Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porofensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

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 provided.
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 must use a non-programmable calculator, protractor and a compass, where necessary.
11. All calculations to be rounded off to TWO decimal spaces.
12. 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 The structure which prevents the food bolus from entering the trachea when swallowing:

A Epiglottis
B Tongue
C Glottis
D Teeth

1.1.2 A function of the kidney:

A CO_2 homeostasis
B Breakdown of bile pigments
C Blood pH homeostasis
D Deamination

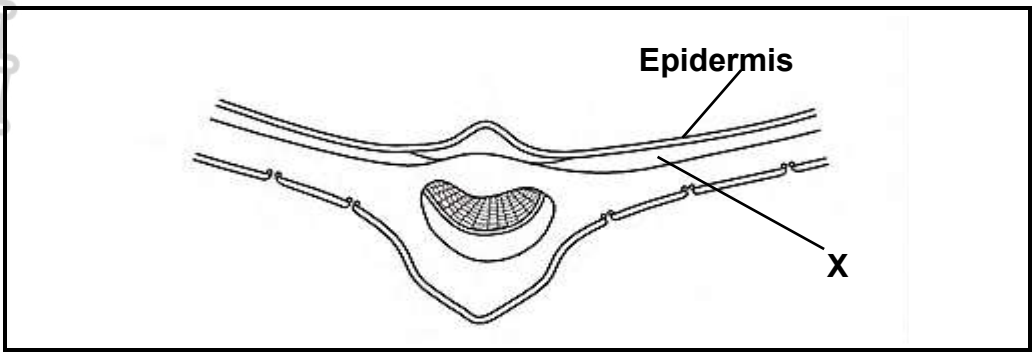
1.1.3 The part of the alimentary canal in which the villus is found:

A Oesophagus
B Large intestine
C Stomach
D Small intestine

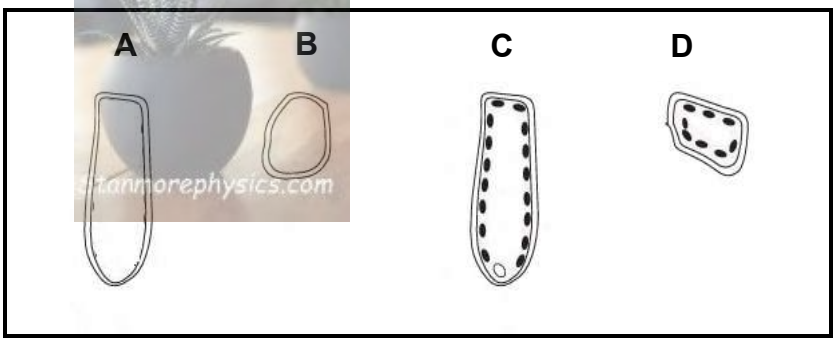
1.1.4 Factor(s) which facilitate oxygen absorption into the human body:

A Air breathed in has less oxygen than air breathed out
B Alveoli having thick walls for oxygen storage and a large surface area
C There are few alveoli in each lung
D The concentration of oxygen in the blood is lower than in the alveoli

1.1.5 A cross-section of a dicot leaf is shown below.



Which type of cell is expected to be found at layer **X**?



1.1.6 The table below shows the composition of four air samples.

AIR SAMPLE	O_2 %	CO_2%	N_2 %
P	21	0,04	78
Q	16	4,04	78
R	4	0,40	39
S	20	4,00	39

Which air sample represents **inspired air** and which air sample represents **expired air**?

	INSPIRED AIR	EXPIRED AIR
A	S	R
B	P	S
C	P	Q
D	Q	S

1.1.7 Substances which are removed from the blood during tubular secretion.

A Water, sodium ions and hormones
B Glucose and sodium ions
C Undigested food and creatine
D Hormones, urea and creatine

1.1.8 The correct path that urine takes through the excretory system

A Kidney → urethra → bladder → ureter
B Kidney → ureter → bladder → urethra
C Bladder → kidney → ureter → urethra
D Ureter → kidney → urethra → bladder

1.1.9 Osmoregulation is the way the body controls the amount of water and salts it contains.

Consider the table below. What is most likely to happen in the body on a cold day when a person drinks a lot of water?

	UREA CONCENTRATION	RENAL TUBULE PERMEABILITY	URINE VOLUME
A	Low	Permeable	High
B	High	Impermeable	Low
C	Low	Impermeable	Low
D	High	Permeable	High

1.1.10 The inside of the trachea (windpipe) is lined with a special tissue called ciliated columnar epithelium. This tissue has tiny hair-like structures called cilia.

What is the main function of the cilia in the trachea (windpipe)?

A Increase surface area for gaseous exchange
B Help gases move quickly because they are close to blood vessels
C Trap dirt and pathogenic (harmful) microbes (germs)
D Excrete metabolic waste products (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.

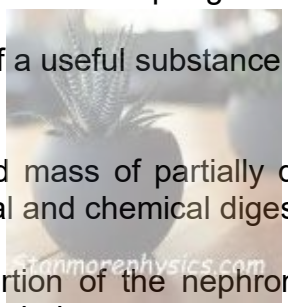
1.2.1 Process of taking air into and expelling it from the lungs

1.2.2 The hormone which assists in the regulation of sodium ions

1.2.3 Large flat and uneven teeth used for grinding and crushing food

1.2.4 Region which connects the nasal cavity with larynx and leads into the trachea and the oesophagus

1.2.5 Release of a useful substance (enzymes, saliva) from cells or glands



1.2.6 Semi-liquid mass of partially digested food which has gone through mechanical and chemical digestive processes of the stomach

