LIFE SCIENCES EXAM

NOVEMBER 2021

PAPER 1

GRADE 11

TIME: 2 Hours **MARKS:100**

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MODERATORS: Mrs L Prior, Mrs R Harmse

Instructions:

1. Answer ALL the questions
2. Number and answer correctly according to the numbering system used in the question paper.
3. Present your answer according to the instructions of each question.
4. Do ALL drawings in pencil and label them in blue or black ink.
5. Write neatly and legibly

SECTION A

Question 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question number (1.1.1- 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which of the following is NOT a requirement for photosynthesis?

A Water
B Oxygen
C Carbon dioxide
D Chlorophyll

1.1.2 During the dark phase of photosynthesis…

A Energized hydrogen atoms combine with carbon dioxide
B ATP is formed
C Water is split
D Oxygen is released

1.1.3 Which compound has the most energy per molecule?

A Pyruvate acid
B ADP
C ATP
D Glucose

1.1.4 The substance that enters the mitochondria at the beginning of Krebs cycle of cellular respiration is:

A Glucose

B Lactic acid

C Ethanol

D Pyruvic acid

1.1.5 The region of the digestive tract where no villi occur, no digestive juices are secreted, but where some absorption does occur is the…

A Stomach

B Oesophagus

C Colon

D Small intestine

1.1.6 The function of the liver is to…

A Produce bile

B Store proteins

C Produce insulin

D Secrete gastric juice

1.1.7 Which of the following substances can directly be absorbed by blood without further digestion?

A Proteins

B Starch

C Glucose

D Fats

1.1.8 Most of the carbon dioxide in the blood is transported to the lungs…

A as carbonic acid

B as oxyhaemoglobin

C in solution in the plasma

D as bicarbonate ions

1.1.9 During inhalation in man, the diaphragm…

A Contracts and becomes flattened

B Relaxes and becomes arched

C Contracts and becomes arched

D Relaxes and becomes flattened

1.1.10 Which one of the following blood vessels contains the highest concentration of carbon dioxide?

A Renal vein

B Renal artery

C Pulmonary vein

D Pulmonary artery

[1 X 10 = 10]

1.2 Give the correct biological term for each of the following descriptions. Write only the term next to the question number (1.2.1 – 1.2.10) in the ANSWER BOOK, for example 1.2.11 Trachea.

1.2.1 The photo-chemical splitting of water during photosynthesis.

1.2.2 Organic molecules that control the dark phase of photosynthesis.

1.2.3 The gas evolved and given off as a by-product during photosynthesis.

1.2.4 A lymph vessel within the core of the villus.

1.2.5 Ejection of solid waste from the body.

1.2.6 The valve that controls the movement of chyme from the stomach to the duodenum.

1.2.7 The double membrane that covers the outer surface of the lungs.

1.2.8 The single layer of cells that lines alveoli.

1.2.9 The part of the cell where Kreb's cycle occurs.

1.2.10 The organic acid that builds up in the muscles due to anaerobic respiration.

[10 X 1 = 10]

1.3 Indicate whether each of the statements in COLUMN A applies to **A only**, **B only**, **both A and B** or **None** of the items in COLUMN B. Write **A only**, **B only**, **both A and B** or **None** next to the question number (1.3.1 – 1.3.10) in the ANSWER BOOK.

COLUMN A	COLUMN B
1.3.1 The structure that prevents the passage of food particles in the lungs.	A. Epiglottis B. Glottis
1.3.2 Factor affecting the rate of photosynthesis.	A. Light B. Temperature
1.3.3 A product of cellular respiration which supplies energy needed for metabolic reactions in cells.	A. Oxygen B. ATP
1.3.4 C- shaped cartilaginous rings	A. Trachea B. Oesophagus
1.3.5 Stimulates respiratory centres in the brain	A. Oxygen B. Carbon dioxide
1.3.6 Digestive enzyme found in saliva	A. Salivary amylase B. Bile
1.3.7 Site of glycolysis	A. Mitochondria B. Cytoplasm
1.3.8 The energy from the sun is used to…	A. Split water B. Form ATP
1.3.9 Energy rich carbohydrate formed during photosynthesis	A. Glycogen B. Glucose
1.3.10 Structure lined with ciliated columnar epithelium	A. Bronchiole B. Oesophagus

[10 X 1 = 10]

