Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2022

LIFE SCIENCES P1

MARKS: **150**

TIME: **2½ hours**

This question paper consists of 16 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answer to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

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

1.1.1 Which of the chemical equations below represents the process of photosynthesis?

A Glucose + Water + Light energy → Starch + Carbon dioxide
B Carbon dioxide + Water + Light energy → Starch + Oxygen
C Oxygen + Carbon dioxide + Light energy → Glucose + Oxygen
D Carbon dioxide + Water + Light energy → Glycogen + Oxygen

1.1.2 The chemical substance used to extract chlorophyll from leaves is …

A diluted iodine solution.
B clear lime water.
C alcohol.
D hydrochloric acid.

1.1.3 Which ONE of the following raw materials, required for photosynthesis, is controlled by the stomata?

A Carbon dioxide
B Water
C Mineral salts
D Oxygen

1.1.4 The main function of chlorophyll is to …

A give plants a green colour.
B protect plants from dangerous cosmic rays.
C synthesise all the enzymes required for the chemical reaction.
D absorb light energy.

1.1.5 Which ONE of the following stages of photosynthesis releases oxygen gas?

A Glycolysis
B Light independent phase
C Light dependent phase
D Oxidative phosphorylation

1.1.6 Which of the following digestive juices contains no enzymes?

A Pancreatic juice
B Gastric juice
C Bile
D Saliva

1.1.7 Study the list of processes associated with the human digestive system:

(i) Detoxification
(ii) Deamination
(iii) Emulsification
(iv) Peristalsis

Which ONE of the following combinations describes the digestive functions of a human liver?

A (i), (ii), (iii) and (iv)
B (i) and (ii)
C (i), (ii) and (iii)
D (i), (iii) and (iv)

1.1.8 The epiglottis prevents the flow of …

A food and water into the trachea.
B oxygen into the lungs.
C carbon dioxide out of the trachea.
D viruses and bacteria into the lungs.

1.1.9 During inhalation of air into the lungs …

A the volume of the thoracic cavity increases and the pressure decreases.
B the volume of the thoracic cavity decreases and the pressure increases.
C the volume and the pressure within the thoracic cavity remain the same.
D the pressure within the thoracic cavity remains constant, irrespective of the change in volume.

1.1.10 Which of the following tubes transport urine from the kidney to the urinary bladder?

A Ureter
B Urethra
C Proximal convoluted tubule
D Distal convoluted tubule

(10 x 2) (20)

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK.

1.2.1 The part of the chloroplast in which the light-independent reactions of photosynthesis take place

1.2.2 The cell organelle in which ATP molecules are produced during cellular respiration

1.2.3 The stage of cellular respiration during which two pyruvic acid molecules are synthesised

1.2.4 A single-celled fungus used in the making of bread

1.2.5 The two main branches of the trachea

1.2.6 The region of the kidney where renal pyramids are found

1.2.7 The removal of metabolic waste products from living organisms

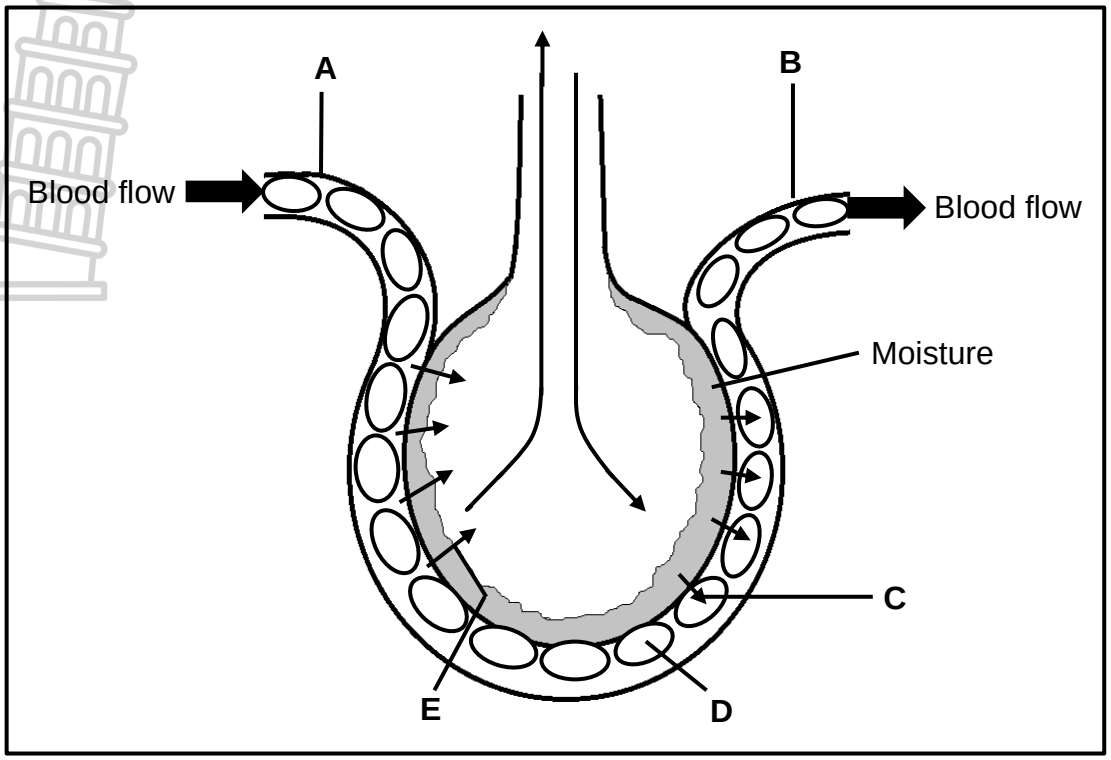
1.2.8 The structural and functional unit of the human kidney (8 x 1) (8)

1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY, BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **BOTH A and B** or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Mesophyll tissue	A: Palisade tissue B: Spongy tissue
1.3.2	The phase of cellular respiration during which carbon dioxide is released	A: Glycolysis B: Krebs cycle
1.3.3	The double membrane covering the lungs	A: Plasma membrane B: Pleural membrane