1.2.7 Folded portion of the nephron between the loop of Henle and the collecting tubule

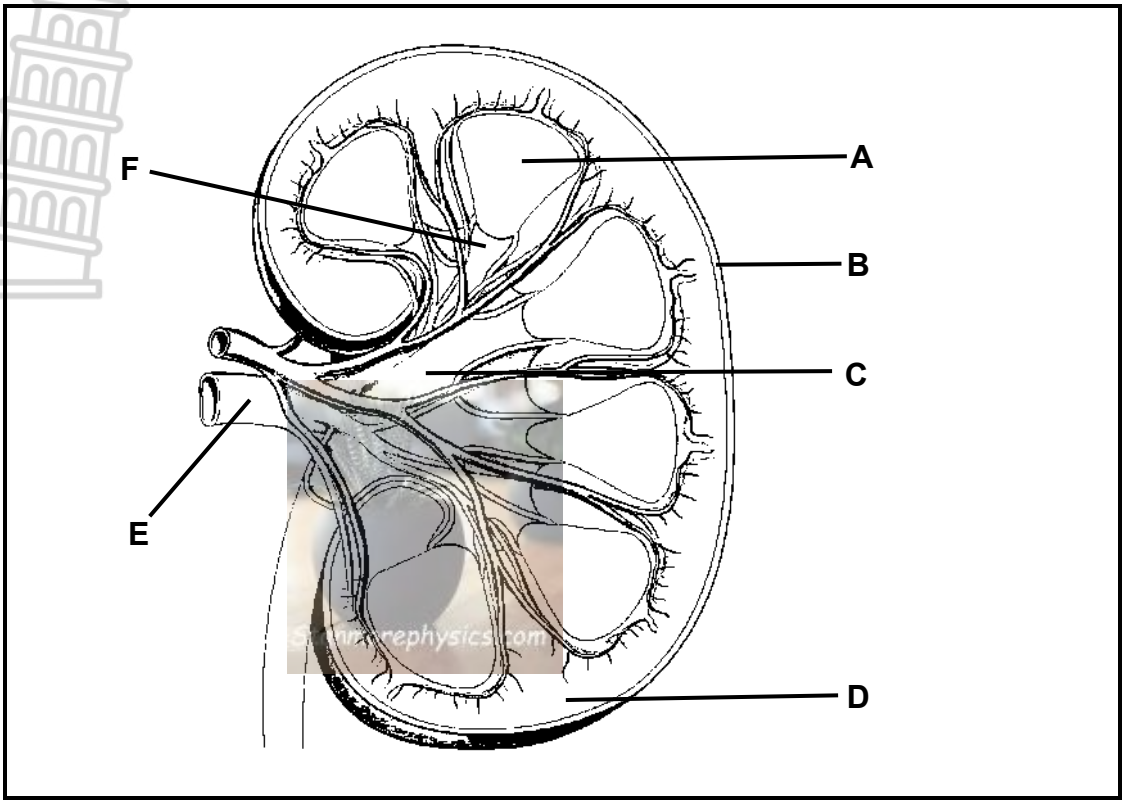
1.2.8 Process which requires no energy to move water from a region of high water potential to a region of low water potential (8)

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 1.3.4) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Part(s) of the chloroplast in which chlorophyll is located	A: Thylakoid B: Lamellae
1.3.2	Cell(s) which make up the surface of the villus	A: Compound columnar B: Goblet
1.3.3	Structure(s) which assist in keeping the trachea open	A: Circular muscle B: Epiglottis
1.3.4	A part of the blood circulatory system of the kidney	A: Convoluted tubules B: Renal calyxes

(4 x 2) (8)

1.4 A macroscopic diagram of the kidney is shown below.



1.4.1 Identify the label and state the name of the …

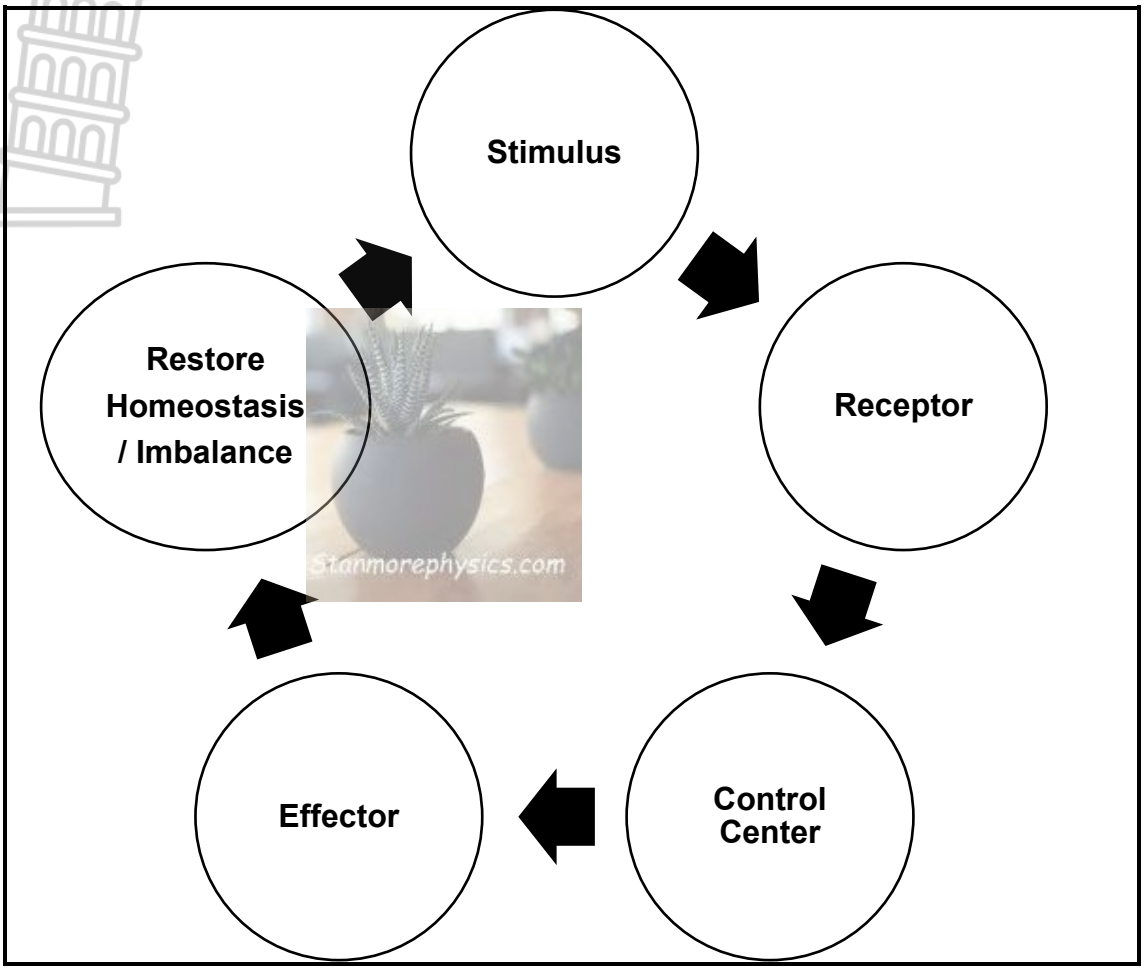
(a) cup-shaped structure which surrounds the renal papillae and funnels urine. (2)