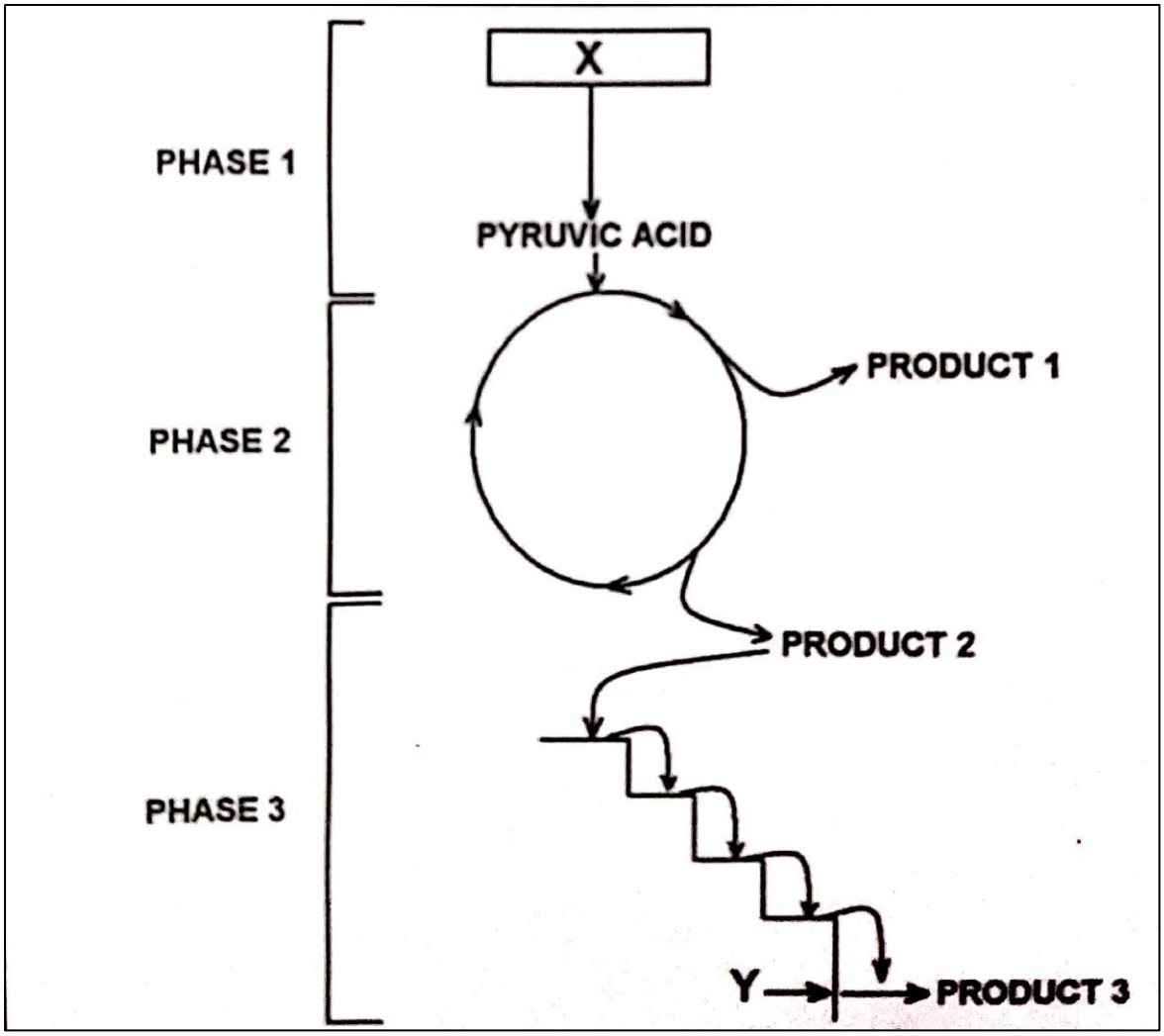
1.4 Draw a fully labelled diagram of a mitochondria. (5)

