



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2014**

**LIFE SCIENCES P1**

**MARKS: 150**

**TIME: 2½ hours**



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This question paper consists of 17 pages.

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**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions.

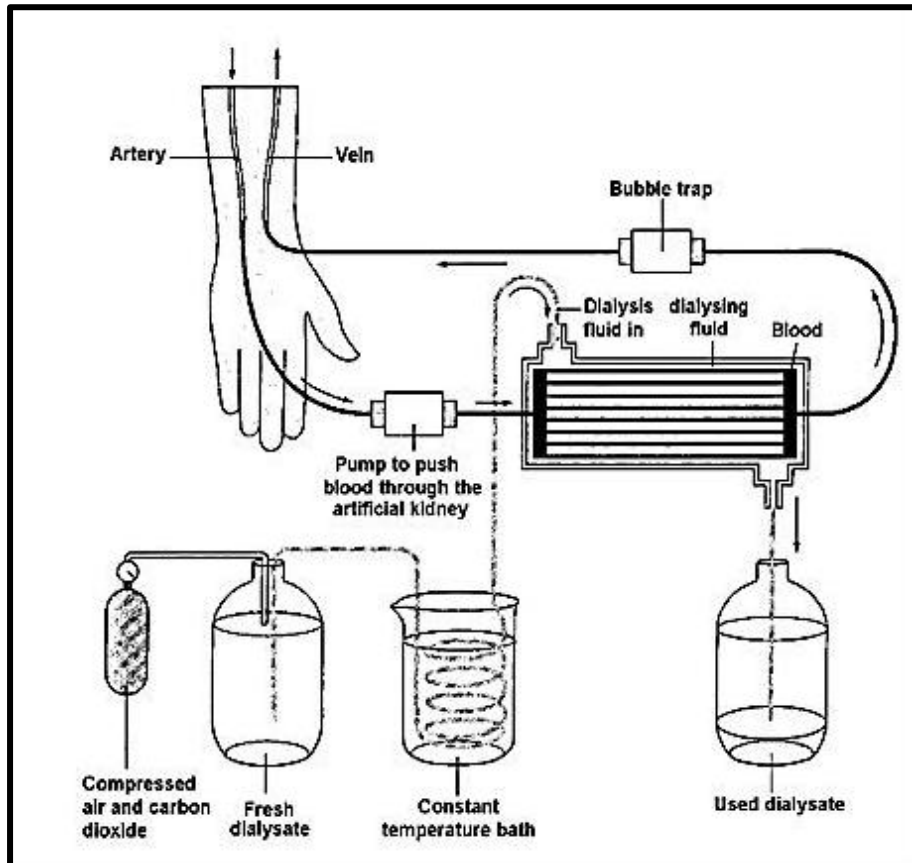
1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Present your answers according to the instructions of each question.
5. Do ALL drawings in pencil and label them in blue or black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

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 (1.1.1–1.1.9) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The equipment below is used to treat the failure of which of the following organs?



- A Heart
- B Kidney
- C Liver
- D Lungs

1.1.2 Which ONE of the following is NOT the direct cause of kidney damage?

- A High blood pressure
- B Bilharzia parasite
- C Diabetes
- D High cholesterol

- 1.1.3 The cartoon below illustrates the possible human impact on our environment. Study the cartoon and answer QUESTIONS 1.1.3–1.1.5.



Which ONE of the following basic requirements for human survival is produced by the innovative design, as illustrated in the cartoon?

- A Water
  - B Antibodies
  - C Oxygen
  - D Optimum body temperature
- 1.1.4 The bio-chemical reaction that yields the by-product mentioned in QUESTION 1.1.3 is ...
- A cellular respiration.
  - B protein synthesis.
  - C transpiration.
  - D photosynthesis.

1.1.5 Study the following statements:

- (i) A light source is provided day and night.
- (ii) A steady supply of water is provided.
- (iii) The light source is switched off at night.
- (iv) A steady supply of carbon dioxide is guaranteed.