(b) part that has layers of fat (adipose tissue) to protect the kidney from mechanical injury. (2)

(c) part that collects urine from the calyces and channels it into the ureter. (2)

1.4.2 Explain why part **D** appears darker red or brown compared to part **A**. (1)

1.5 Negative feedback mechanisms are essential processes which ensure homeostasis. A simple negative feedback loop with its components is shown below.



1.5.1 Define the term *homeostasis*. (2)

1.5.2 Carbon dioxide regulation is an important example of a negative feedback mechanism.

When the level of carbon dioxide in the human body becomes too high which part of the body acts as the:

(a) Receptor (1)

(b) Effector (2)

1.5.3 Give TWO reasons why it is important for carbon dioxide levels in the blood not to remain high. (2)

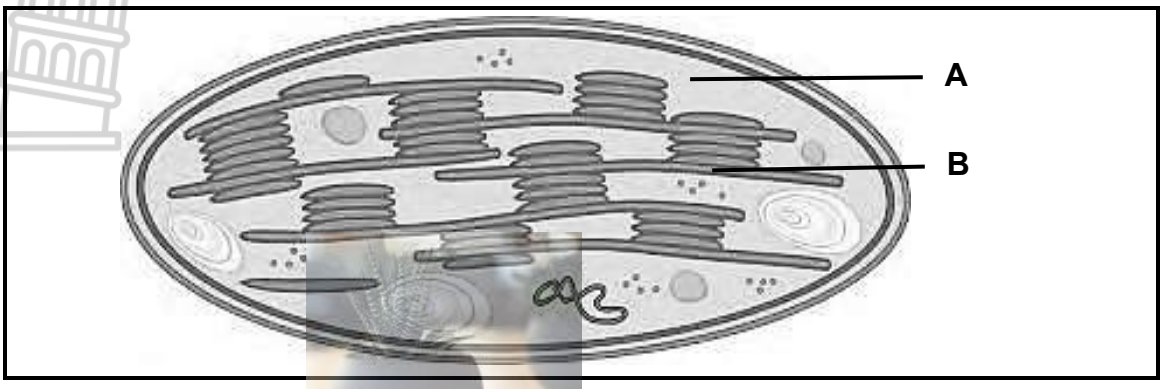
[50]

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the organelle below that is found in a cell.



2.1.1 Identify the organelle shown above. (1)

2.1.2 State TWO visible reasons for the answer given to QUESTION 2.1.1. (2)

2.1.3 Beside their locations, tabulate TWO differences between the processes which occur at **A** and **B**. (5)

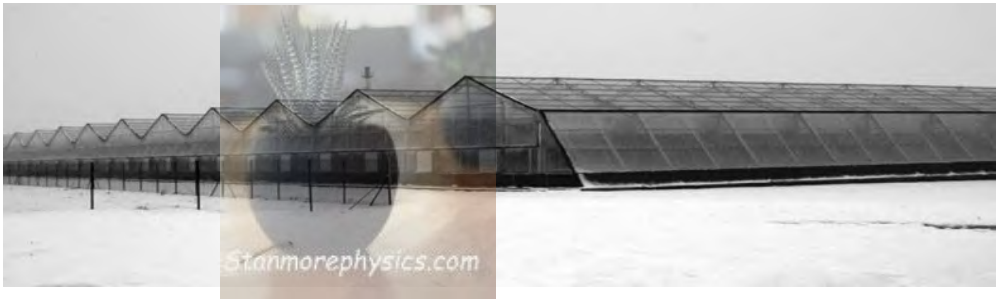
2.1.4 List TWO biological importances of the process which occurs within the given organelle. (2)

2.1.5 Describe ONE visible structural feature within the organelle that makes it suitable for its primary function. (2)

2.2 Read the extract below and answer the questions that follow.

GREENHOUSES HELP GROW FOOD EVEN WHEN THE WEATHER IS UNFAVOURABLE

In Russia, winters are very cold and the time for growing food is short. Greenhouses give a safe and warm space for growing vegetables all year round, even when it is −25 °C outside. In places like Siberia, people can now grow local vegetables instead of buying them from other countries. Russian greenhouses use clean energy from the sun (solar) and the earth (geothermal). Greenhouses also help people get jobs and support local businesses.



2.2.1 List ONE benefit of greenhouse systems on the local community. (1)

2.2.2 Explain how Russian greenhouses are energy efficient. (2)

2.2.3 The best temperature for growing plants in a greenhouse is 28 °C. Outside, the temperature is −25 °C.

(a) Give TWO ways to keep the temperature warm inside the greenhouse when it is very cold outside. (2)