TOTAL = 35

SECTION B

Question 2

2.1 The diagram below represents aerobic respiration in human. Study the diagram and answer the questions.

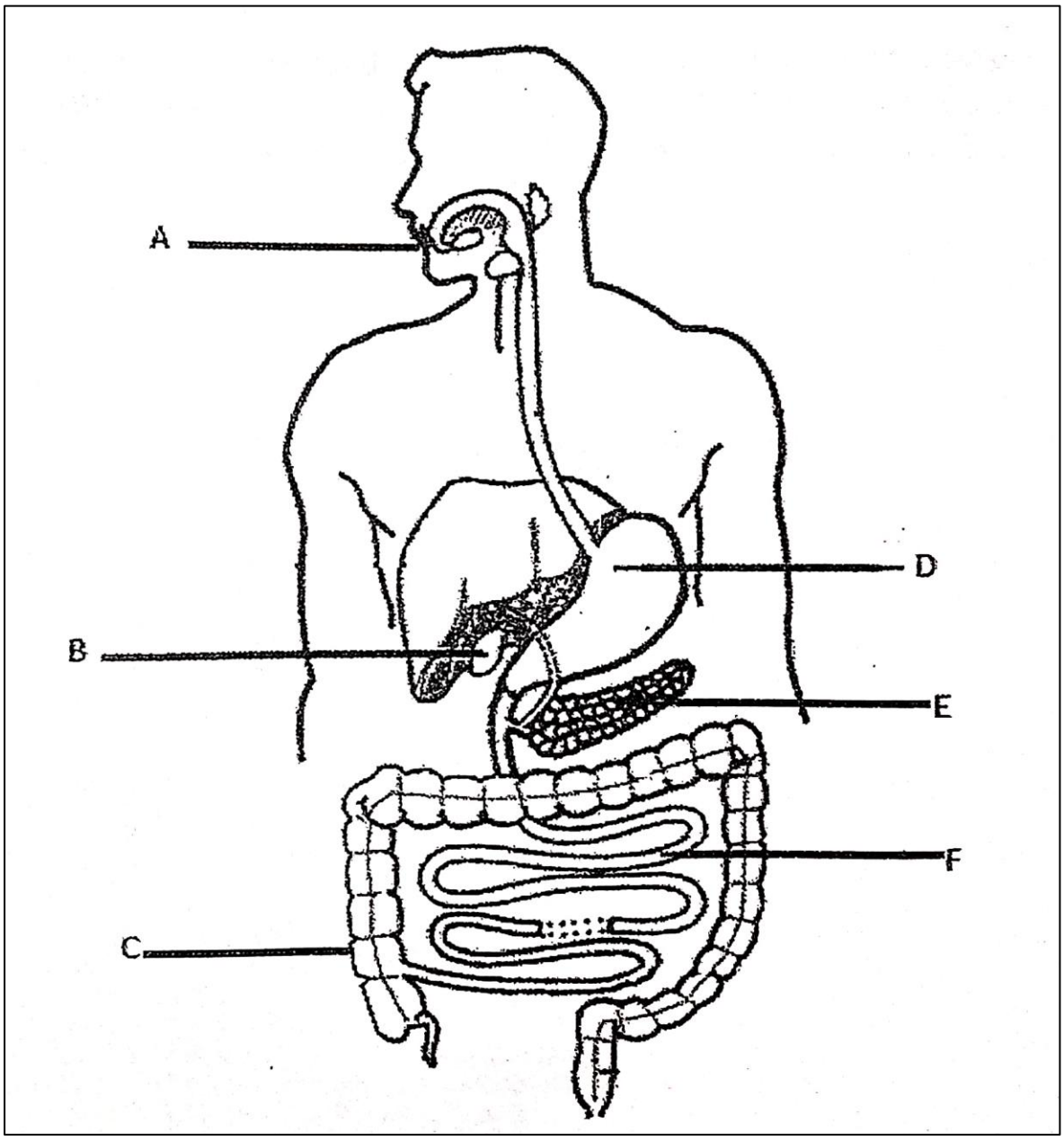


2.1.1 Identify phases 1, 2 and 3. (3)

2.1.2 Name X and Y (2)

[5]

2.2 The diagram below represents the human digestive system.



2.2.1 Give the LETTER/S and the NAME/S of the part/s which:

a) Contain or secrete enzymes which act upon carbohydrates (2)

b) Secrete hydrochloric acid (1)

(c) Is made up of caecum, colon and rectum (1)

2.2.2 State TWO functions of the liquid stored in part **B**. (2)

2.2.3 Explain TWO structural adaptations of a villus found in part **F**. (4)

2.2.4 State why gland **E** is regarded as both endocrine and exocrine. (2)

2.2.5 Describe how the hormone secreted by the pancreas regulates the blood glucose level when the blood glucose drops below normal. (4)

[16]