(3 x 2) (6)

1.4 The diagram below represents the structure of an alveolus.



1.4.1 Identify the:

(a) Gas represented by **C** (1)

(b) Process at **E** (1)

1.4.2 Give the LETTER and NAME of the part that:

(a) Transports deoxygenated blood (2)

(b) Contains haemoglobin (2)

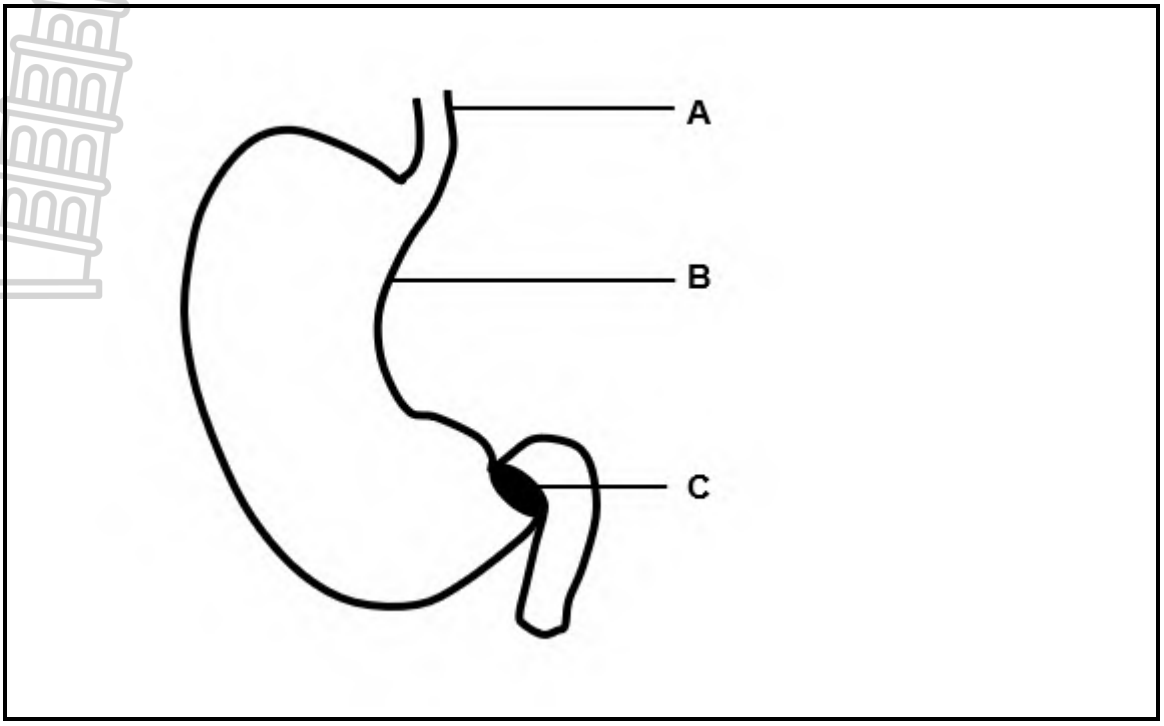
(c) Connected to pulmonary vein (2)

1.4.3 Name the tissue that lines the:

(a) Alveolus (1)

(b) Blood capillary (1)

1.5 The diagram below represents a part of the human digestive system.



1.5.1 Identify parts:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

1.5.2 State the function of part labelled **C**. (1)

1.5.3 Name the:

(a) Digestive glands found on the mucosa layer of part **B** (1)

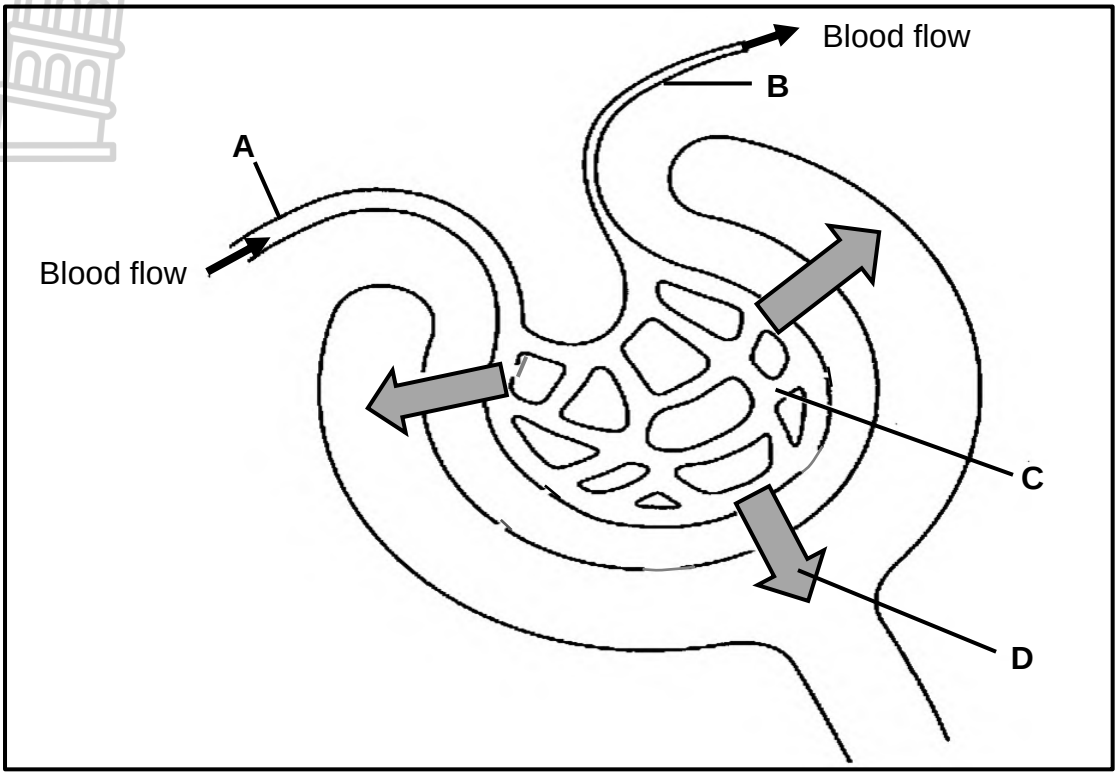
(b) Acid secreted by the glands mentioned in QUESTION 1.5.3(a) (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below represents a part of the human kidney.