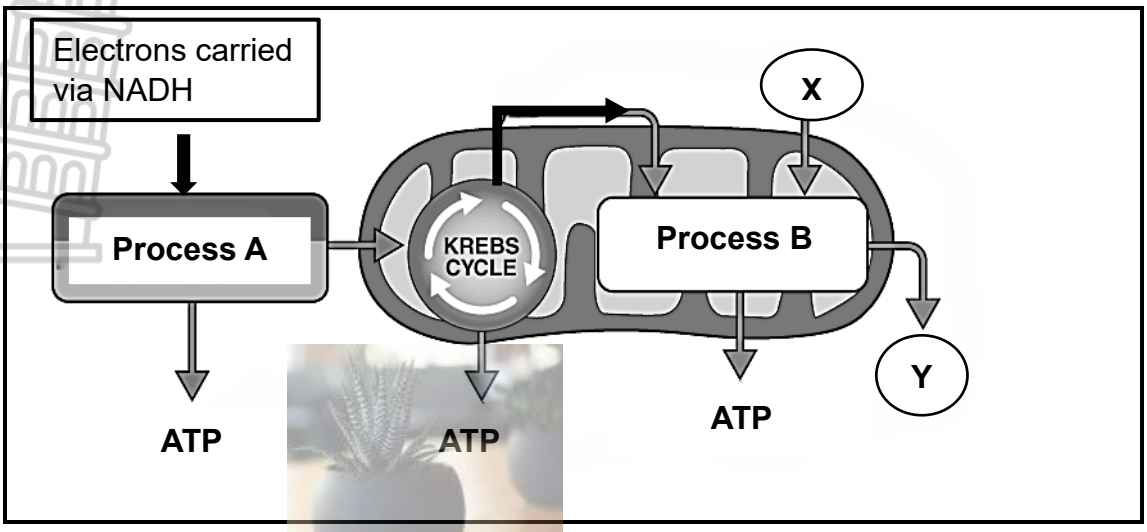
(b) Calculate the percentage difference in temperature between outside (−25 °C) and inside (28 °C) the greenhouse. (3)

2.2.4 Greenhouses use UV-A and UV-B light bulbs when there is not enough sunlight.

(a) Briefly discuss the relationship between light intensity and the photosynthetic rate of plants. (3)

(b) Explain ONE limiting factor of light intensity in plants. (2)

2.3 Cellular respiration is a 3-phase process in which ATP is formed. A schematic representation of this process is given below.



2.3.1 Identify:

(a) Process **A** (1)

(b) Reactant **X** (1)

(c) Product **Y** (1)

2.3.2 Is process **A** an anabolic or catabolic process?
Give ONE reason for the answer. (2)

2.3.3 Between **A** and **B**, which process produces more ATP?
Give a reason for the answer. (2)

2.3.4 Describe the events of the Krebs cycle. (4)

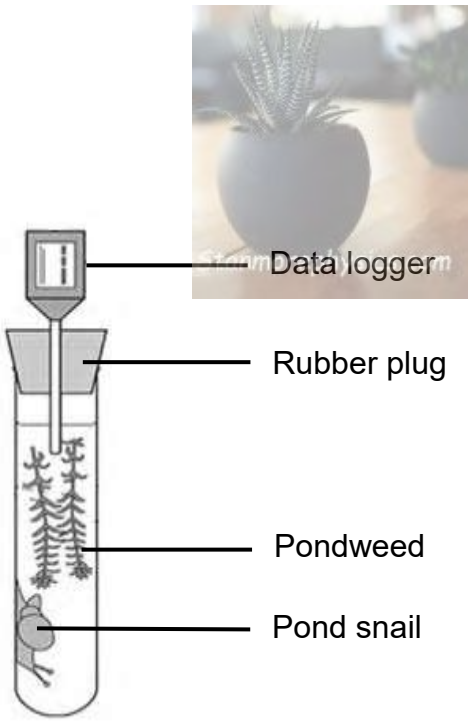
2.3.5 An athlete complained about muscle cramps after running a marathon for four and a half hours.

Using your understanding of cellular respiration, explain why this has occurred. (3)

2.4 A scientist investigated how photosynthesis and respiration affect carbon dioxide levels in water. The experiment used pondweed (a plant) and a pond snail (an animal).

Experimental design:

- The apparatus was left in a well-lit room for 5 days.
- After 5 days, the scientist completely covered the boiling tube with black paper.
- A data logger was used to record carbon dioxide (CO_2) levels every day for 15 days.
- The results are shown in the table below.



TIME IN DAYS	CARBON DIOXIDE CONCENTRATION IN ARBITRARY UNITS
0	5
1	5
2	5
3	5
4	5
5	5
6	5,3
7	5,4
8	5,5
9	6,4
10	6,5
11	6,5
12	6,6
13	6,8
14	7,1
15	7,4