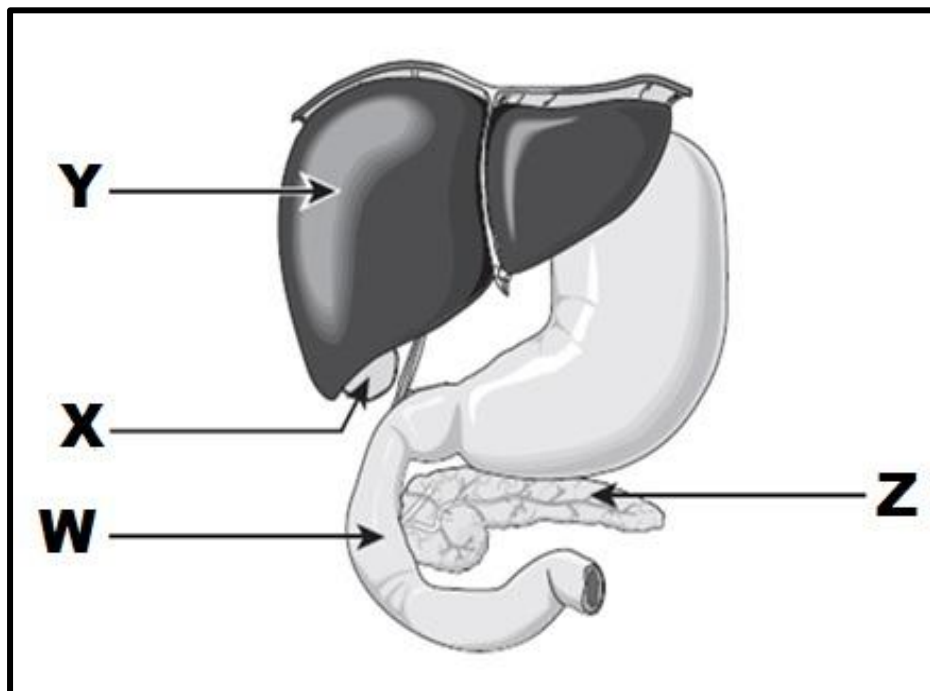
Which ONE of the following combinations is designed to make sure that there is a continuous supply of the by-product mentioned in QUESTION 1.1.3, for human survival?

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

1.1.6 Where does the emulsification of fat occur?

- A In the liver.
- B In the colon.
- C In the gall bladder.
- D In the small intestine.

1.1.7 Which labelled structure secretes a hormone which causes an increased production of glycogen?



- A W
- B X
- C Y
- D Z

1.1.8 What structures increase the surface area in the lungs?

- A Alveoli
- B Bronchi
- C The villi
- D The pleural membranes

1.1.9 Which ONE of the following represents density dependent and density independent factors?

	<b>Density dependent factors</b>	<b>Density independent factors</b>
<b>A</b>	Disease and competition	Flood and drought
<b>B</b>	Fire and flood	Food supply and predation
<b>C</b>	Food supply and disease	Competition and predation
<b>D</b>	Competition and fire	Flood and drought

(9 x 2) (18)