2.1.1 Name the:

(a) Part shown in the diagram (1)

(b) Process that takes place in the part represented in the diagram. (1)

2.1.2 Identify:

(a) Part **A** (1)

(b) Part **C** (1)

(c) Process **D** (1)

2.1.3 Explain why high amounts of protein (albumen) in the urine indicate kidney damage. (3)

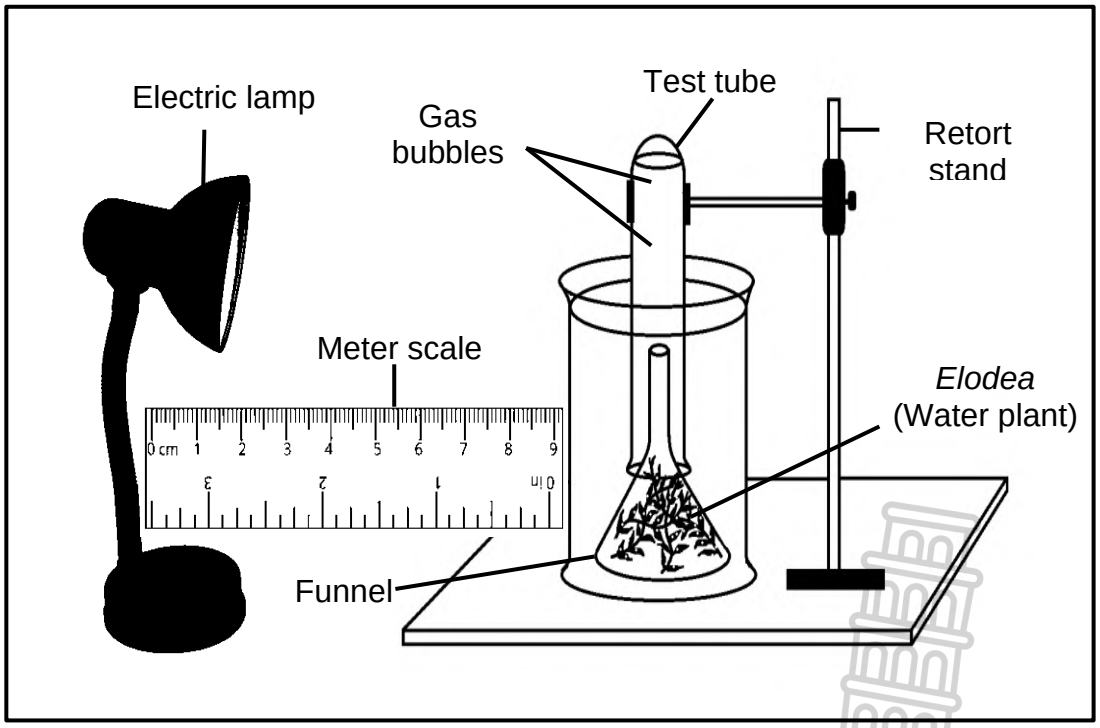
2.1.4 Name the essential nutrient that will not be reabsorbed from the content of **D**, in diabetes patients. (1)

2.1.5 Explain THREE ways in which the part shown in the diagram is structurally adapted to perform its function. (3 x 2) (6)

2.2 An experiment was conducted to determine the effect of light intensity on the rate of photosynthesis.

The procedure was as follows:

- Water plants of the *Elodea* species were placed under a glass funnel in a beaker containing water.
- A test tube containing water with no air bubbles was fitted over the glass funnel as shown in the diagram.
- Two pinches of bicarbonate of soda were added to the water before the start of the experiment.
- After switching off all the lights, a lighted table lamp was placed 1 metre away from the beaker.
- A meter scale was placed between the table lamp and the beaker.
- The number of air bubbles released by the plants in a 1-minute period was counted and recorded in a table.
- The above steps were repeated at different light intensities by moving the lamp to different distances.
- A test was conducted to identify the gas collected in the test tube.



2.2.1 Formulate a hypothesis for this experiment. (2)

2.2.2 Identify the independent variable in the experiment. (1)

2.2.3 How was the dependent variable measured in this experiment? (2)

2.2.4 Name the gas released as bubbles. (1)

2.2.5 State TWO variables that should have been kept constant during this experiment. (2)

2.2.6 Why was a pinch of bicarbonate of soda added to the beaker at the start of the experiment? (1)

2.2.7 Describe the test conducted to identify the gas mentioned in QUESTION 2.2.4. (2)

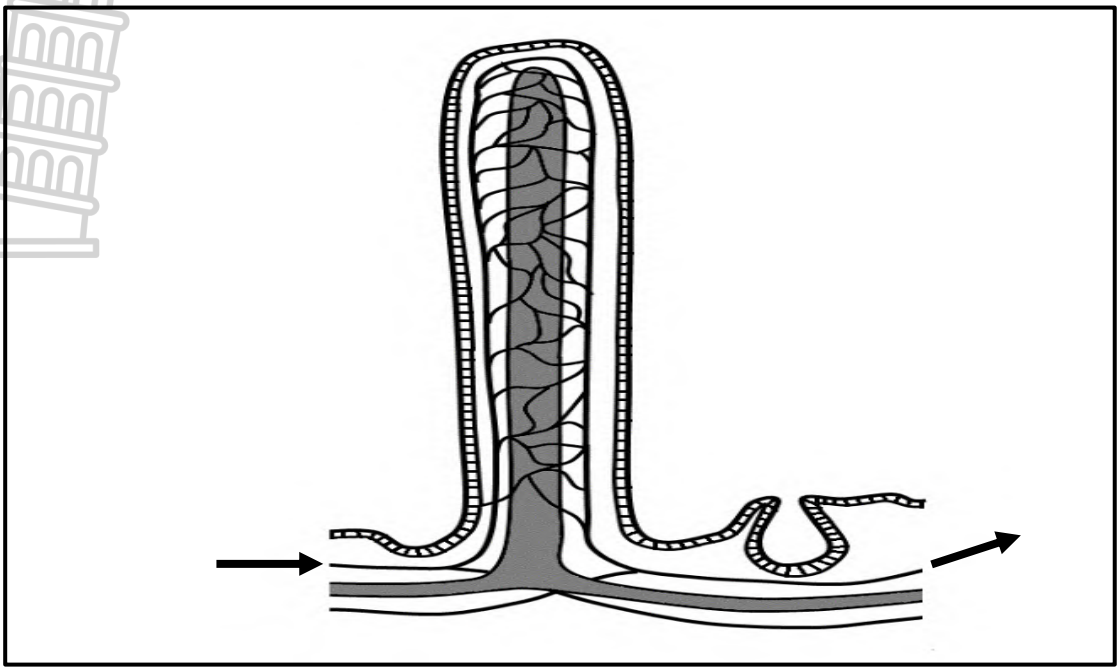
2.2.8 The table below shows the number of bubbles released by the *Elodea* plants when the light source was at different distances.