2.4.1 Identify the dependent variable of the investigation. (1)

2.4.2 State a suitable control for the investigation. (2)

2.4.3 Account for the carbon dioxide concentration between day 0 and day 5. (2)

2.4.4 Suggest a reason why carbon dioxide concentration increased after day 5. (2)

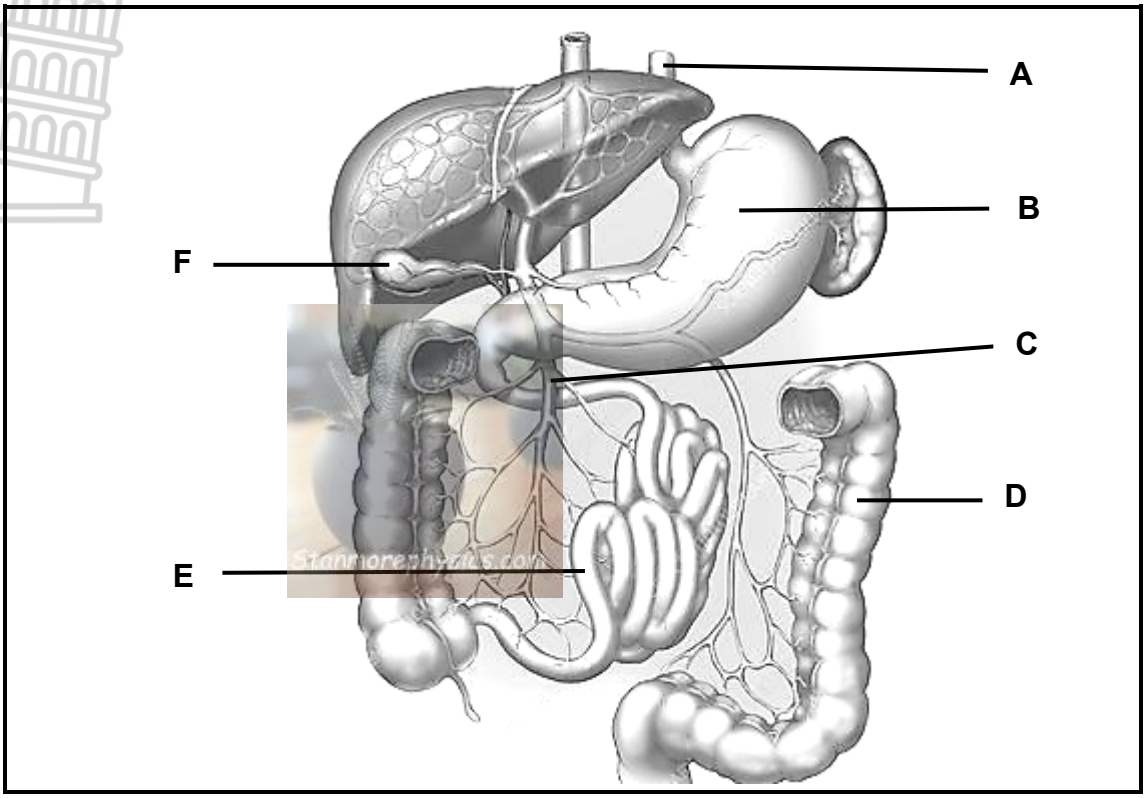
2.4.5 The snail died on day 10. Explain why this happened. (2)

2.4.6 State a suitable conclusion for the investigation. (2)

[50]

QUESTION 3

3.1 Below is a diagram of some parts of the digestive system.



3.1.1 Provide suitable labels for:

(a) Tube **A** (1)

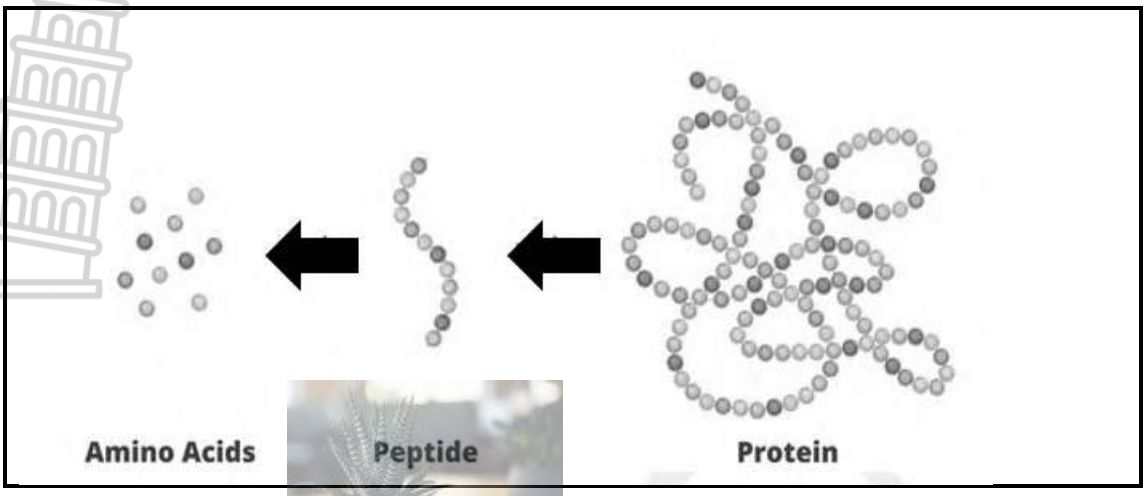
(b) Vein **C** (1)

3.1.2 Explain THREE ways structure **E** is adapted for its function. (6)

3.1.3 Distinguish between the *physical* and *chemical* digestion which occur simultaneously in structure **B**. (4)

3.1.4 Explain why fat absorption is still possible, despite structure **F** being surgically removed. (2)

3.2 The diagram below shows one of the five phases of human nutrition.



3.2.1 Based on the diagram above, name the phase of human nutrition shown. Also, name the enzyme responsible for breaking down proteins during this phase. (2)