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

1.2.1 The cartilaginous structure that contains vocal cords

1.2.2 The blood cells that transport oxygen

1.2.3 Gradual increase in the average temperature of Earth's biosphere

1.2.4 The maximum number of individuals that can be accommodated by the resources of a particular habitat

1.2.5 Movement of individuals, or the part responsible for reproduction, into or out of a population area

1.2.6 A group of organisms of the same species living together in the same habitat and capable of random interbreeding

1.2.7 The type of plastid that absorbs radiant energy during photosynthesis

1.2.8 The acid that accumulates in the muscles of humans during continuous strenuous physical activity

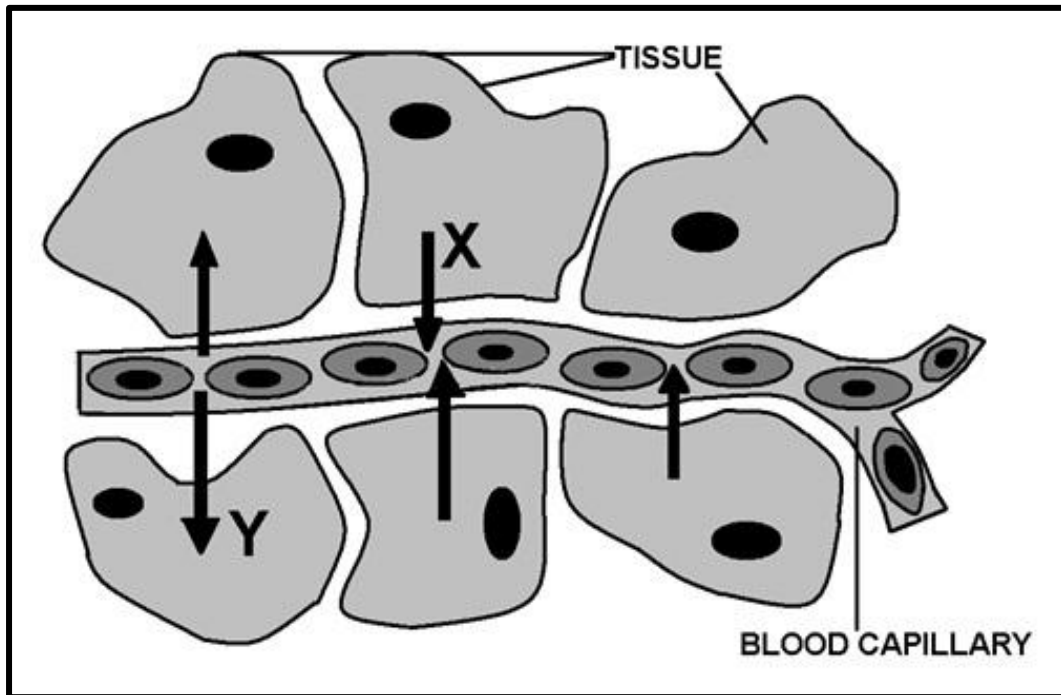
(8 x 1) (8)

- 1.3 Indicate whether each of the statements 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 number (1.3.1–1.3.9) in the ANSWERBOOK.

	<b>COLUMN I</b>		<b>COLUMN II</b>
1.3.1	Oxidation of glucose in a living cell	A	Anabolism
		B	Catabolism
1.3.2	Light dependent phase of photosynthesis	A	Grana
		B	Stroma
1.3.3	Anaerobic respiration in yeast cells	A	Carbon dioxide
		B	Ethyl alcohol
1.3.4	Blockage of urine flow	A	Gall stones
		B	Renal stones
1.3.5	Heavy ecological footprint	A	TV stays on day and night
		B	Leaking tap never gets fixed
1.3.6	Resource partitioning	A	Reduce overlapping of ecological niches
		B	Increase in biodiversity
1.3.7	Changes in species composition over time in a habitat that was not previously inhabited by organisms	A	Commensalism
		B	Mutualism
1.3.8	Simple sampling	A	Indirect technique
		B	Direct technique
1.3.9	The average number of children born in one generation per female of child bearing age	A	Fertility
		B	Fecundity

(9 x 2) (18)

- 1.4 The diagram below illustrates internal gaseous exchange. Study the diagram and answer the questions.



- 1.4.1 Which respiratory gas is represented by X and Y respectively? (2)
- 1.4.2 Which physiological process is responsible for the movement of gases as indicated by the arrows? (1)
- 1.4.3 Name TWO different ways in which the gas referred as X is transported in the blood. (2)
- 1.4.4 Which protein plays an important role in the transport of the gas referred to as Y. (1)