DISTANCE BETWEEN THE PONDWEED AND LIGHT SOURCE (METRES)	NUMBER OF BUBBLES GIVEN OFF IN 1 MINUTE
1,0	8
0,5	28
0,25	105
0,125	105

(a) Calculate the percentage increase in the number of bubbles when the light source was shifted from 1,0 m to 0,5 m. Show ALL your calculations. (3)

(b) Explain how the result obtained in this experiment is beneficial for the greenhouse farming of crops. (3)

2.3 The diagram below represents one of the many structures found in the human digestive canal.



2.3.1 Identify the structure shown in the diagram. (1)

2.3.2 In what organ is the structure mentioned in QUESTION 2.3.1 found? (1)

2.3.3 State the function of this structure. (1)

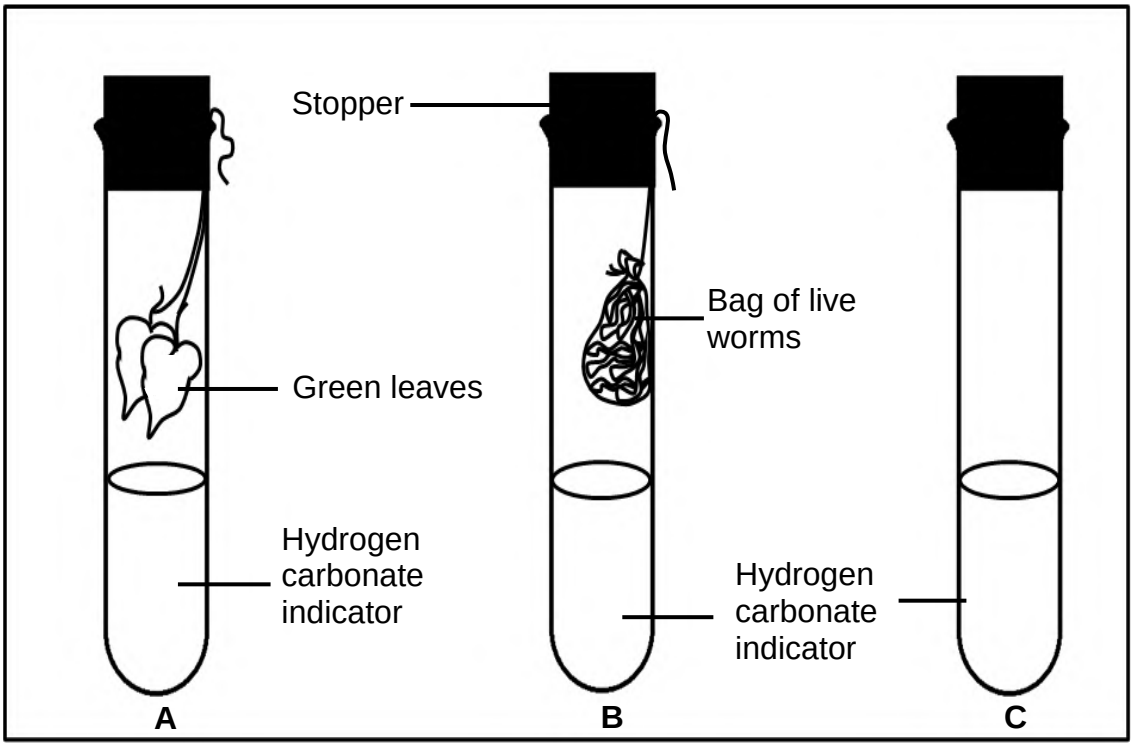
2.3.4 Define the process by which substances may move into this structure. (2)

2.3.5 Explain how the structure shown in the diagram is structurally adapted to perform its function effectively. (6)

2.4 The diagram below represents an experiment set up by a group of learners. All three tubes were exposed to light for 3 hours. Hydrogen carbonate was used as an indicator to test the different levels of carbon dioxide in the test tubes.

Hydrogen carbonate indicator turns:

- Purple in the presence of a small amount of carbon dioxide
- Yellow in the presence of a large amount of carbon dioxide
- Orange in the presence of a moderate amount of carbon dioxide



The result of the experiment is given in the table below:

	Test tube A	Test tube B	Test tube C
Colour of indicator at the start of the experiment	Orange	Orange	Orange
Colour of indicator after 3 hours	Purple	Yellow	Orange