3.2.2 Where in the human body will the enzyme mentioned in QUESTION 3.2.1 be produced? (1)

3.2.3 During which phase of human nutrition will proteins be formed in the human body? (1)

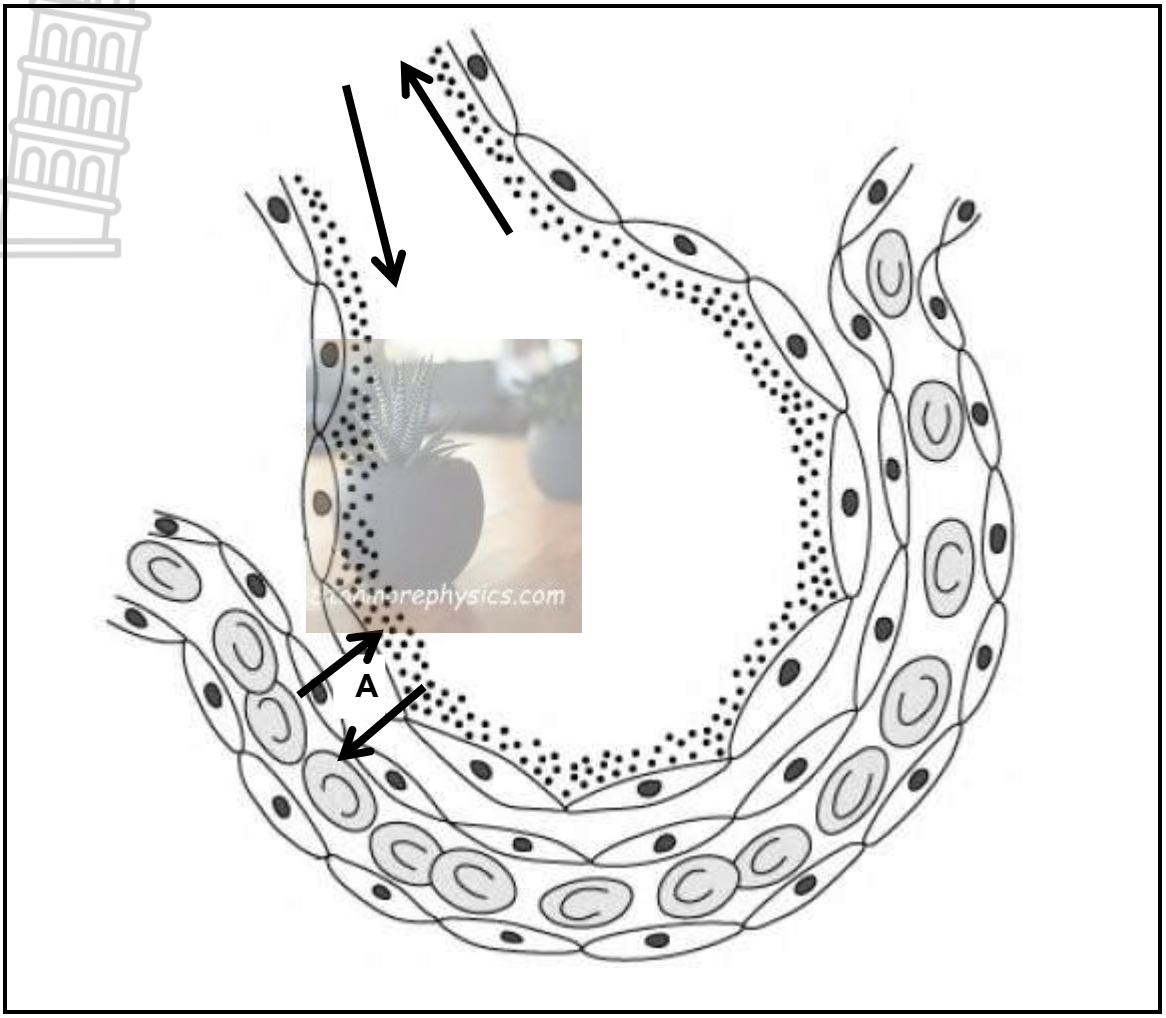
3.2.4 Identify and discuss the final phase of human nutrition. Mention the structure(s) involved and their biological importance. (3)

3.3 Bread is masticated in the human mouth.

3.3.1 Explain the importance of mastication in human nutrition. (2)

3.3.2 Explain why bread tastes sweeter after a short period of time in the mouth. (2)

3.4 The diagram below shows an alveolus, a small, hollow, air-filled sac located in the lungs.



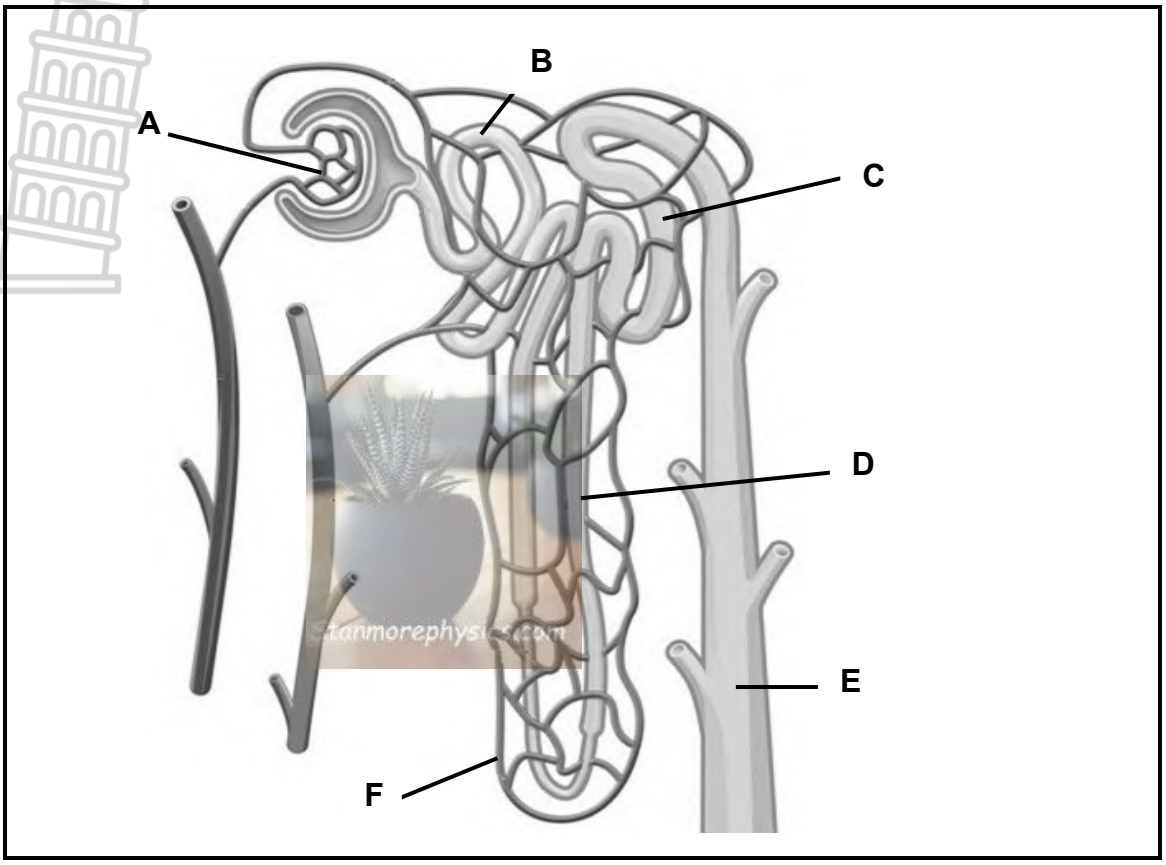
3.4.1 Identify the type of movement represented by **A**. (1)

3.4.2 Identify and describe TWO visible features of the alveolus that make it an effective gaseous exchange surface. (4)

3.4.3 List TWO ways in which oxygen is transported in the body. (2)

3.4.4 Describe how a bullet wound to the chest could affect effective ventilation of the lungs. (5)

3.5 The diagram below shows a nephron.



3.5.1 List TWO letters from the nephron diagram that are located in the renal cortex. (2)

3.5.2 Identify and discuss TWO significant processes which occur between the renal tubule and network **F**. (4)

3.5.3 Bartter syndrome is a rare genetic disorder which causes ineffective reabsorption of sodium ions, despite aldosterone's secretion. Sodium pumps are also unable to actively pump sodium out.