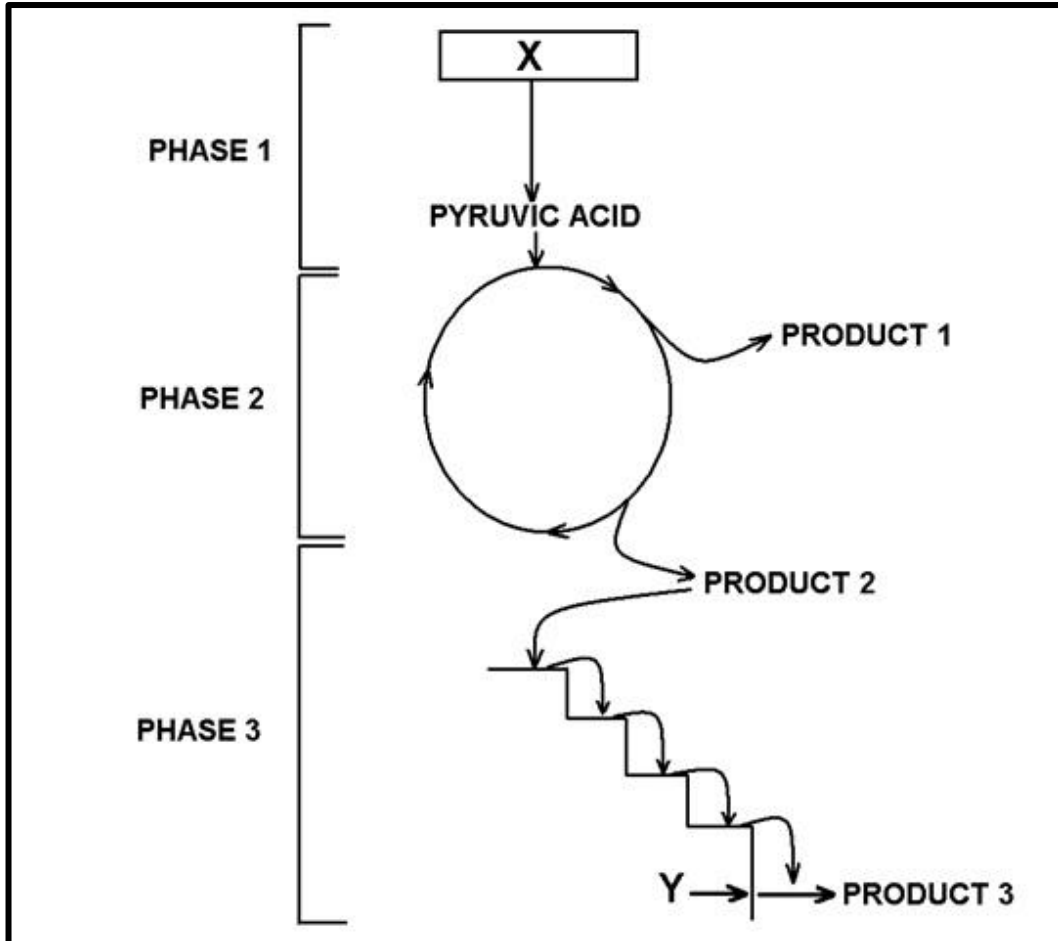
**TOTAL SECTION A: 50**



**SECTION B**

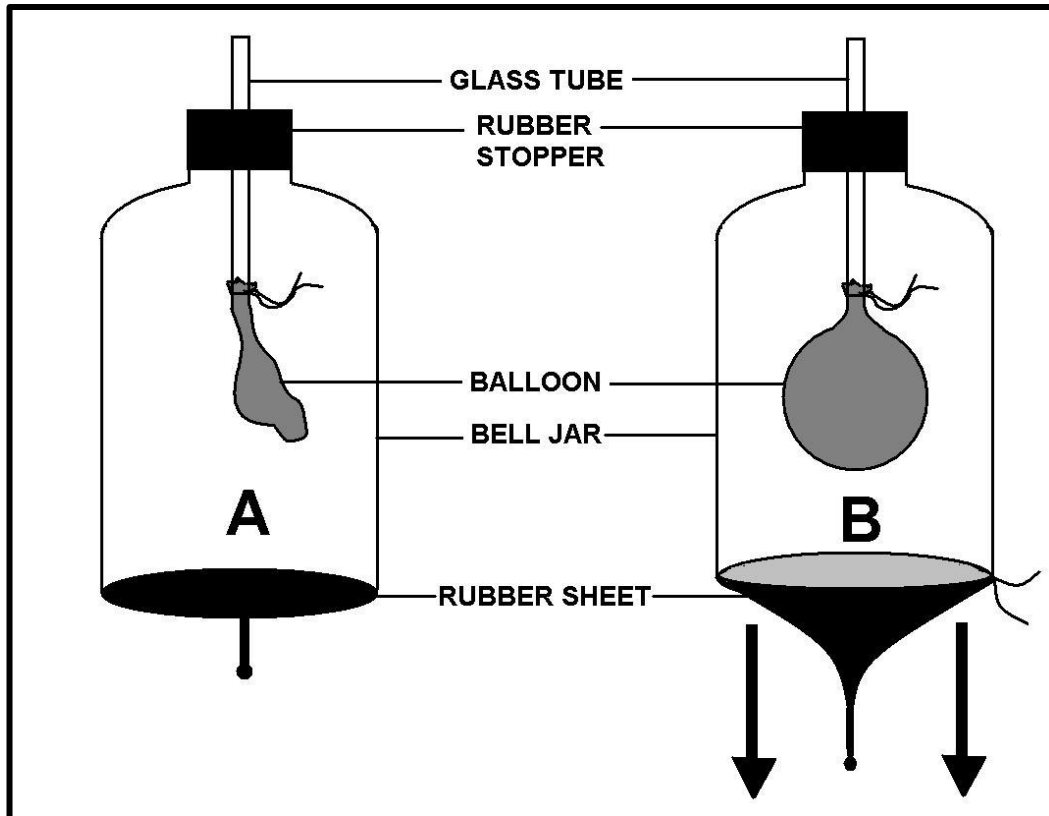
**QUESTION 2**

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