2.4.1 State a reason for closing each test tube with a stopper. (1)

2.4.2 Explain why the indicator in test tube **B** became yellow after 3 hours. (2)

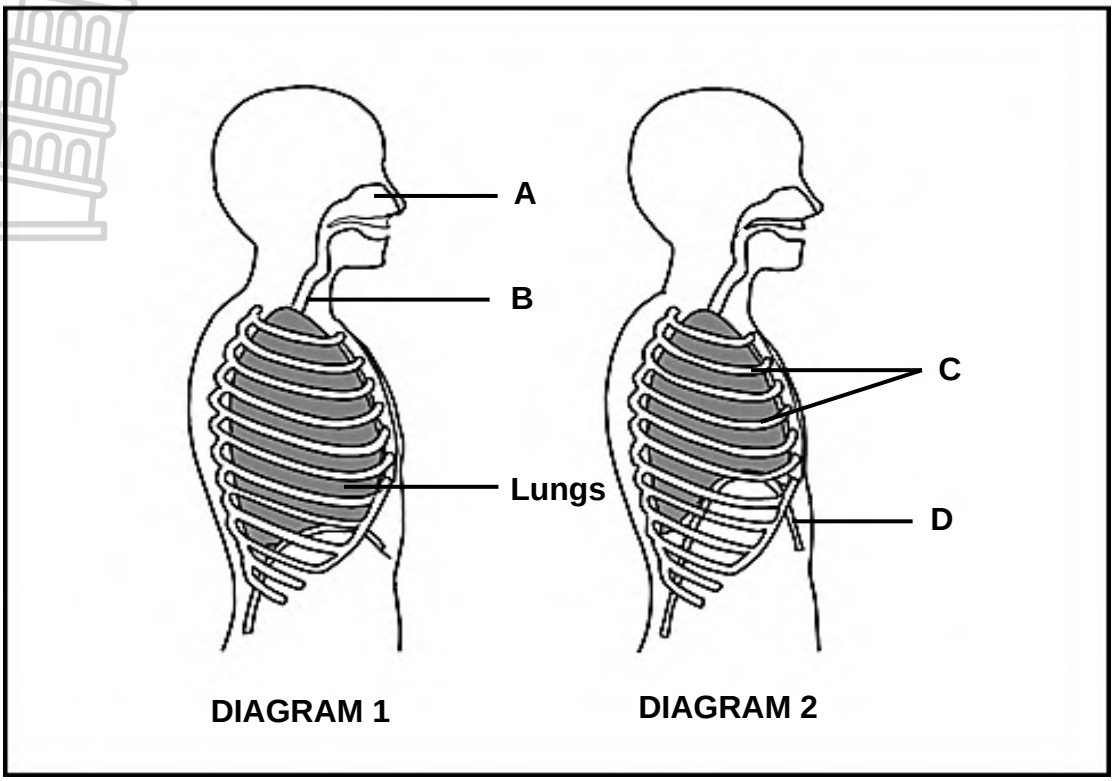
2.4.3 What is the purpose of test tube **C** in the investigation? (1)

2.4.4 Explain why the colour of the indicator would change to orange/yellow, if test tube **A** is placed in a dark cupboard for the entire day. (3)

[50]

QUESTION 3

3.1 The diagrams below represent the process of breathing in humans.



3.1.1 Name the breathing muscles:

(a) Represented by **D** (1)

(b) Found between **C** (1)

3.1.2 Which diagram (**1** or **2**) shows exhalation? (1)

3.1.3 State TWO observable features to support your answer in QUESTION 3.1.2. (2)

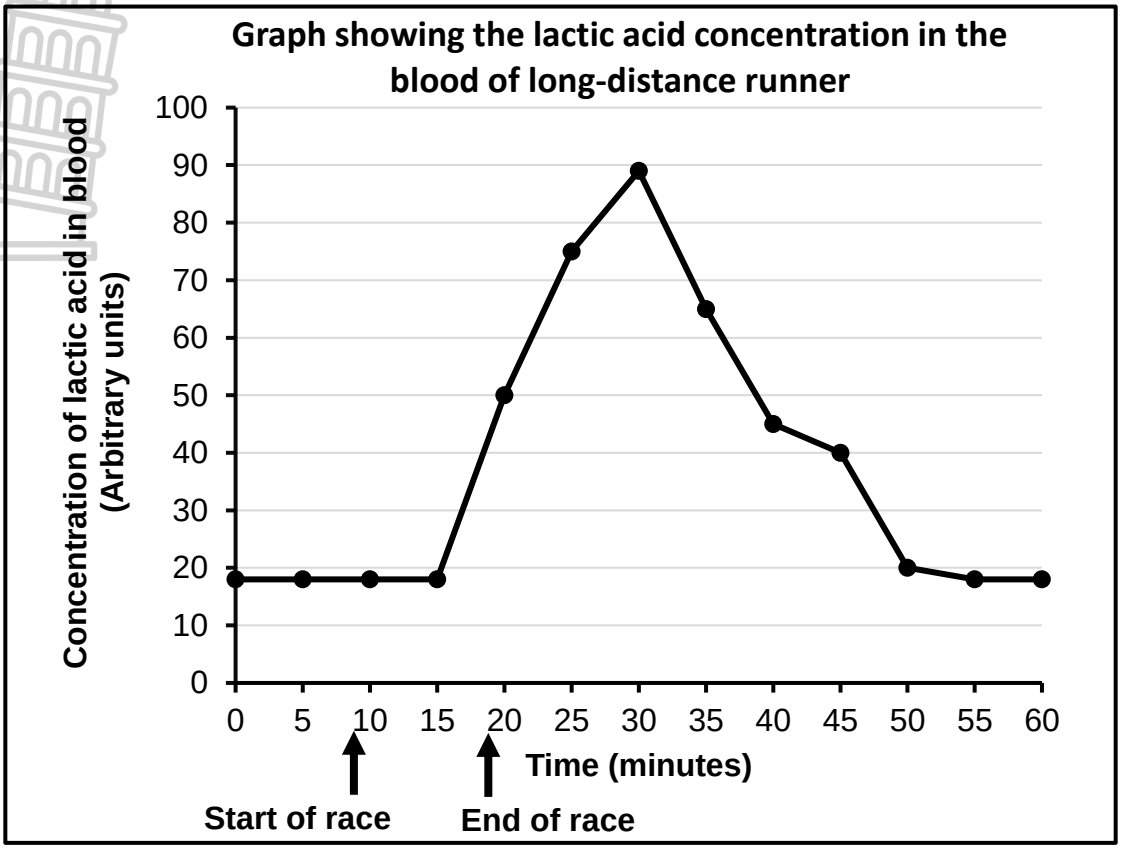
3.1.4 Identify the LETTERS representing the air pathway where coronaviruses would settle and multiply, before gaining entry into the lungs. (2)

3.1.5 If the coronavirus infects the thin inner lining of the alveoli, large amounts of mucus and fluid are secreted as a reaction. This substantially lowers the efficiency of gaseous exchange. This condition is known as pneumonia.