2.3 The following table shows the volume of air inhaled by a person over a timeframe of 120 seconds.

Time (sec)	Volume of air inhaled (litres)
10	3.5
20	3.5
30	3.5
40	3.5
50	3.5
60	5.0
70	5.0
80	5.0
90	4.5
100	4.0
110	3.5

2.3.1 Use the information in the table to draw a line graph starting from 30 to 100 seconds. (5)

2.3.2 For how long did this person exercise? (1)

2.3.3 Explain your answer in QUESTION 2.3.2. (2)

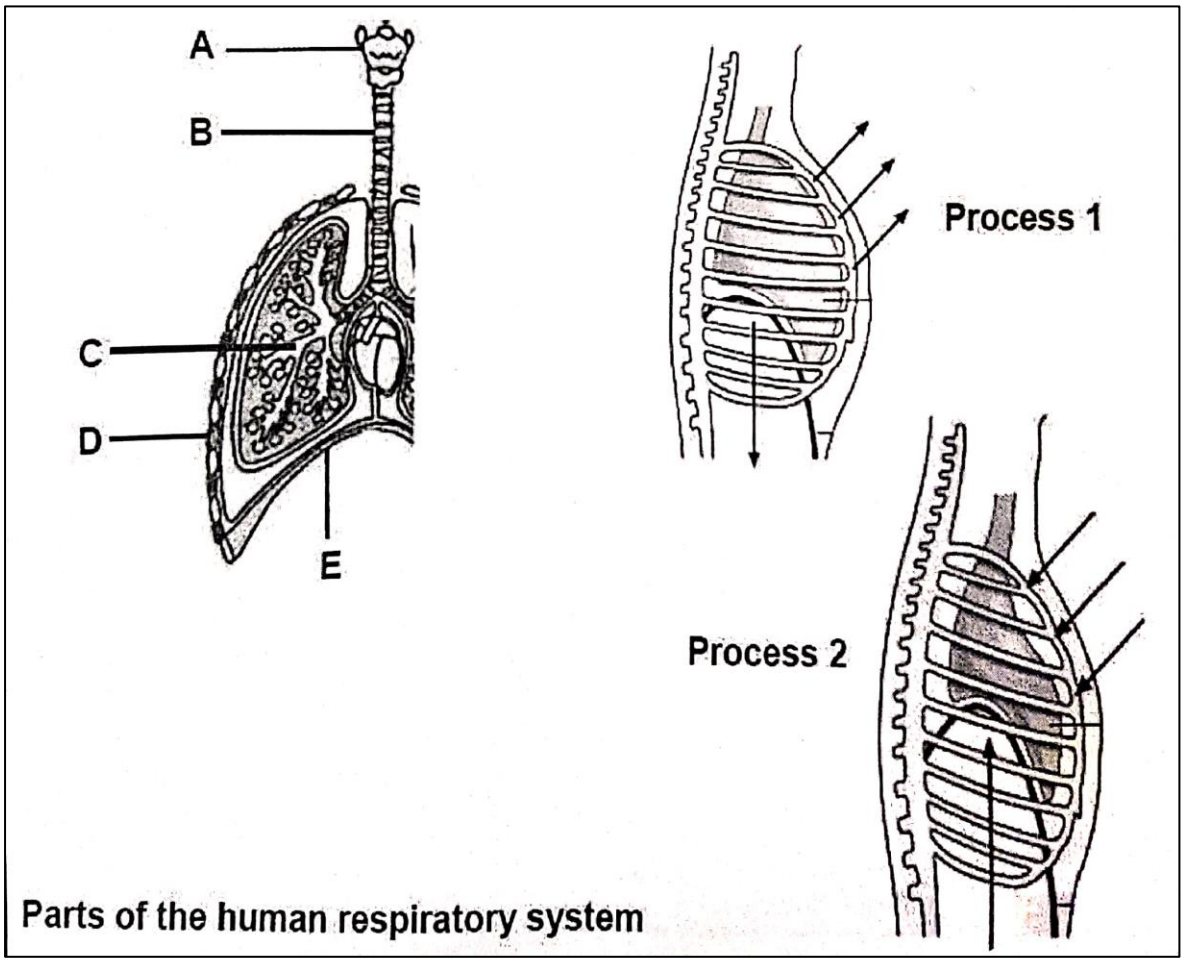
2.3.4 Explain how the information in the table would be different if this person suffered from asthma. (1)

[9]