(a) Identify and write down the name of the part Bartter syndrome will most likely affect. (2)

(b) Discuss how Bartter syndrome will negatively affect osmoregulation. (5)

[50]

TOTAL SECTION B: 50
GRAND TOTAL: 150

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NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

LIFE SCIENCES P1
MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 10 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is 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 a whole process is given when only a part of it is required**
   Read all and credit the relevant part.

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 provincial 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. Marking guideline will allocate marks for units separately.

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

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 learners' 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 A ✓✓
1.1.2 C ✓✓
1.1.3 D ✓✓
1.1.4 D ✓✓
1.1.5 C ✓✓
1.1.6 C ✓✓
1.1.7 D ✓✓
1.1.8 B ✓✓
1.1.9 A ✓✓
1.1.10 C ✓✓ (10 x 2) (20)

1.2
1.2.1 Breathing ✓/ Ventilation
1.2.2 Aldosterone ✓
1.2.3 Pre-molars/Molars ✓
1.2.4 Pharynx ✓
1.2.5 Secretion ✓
1.2.6 Chyme ✓
1.2.7 Distal convoluted tubule ✓
1.2.8 Osmosis ✓ (8)

1.3
1.3.1 A ONLY ✓✓
1.3.2 B ONLY ✓✓
1.3.3 NONE ✓✓
1.3.4 NONE ✓✓ (8)

1.4
1.4.1 (a) F ✓ – Renal calyx ✓ (2)
(b) B ✓ – Renal capsule ✓ (2)
(c) C ✓ – Renal pelvis ✓ (2)

1.4.2 Part D is darker because it contains more blood vessels.
OR
Part A is lighter because it has fewer blood vessels. (1)

1.5
1.5.1 - The body's ability to maintain a stable internal environment ✓
- ✓ despite changes in the external environment (2)

1.5.2 (a) Chemoreceptors of the carotid artery ✓ (1)

(b) Intercostal muscles, ✓ diaphragm ✓ (respiratory muscles ✓), heart ✓ (Any 2 x 1) (2)

1.5.3 - The blood becomes increasingly acidic ✓ /cell death
- Less aerobic respiration can take place ✓ /no ATP created (2)

[50]

TOTAL SECTION A: 50

QUESTION 2

2.1 2.1.1 Chloroplast ✓ (1)

2.1.2
- Presence of thylakoid/grana/inter-grana disks/lamellae ✓
- Stroma present ✓
- Starch granules present ✓

(FIRST TWO ONLY) (MAX 2)
(Do not accept double membrane as it is not a distinct identifying characteristic as many organelles have this.) (2)

2.1.3

Light (dependent) Phase/B	Dark (light-independent) Phase/A
Requires light	Does not require light
Photolysis occurs	No photolysis occurs
CO_2 is not absorbed	CO_2 is absorbed
No glucose is produced	Glucose is produced

(FIRST TWO ONLY) ✓ per correct difference (MAX 4) + Table ✓
NOTE: Differences must match correctly to be awarded marks. (5)

2.1.4
- Produces food for heterotrophic organisms/Forms basis of food chains ✓
- Production of oxygen ✓
- Absorption and storage of carbon dioxide ✓
- Maintaining/balancing a constant level of oxygen in the environment (aquatic/terrestrial) ✓

(MARK FIRST TWO ONLY) (2)

2.1.5
- Presence of many grana/thylakoids/lamella ✓
  It holds a significant amount of chlorophyll (pigment) to maximise that rate of photosynthesis ✓
- Large surface area ✓
  To maximise the amount of radiant energy which can enter it✓
- It has a (fluid)stroma ✓
  Allowing for chemical reactions to take place/products of the light phase can move into the dark phase ✓

(MARK FIRST ONE ONLY) (1 x 2) (2)

2.2 2.2.1
- Greenhouses create jobs in rural areas and support the local economy. ✓
- Greenhouses help grow local vegetables, so people don't have to import food. ✓
- Greenhouses allow farmers to grow crops all year, even when it's cold. ✓

(MARK FIRST ONE ONLY) (1)

2.2.2
- Greenhouses use geothermal and solar energy, ✓ which reduces the need to use electricity from the local power grid and helps save costs. ✓ (2)

2.2.3 (a)
- Use of heaters ✓ powered by geothermal energy.
- Insulated material ✓ (like double walls or plastic layers) to keep the heat inside the greenhouse

(MARK FIRST TWO ONLY) (2)

(b) $\frac{-25-28}{-25}$ ✓ x 100 ✓ = 212 ✓% change

OR

$\frac{28-(-25)}{25}$ ✓ x 100 ✓ = 212 ✓% change (3)

2.2.4 (a)
- As light intensity increases, the rate of photosynthesis increases/light intensity is directly proportional to rate of photosynthesis ✓
- Up to a point ✓
- Beyond this point, further increases to light intensity do not affect the rate of photosynthesis ✓ (3)

(b)
- Chlorophyll is saturated/insufficient ✓
- Not enough enzymes/transfer chains to assist with photosynthesis ✓

(MARK FIRST ONE ONLY) (2)

2.3 2.3.1 (a) Glycolysis (1)

(b) Oxygen (1)

(c) Carbon dioxide (1)

2.3.2 - Catabolic ✓*
Glucose is broken down into pyruvic acid ✓
OR
A six-carbon glucose molecule is broken to form two three-carbon chain pyruvic acid molecules ✓

(Compulsory ✓* + ANY OTHER ✓) (2)