(a) Explain why there is a substantial increase in breathing rate and heart rate amongst the patients who suffer from pneumonia. (4)

(b) Explain why the patients require a ventilator to maintain life.
(A ventilator is a machine that actively pumps highly concentrated oxygen directly into the lungs of the patient through an attached tube inserted into the part labelled **B.**) (4)

3.2 The graph below represents the lactic acid levels in the blood of a long-distance runner.



3.2.1 Name the:

(a) Type of respiration that takes place in the cells of a long-distance runner 15 minutes after the race has started (1)

(b) Site where lactic acid accumulates during this process (1)

3.2.2 According to the graph, what is the acceptable level of lactic acid in the blood? (1)

3.2.3 For how long did the lactic acid concentration continue to increase after the end of the race? (1)

3.2.4 Explain why there is an increase in the lactic acid concentration in the blood. (4)

3.2.5 Explain why a long-distance runner who is suffering from severe muscle cramp, is advised to rest immediately. (4)

3.3 Read the extract below.

> Hypernatremia is the medical term used to describe having too much sodium in the blood. Sodium is an important nutrient for proper functioning of the body. Most of the body's sodium is found in the blood.
>
> Hypernatremia can occur when there is too much water loss or too much sodium gain in the body. The result is too little body water for the amount of total body sodium.

3.3.1 What is *hypernatremia*? (1)

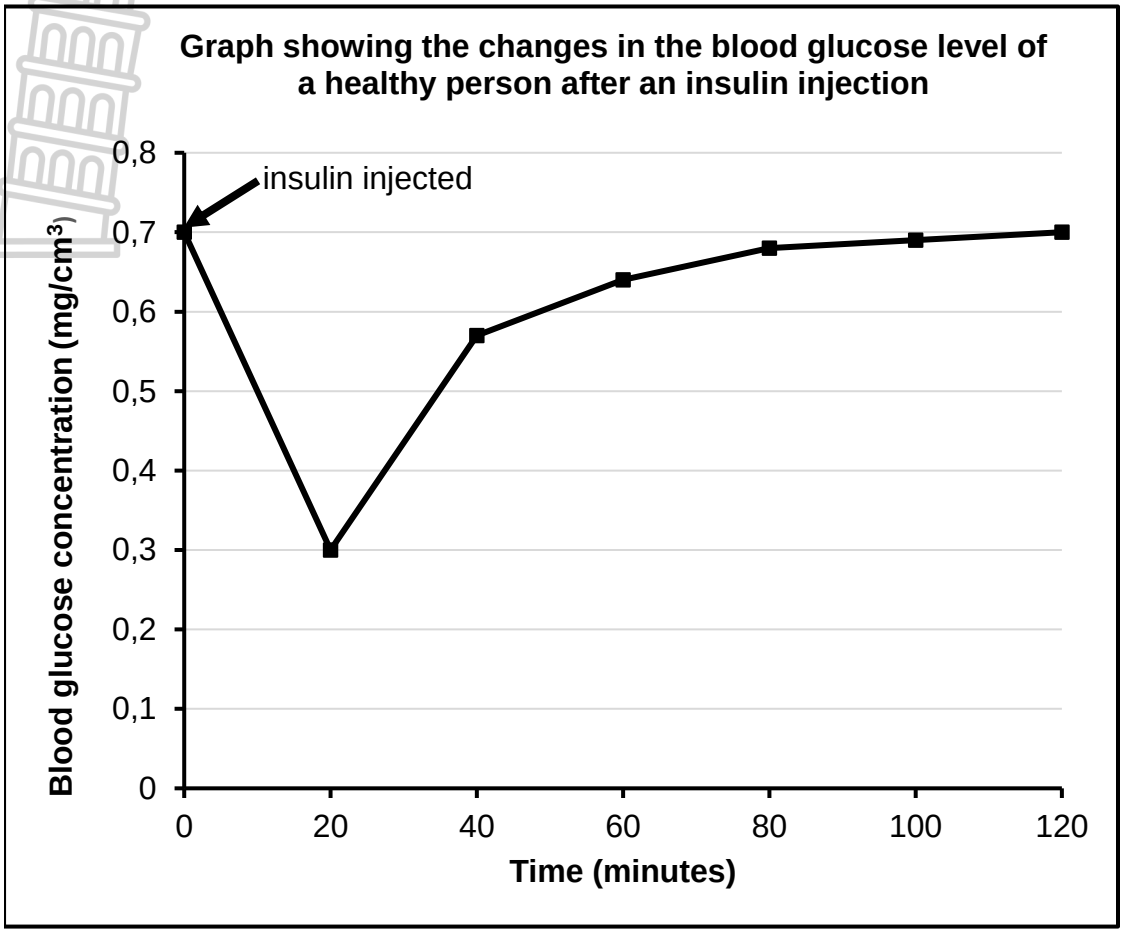
3.3.2 With reference to the extract, state TWO possible reasons for hypernatremia. (2)

3.3.3 Explain why sodium ions are actively pumped out at certain regions of the loop of Henle into the medulla region of the kidney. (3)

3.3.4 Describe how constant sodium concentration in the blood of a healthy human is maintained, when the level of sodium is decreased below the normal level. (4)

3.3.5 Explain why the levels of antidiuretic hormone (ADH) remains high in a patient who is severely dehydrated with diarrhoea and vomiting. (2)

3.4 The graph below shows the changes in the blood glucose levels of a healthy person after an insulin injection.



3.4.1 State the amount of glucose that was present in the person's blood:

(a) At the time of injection (1)

(b) 10 minutes after the insulin injection (1)

3.4.2 Explain the drastic drop in the blood glucose level of the normal healthy person after the injection. (3)

3.4.3 Explain how the normal blood glucose level is restored two hours after the injection. (4)

3.4.4 Some diabetes patients collapse due to a sudden drop in the blood glucose level. In order to raise the blood glucose level, they are given a concentrated glucose solution, rather than starch containing food. Explain the reason for this treatment. (2)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2022

LIFE SCIENCES P1
MARKING GUIDELINE

MARKS: **150**

This marking guideline consists of 11 pages.