TOTAL = 30

Question 3

3.1 Study the diagram below showing some parts of the human respiratory system. Answer the questions that follow.



3.1.1 Identify parts A, B, C and E. (4)

3.1.2 Which process in the above diagrams illustrates inhalation (Process 1 or Process 2)? (1)

3.1.3 Give TWO reasons from the diagrams to support your answer to QUESTION 3.1.2. (2)

3.1.4 Use the LETTERS and the NAMES of the muscles shown in the diagram that are involved during inhalation. (3)

3.1.5 Identify the diagram that illustrates exhalation (Process 1 or Process 2) (1)

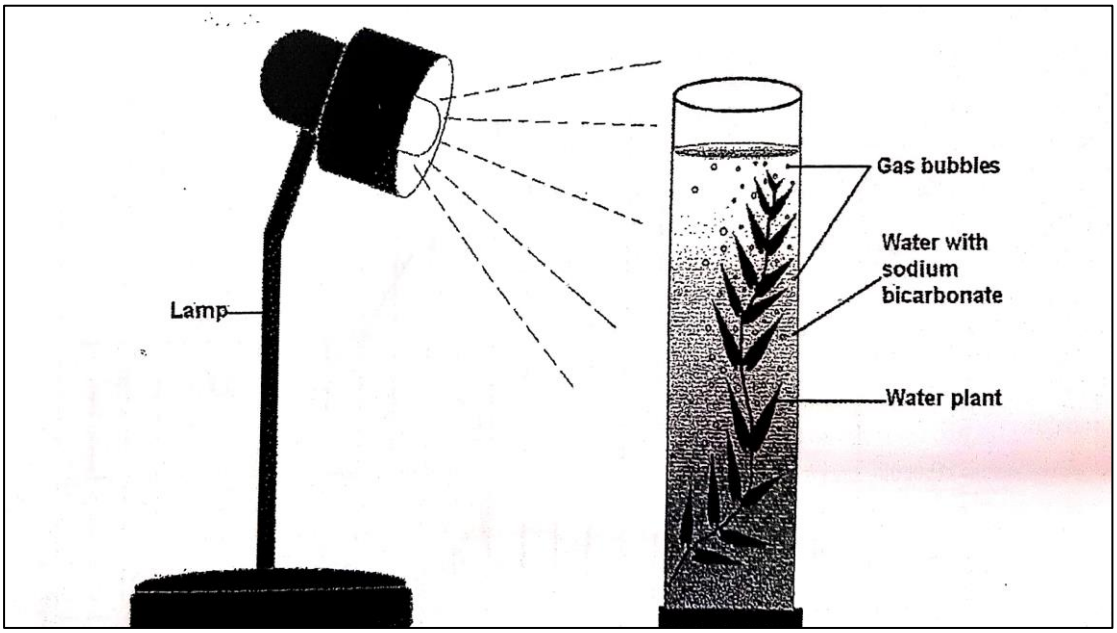
3.1.6 Give TWO reasons from the diagram to support your answer to QUESTION 3.1.5. (2)

3.1.7 A person's thoracic wall is punctured during a motor vehicle accident. Explain how this injury will affect the breathing process. (2)

3.1.8 Draw and label a diagram showing gaseous exchange across an alveolus. Use arrows to show the direction of gas movement. (5)

[20]

3.2 The diagram below illustrates an experiment in progress. The distance between the light source and the apparatus have been altered at regular intervals to record the number of bubbles released at various distances. The data gathered has been represented in a table below. Study the diagram and the table to answer the following questions.



Number of air bubble counted when the distance between the lamp and the apparatus altered at regular intervals.

Distance between lamp and plant in mm	40	80	120	160	200	240	280	320	360	400	440
Bubbles per minute	30	30	30	25	15	10	5	3	2	0	0

3.2.1 What is the aim of the above experiment? (1)

3.2.2 What is the function of sodium bicarbonate? (1)

3.2.3 Name the gas released during the experiment. (1)

3.2.4 Explain a simple test that can be done to confirm the presence of the gas mentioned in question 3.2.3. (2)

3.2.5 Name any TWO environmental factors, besides light intensity, that could affect the chemical process shown in the diagram above. (2)

3.2.6 Plot a line graph to represent the data obtained from the table above during the experiment. (5)

3.2.7 Name an independent factor that should be kept constant during this experiment. (1)

3.2.8 What can be concluded from the information obtained from the line graph in question 3.2.6. (2)

TOTAL = 35