2.3.3 - B ✓*
Because oxygen is used ✓ as the final electron acceptor, allowing the chain to function continuously **OR**
The process drives the production of about 36 ATP molecules, while glycolysis only produces 2 ATPs ✓ (2)

2.3.4 - Can only take place if oxygen is present ✓
- Occurs inside of the mitochondrion ✓
- Releases carbon dioxide and high energy hydrogen ions (H+) ✓
- Transports hydrogen atoms to the third stage ✓ (4)

2.3.5 - Not enough oxygen was available ✓ to his muscles to undergo aerobic respiration
- Pyruvic acid was converted into lactic acid/Lactic acid fermentation occurred ✓
- Lactic acid caused his muscles to cramp ✓ (3)

2.4 2.4.1 Carbon dioxide concentration ✓ (in arbitrary units) (1)

2.4.2 - Duplicating the experiment with all variables kept the same ✓
- Not including the pondweed and pond snail/independent variables ✓ (2)

2.4.3 - The amount of CO_2 released during cellular respiration ✓
- is utilised by the pondweed during photosynthesis ✓ (2)

2.4.4 - Photosynthesis could no longer take place ✓
- as no light was available ✓ (2)

2.4.5 - The environment was anoxic/lacked sufficient O_2 ✓*
- For cellular respiration to occur ✓
- The water became too acidic to support aquatic life ✓
(✓* plus any other ✓) (2)

2.4.6 Photosynthesis and cellular respiration are complementary processes ✓ regulating CO_2 concentration in the environment. ✓
OR
Photosynthesis removes carbon dioxide ✓ and produces oxygen. ✓
OR
When there is no light, photosynthesis stops ✓ and carbon dioxide increases due to respiration. ✓ (2)
[50]

QUESTION 3

3.1 3.1.1 (a) Oesophagus ✓ (1)

(b) Hepatic portal vein ✓ (1)

3.1.2
- The small intestine is long ✓*
  Increasing surface area for absorption ✓
- It has circular folds ✓*
  Increasing surface area for absorption ✓
- It is lined with millions of villi ✓*
  Increasing surface area for absorption ✓
- It is richly supplied with blood vessels ✓*
  Allowing for an efficient transport system of nutrients from the gut to the body ✓
- It has smooth muscle tissue (circular and longitudinal) ✓*
  To efficiently move food and indigestible matter through the gut ✓
- Has a mucus rich layer on its surface ✓*
  To allow for nutrients to dissolve into and to be absorbed into the body ✓ / to lubricate / act as a medium for chemical reactions

(MARK FIRST THREE ONLY) **(✓* compulsory mark)** (3 x 2) (6)

3.1.3 **Physical digestion**
- Occurs due to the churning movements ✓ of the stomach.
- Smooth muscle layers involuntarily contract, mixing the bolus of food with gastric juices ✓

Chemical digestion
- occurs as gastric juices/enzymes react with exposed surface ✓ of bolus/chyme
- Breaking insoluble macroscopic molecules into their soluble forms✓/ (accept suitable example). (4)

3.1.4
- Bile is produced by the liver ✓
- Bile will still enter the duodenum and fat emulsification will take place ✓ (2)

3.2 3.2.1
- Digestion ✓*
- Proteases ✓ (2)

3.2.2 Stomach ✓ (1)

3.2.3 Assimilation ✓ (1)

3.2.4
- Egestion ✓*
- Undigested materials and waste products are transported through the colon ✓ where most water and mineral salts are absorbed ✓
- Undigested material is temporarily stored in the rectum ✓ until it is excreted through the anus ✓

(✓* COMPULSORY + ANY OTHER TWO) (3)

3.3 3.3.1 Breaking of larger food pieces into smaller pieces ✓ making it easier to swallow increases the surface area of the food so that digestive enzymes can work more effectively. ✓ (2)

3.3.2
- Bread contains starch.
- During chewing, an enzyme in saliva called amylase breaks down starch ✓ into sugar (maltose), ✓ which tastes sweet. (2)

3.4 3.4.1 Diffusion ✓ (1)

3.4.2
- Mucus layer present inside the alveolus ✓*
  Allowing for O_2 and CO_2 to be dissolved as diffusion occurs ✓
- Alveolus is only one squamous epithelium layer thick ✓*
  Promoting easy diffusion into/out of the wall of the alveolus ✓
- Blood capillary is only one cell layer thick ✓*
  Promoting easy diffusion into/out the wall of the alveolus ✓
- Richly supplied with blood vessel(s) ✓*
  Allowing for efficient gaseous exchange (of CO_2 and O_2) to occur ✓

(ANY TWO ✓* with corresponding reasoning ✓) (2 x 2) (4)

3.4.3
- As oxyhaemoglobin ✓
- Dissolved within blood plasma ✓ (2)

3.4.4
- Blood would move into the lung/alveoli ✓
  Limiting/preventing efficient gaseous exchange ✓
- Pressure would no longer be effectively regulated/ Lung will collapse ✓
  Impeding the processes of inhalation and exhalation as pressure is required to pull air into the lung/force air out ✓
- Lung tissue/alveoli/ bronchioles would be damaged ✓
  Limiting/preventing gas pathways through the lung ✓

(MAX. 5) (5)

3.5 3.5.1
- A ✓ B ✓ C ✓

(MARK FIRST TWO ONLY) (2)

3.5.2
- Tubular reabsorption ✓*
  (Useful) solutes and water are moved from the renal tubule back into the peritubular capillary network/F
- Tubular secretion ✓*
  Waste products and toxins are moved from F into the renal tubule ✓

(✓* with its corresponding ✓) (4)

3.5.3 (a) D ✓ - Ascending limb of Henle/loop of Henle ✓ (2)

(b)
- The renal medulla will no longer be hypertonic in its sodium concentration ✓
- No osmotic water potential gradient would be created ✓
- Between the filtrate/medulla tissue fluid/blood ✓
- Less/no water will be drawn in the renal medulla ✓
- Less water would be reabsorbed back into the blood ✓ (5)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150