PRINCIPLES RELATED TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and put a wavy line and 'max.' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct / incorrect.

3. **If whole process is given when only a part of it is required**
   Read all and credit the relevant parts.

4. **If comparisons are asked for, but descriptions are given**
   Accept if the differences / similarities are clear.

5. **If tabulation is required, but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks.

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions, but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
    Accept, provided it was accepted at the national memo discussion meeting.

14. **If only the letter is asked for, but only the name is given (and vice versa)**
    Do not credit.

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.

16. **Be sensitive to the sense of an answer, which may be stated in different ways**

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓			
	1.1.2	C ✓✓			
	1.1.3	A ✓✓			
	1.1.4	D ✓✓			
	1.1.5	C ✓✓			
	1.1.6	C ✓✓			
	1.1.7	C ✓✓			
	1.1.8	A ✓✓			
	1.1.9	A ✓✓			
	1.1.10	A ✓✓		(10 x 2)	(20)
1.2	1.2.1	Stroma ✓			
	1.2.2	Mitochondrion ✓/ Mitochondria			
	1.2.3	Glycolysis ✓			
	1.2.4	Yeast ✓			
	1.2.5	Bronchi ✓			
	1.2.6	Medulla ✓			
	1.2.7	Excretion ✓			
	1.2.8	Nephron ✓		(8 x 1)	(8)
1.3	1.3.1	Both A and B ✓✓			
	1.3.2	B only ✓✓			
	1.3.3	B only ✓✓		(3 x 2)	(6)
1.4	1.4.1	(a)	Oxygen ✓		(1)
		(b)	Diffusion ✓		(1)
	1.4.2	(a)	A ✓ – (Pulmonary) arteriole ✓		(2)
		(b)	D ✓ – Erythrocyte ✓ / Red blood cell		(2)
		(c)	B ✓ – (Pulmonary) venule ✓		(2)
	1.4.3	(a)	Squamous ✓ epithelium		(1)
		(b)	Endothelium ✓		(1)

1.5 1.5.1 (a) Oesophagus ✓ (1)

(b) Stomach ✓ (1)

(c) Pylorus ✓ / Pyloric sphincter (1)

1.5.2 Controls the movement of chyme from the stomach to the small intestine ✓ (1)

1.5.3 (a) Gastric glands ✓ (1)

(b) Hydrochloric acid ✓ (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (a) A – Malpighian body ✓/renal corpuscle (1)

(b) B – (Ultra) filtration ✓ (1)

2.1.2 (a) Afferent arteriole ✓ (1)

(b) Glomerulus ✓ (1)

(c) Glomerular filtration ✓ (1)

2.1.3
- Protein molecules are large molecules ✓
- which generally cannot pass through ✓ the tiny pores of the thin glomerular endothelium into the capsular space
- Therefore, very high amounts of protein in the urine indicates malfunctioning of filtration process ✓/ greater pressure facilitates filtration
- as well as tubular reabsorption ✓
- a tear in the glomerular membrane can also lead to proteins appearing in the urine ✓ (Any 3 x 1) (3)

2.1.4 Glucose ✓ (1)

2.1.5
- Afferent arteriole is wider than efferent arteriole ✓/the narrow diameter of efferent arteriole resists the flow of blood from the wider afferent arteriole
  causing high blood pressure in the glomerulus ✓
- The glomerulus provides large surface area ✓
  so that more plasma(liquid) is able filter through the endothelium within a short period of time ✓
- Walls of glomerular capillaries consist of a single endothelial layer ✓ which is in close contact with inner wall of Bowman's capsule and therefore, which facilitates efficient filtration ✓
- The endothelial wall of glomerular capillaries has many pores ✓
  so that the liquid part of the blood / plasma is able filter out in to the capsular space ✓
- Bowman's capsule is cup-shaped to provide a large filtration surface✓
  so that more filtration occurs ✓
- The inner wall of Bowman's capsule consists of a single epithelial layer consisting of irregular shaped podocytes with intercellular spaces ✓ for easy glomerular filtration ✓

(Mark first THREE only) (Any 3 x 2) (6)

2.2 2.2.1 The rate of photosynthesis increases with increasing light intensity ✓✓

OR

The rate of photosynthesis decreases with increasing light intensity ✓✓

OR

The light intensity has no effect on rate of photosynthesis ✓✓ (2)

2.2.2 The light intensity ✓ (1)

2.2.3 By counting the number of bubbles released per minute ✓✓ (2)

2.2.4 Oxygen ✓ (1)

2.2.5
- Temperature ✓
- The voltage of the bulb ✓/ current
- The amount of carbon dioxide ✓
- Person counting the bubbles ✓
- Plant species ✓
- The surface tension of water ✓
- The purity of water used ✓

(Mark first TWO only) (Any 2 x 1) (2)

2.2.6 To increase the concentration of carbon dioxide in the water ✓ (1)

2.2.7
- The glowing splint ✓ burst into flame / glows brighter
- which indicates that oxygen has been given off ✓ by the plant. (2)

2.2.8 (a) $28 - 8 = 20$ ✓

$\frac{20}{8} \times 100$ ✓ $= 250$ ✓% (3)

(b)
- It enables farmer to adjust the light to its optimal level ✓
- in order to increase the rate of photosynthesis ✓
- By increasing the rate of photosynthesis, the farmer is able to increase agricultural yield to its maximum ✓ (3)

2.3 2.3.1 (Structure of) a villus. ✓ (1)

2.3.2 Found in the small intestine ✓/duodenum/jejunum/ileum (1)

2.3.3 Absorption of digested nutrients ✓ (1)

2.3.4 Diffusion: ✓ is the movement of molecules from a region of its higher concentration to a region of its lower concentration. ✓

OR

Active transport: ✓ is the movement of molecules with the assistance of carrier molecules against the concentration gradient/ from high concentration to low concentration using energy. ✓

