to glycogen.** ✓  
 - **hence the glucose is excreted in urine.** ✓  
 (\* 1 compulsory mark and any 3 x 1) (4)
- 3.1.4 **Glucose, amino acids and proteins because they were reabsorbed before they were at structure B.** ✓ (4)
- [12]
- 3.2.1 **Malpighian body** ✓ (1)
- 3.2.2 **A – Afferent arteriole** ✓  
**B – Efferent arteriole** ✓ (2)
- 3.2.3 **-The diameter of both vessel A and B are the same** ✓  
**-Therefore no high blood pressure created in the glomerulus** ✓  
**-Hence no filtration.** ✓  
 OR  
**-There are no podocytes,** ✓  
**-No there is no filtration of wastes,** ✓  
**-wastes will accumulate in the body, and**  
**-wastes will be removed.** (Mark any first 3) (3)

[6]

- 3.3.1 (a) **A community refers to different species in the same communities✓ living at the same habitat ✓ living at the same time.✓** (2)
- (b) **The ecological niche is a role of species✓ within a the structure and function of a community. ✓** (2)
- 3.3.2 **T. confusum✓. 100 survived in bottle 6 when the temperature was 24°C and the relative humidity was 30%.✓** (2)
- 3.3.3 **Density-independent factors✓. Because it has nothing it has to do with the population. ✓** (2)
- 3.3.4 **Intraspecific competition because there are two species involved. ✓** (3)
- [11]**
- 3.4.1 **Exponential/geometric growth rate ✓** (1)
- 3.4.2 **Accelerated growth rate ✓** (1)
- 3.4.3 - **Increases in food production and distribution ✓**  
 - **Improvement in public health ✓**  
 - **Achievement in biomedical technology ✓**  
 - **Education and awareness leading to more health conscious population. ✓** (4)
- 3.4.4 - **Competition for food, water and living space led to wars. ✓**  
 - **New diseases ✓ (e.g. HIV, TB, Ebola, etc.)**  
 - **Greater awareness and education. ✓ (Mark any first TWO)** (2 x 1)
- (2)**
- 3.4.5 (a) **Might lead to human extinction ✓**
- (b) **Educate and organise an awareness programme to highlight consequences of unchecked population growth ✓**  
 - **Tax incentives for smaller families ✓**  
 - **Introduction of family programmes. ✓**  
 (Accept any reasonable explanation) (1 x 1 mark) (1)

**[10]**

- 3.5 - ***The double membrane is highly permeable ✓ and allows water and carbon dioxide to enter easily. ✓***
- ***grana contain chlorophyll ✓ to trap sunlight. ✓***
  - ***The grana are made up of thin flat discs called lamellae ✓ that present a large surface area for the absorption of sunlight. ✓***
  - ***The stroma contains enzymes ✓ for the reactions of the dark phase. ✓***
  - ***Ribosomes in the stroma ✓ synthesise enzymes for photosynthesis. ✓***
  - ***Starch granules ✓ are present to temporarily store the starch that is produced. ✓***

(Any 1 x 2)

(2)

[10]

TOTAL QUESTION 3:[40]

TOTAL SECTION B:80



## SECTION C

### QUESTION 4

#### **Homeostasis**

Homeostasis is the ability of a living organism to maintain a constant ✓ internal environment ✓ irrespective of changes in the external environment ✓ e.g. ability to maintain constant (correct level) glucose concentration level of the blood. ✓ Two hormones, insulin ✓ and glucagon, ✓ secreted by the islets of

Langerhans ✓ in the pancreas ✓ control the concentration of glucose level of the blood.

When the sugar level is higher ✓ than normal, ✓ the hormone insulin is secreted. ✓ The release of the hormone insulin reduces the level of glucose ✓ in the blood in two ways. Firstly, it increase the rate at which glucose is absorbed ✓ by the cells of the liver and muscles. ✓ Secondly, it stimulates the conversion of glucose into glycogen ✓ and fats in the liver and muscles. ✓

When the level of glucose is lower than normal, ✓ the hormone glucagon ✓ is secreted. The hormone glucagon stimulates the conversion of stored glycogen ✓ in the liver ✓, into glucose. ✓ This glucose is released in to the blood in order to raise the levels of glucose back to normal. ✓

(max 10)

(10)

#### **Diabetes mellitus**

When insulin is not secreted in the body the glucose level in the blood rises. ✓ This condition is known as diabetes mellitus. ✓ The kidney excretes some of the glucose in the urine. ✓

There are two types of diabetes mellitus. Type 1 occurs when the pancreas stops secreting insulin. ✓ People who have Type 1 diabetes must inject insulin in order to survive. ✓ Type 2 is caused by the secretion of insufficient insulin. ✓ This condition can be treated successfully without medication ✓ by making certain adjustments to diet.

The symptoms of diabetes mellitus are presence of glucose in the urine, ✓ extreme thirst ✓, nausea/vomiting ✓, weight loss ✓, fatigue ✓, non-healing wounds ✓ and frequent urination. ✓

The treatment and management includes regular exercise, ✓ following a prescribed diet ✓ and using prescribed medication. ✓

(max 7)

(7)

**Content: (17)**

**Synthesis: (3)**

## ASSESSING THE PRESENTATION OF THE ESSAY

<b>Relevance</b>	<b>Logical sequence</b>	<b>Comprehensive</b>
All information provided is relevant to the topic	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay
Only information relating to (There is no irrelevant information)	Logical sequence of events described.	Includes sufficient information on: difference between Homeostasis <b>1/2</b> and Diabetes mellitus <b>1/2</b> Mentioning factors <b>2/3</b> And maximum of two facts in each factor <b>6/9</b>
1 mark	1 mark	1 mark