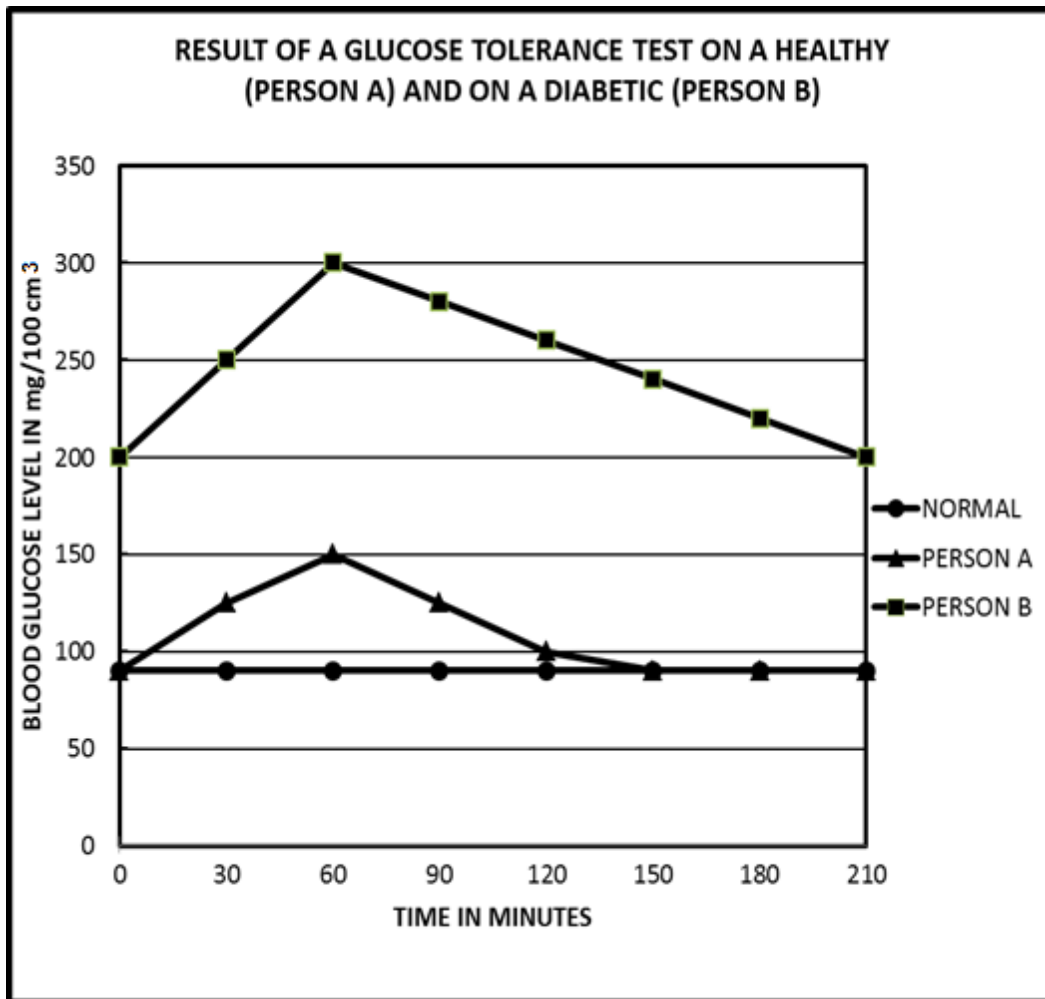
- 2.1.1 Identify phases 1, 2 and 3. (3)
- 2.1.2 Name X and Y. (2)
- 2.1.3 State the origin of X and Y. (2)
- 2.1.4 Identify products 1, 2 and 3. (3)