(Mark first ONE only) (2)

2.3.5 - The thin columnar epithelium ✓
facilitates easy diffusion of nutrients ✓
- Provides large surface area ✓ (large area of absorption)
so that more nutrients are absorbed in a faster pace. ✓
- Consists of many blood capillaries (a network of blood capillaries) and lacteal ✓ for faster transport of nutrients away from the site of absorption. ✓ (6)

2.4 2.4.1 To prevent air from entering the test tubes ✓as it would alter the experimental results / to stop gases from entering or leaving. (1)

2.4.2 - Test tube **B** contains a bag of live worms ✓
- They produce large amounts of carbon dioxide over time. ✓ / during
- cellular respiration which causes the indicator in test tube **B** to become yellow (2)

2.4.3 Test tube **C** was set up as a control ✓/ to compare results / to determine whether the factor under investigation was actually the one that caused the change. (1)

2.4.4 - No photosynthesis will take place ✓ due to lack of light.
- the green leaves continue to respire ✓ at a rate slower than animals
- hence releases small amounts of carbon dioxide ✓ and later
- the amount of carbon dioxide increases ✓ due to gradual accumulation. (Any 3 x 1) (3)

[50]

QUESTION 3

3.1 3.1.1 (a) Diaphragm ✓ (1)

(b) Intercostal muscles ✓/ external and internal intercostal muscles (1)

3.1.2 Diagram 2 ✓ (1)

3.1.3
- The diaphragm is relaxed and therefore restores its original dome shape ✓
- Size of thoracic/chest cavity is substantially reduced ✓
- Size of the lungs became smaller ✓

(Mark first TWO only) (Any 2 x 1) (2)

3.1.4 A → B ✓✓ (2)

3.1.5 (a)
- The accumulation of fluids and mucus in the alveoli drastically reduces the rate of gaseous exchange ✓
- This causes an increase in the carbon dioxide level and drop in the oxygen level in the blood ✓
- The high level of carbon dioxide stimulates medulla oblongata ✓
- to send impulses to breathing muscles ✓ and
- heart muscles ✓
- causing an increase in the rate and depth of breathing ✓ and
- rate of heart beat ✓
- in an attempt to restore carbon dioxide/oxygen balance in the
- blood ✓ (Any 4 x 1) (4)

(b)
- Reduced rate of gaseous exchange ✓ due to pneumonia
- leads to a steady drop in oxygen in the blood ✓
- hence active pumping of oxygen is required to raise the level of oxygen in the blood ✓
- to maintain the optimal rate of cellular metabolism ✓ (e.g., cellular respiration)
- to generate energy for the proper functioning of vital organs to maintain life ✓ (Any 4 x 1) (4)

3.2 3.2.1 (a) Anaerobic respiration ✓/ lactic acid fermentation (1)

(b) In the skeletal muscles ✓ (1)

3.2.2 18/19 ✓arbitrary units (1)

3.2.3 10 ✓ minutes (1)

3.2.4
- The intense physical activity leads to an increased rate of cellular respiration ✓
- causing an accumulation of carbon dioxide ✓ and
- decrease in the level of available oxygen ✓ due to insufficient ventilation
- therefore, only glycolysis takes place ✓
- In the absence of sufficient oxygen, the pyruvic acid molecules are converted to lactic acid ✓ which is stored in the muscle tissues.

(Any 4 x 1) (4)

3.2.5
- No physical activity occurs during resting ✓
- less glucose is required to be oxidised ✓
- therefore, the demand for oxygen is decreased ✓/ excess carbon dioxide is expelled from the body gradually / carbon dioxide-oxygen balance will be restored.
- the lactic acid stored in the muscles will be converted back to pyruvic acid ✓
- enabling the cell to complete the process ✓/ Krebs cycle and oxidative phosphorylation (Any 4 x 1) (4)

3.3 3.3.1 A condition characterised by excess sodium in the blood ✓ (1)

3.3.2
- Too much water loss ✓
- High intake of salt ✓/ sodium (2)

3.3.3
- The high concentration of sodium ✓ creates
- a steeper concentration gradient ✓
- which leads to the passive absorption of water ✓
- from the collecting tubule into the surrounding tissue fluid ✓
- surrounding the cells at the medulla region (Any 3 x 1) (3)

3.3.4
- The lower level of sodium in the blood stimulates
- the adrenal gland ✓ to secrete and release
- more aldosterone into the blood ✓
- which causes the reabsorption of more sodium by the capillaries ✓
- at the distal and collecting tubules ✓/less sodium ions are excreted
- from the kidneys ✓
- Sodium ions are reabsorbed until its level in the blood returns to normal ✓

(Any 4 x 1) (4)

3.3.5
- The diarrhoea and vomiting leads to excessive loss of water and salts ✓
- drops the level of water in the blood ✓/ causes dehydration that
- stimulates the hypothalamus ✓/ pituitary gland to release more ADH into the blood.

(Any 2 x 1) (2)

3.4 3.4.1 (a) 0,7 ✓mg/cm^3 (1)

(b) 0,5 ✓mg/cm^3 (1)

3.4.2
- A healthy person maintains optimum levels of insulin ✓ and
- hence maintains normal blood glucose level ✓
- the additional amount of insulin injected converts more glucose in the blood to glycogen ✓
- which is stored in the muscles and liver ✓ dropping the blood glucose level drastically (Any 3 x 1) (3)

3.4.3
- When the level of glucose drops below the normal ✓
- pancreas/cells of islets of Langerhans are stimulated ✓ to
- secrete more glucagon ✓ into the blood which
- causes the muscles and liver ✓
- to convert stored glycogen into glucose ✓
- this raises the level of glucose back to normal ✓ (Any 4 x 1) (4)

3.4.4
- Concentrated glucose / sugar solution will be absorbed directly in to the blood ✓
- because glucose is the monomer unit of carbohydrates which requires no digestion ✓

OR

- Starch containing food has to be digested into glucose before it can be absorbed into the blood ✓
- The digestion process takes time to complete and it may delay the treatment of the patient ✓ (2)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150