2.2 The diagram below illustrates the mechanism of breathing. Study the diagram and answer the questions.



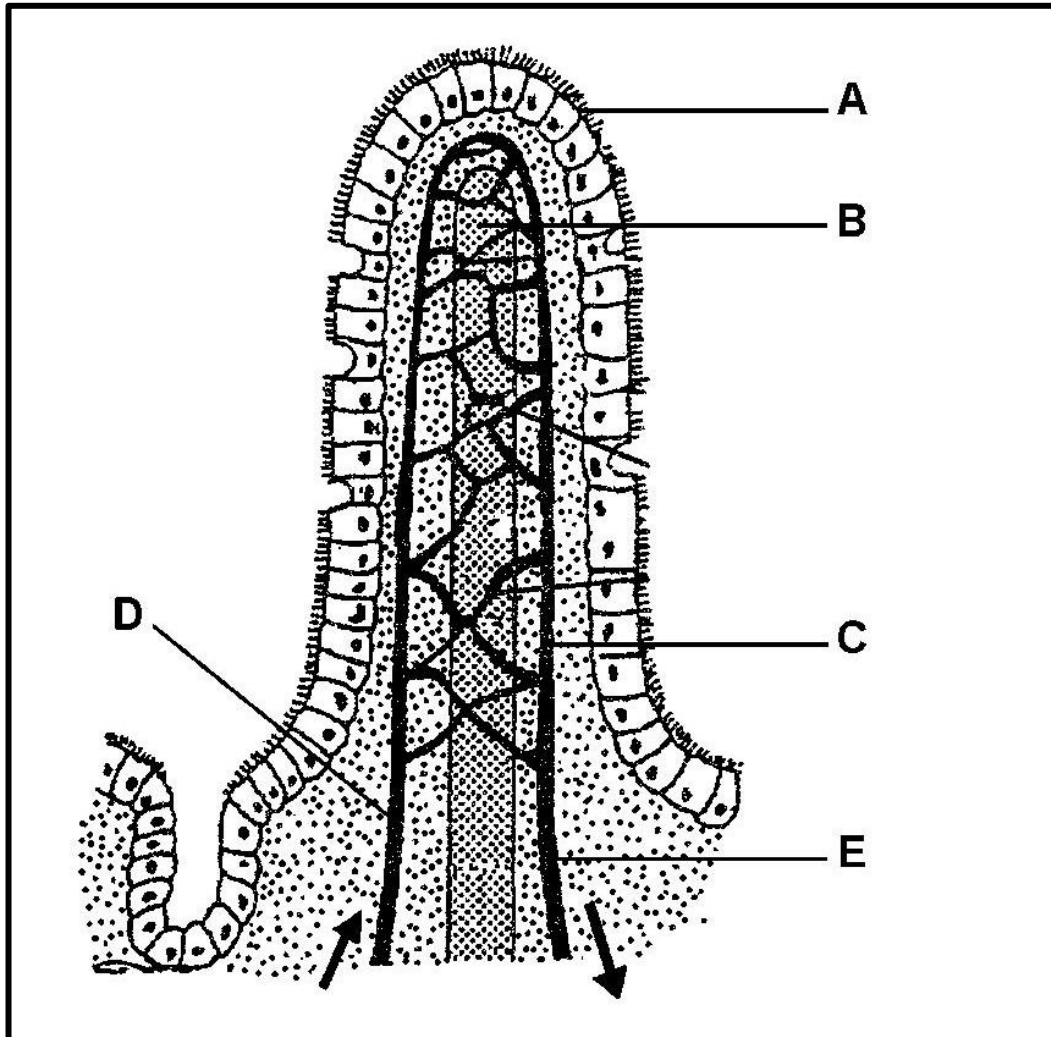
- 2.2.1 Which apparatus (A or B) represents inhalation? (1)
- 2.2.2 Describe the mechanism of inhalation in humans. (6)
- 2.2.3 What human structures are represented by the glass tube, bell jar and rubber sheet respectively? (3)
- 2.2.4 One of the learners created a hole in the rubber sheet by pricking it with a nail. What would be the result when this punctured rubber sheet is stretched down? Give a reason for your response. (2)

2.3 The graph below shows the results of a glucose tolerance test on a healthy (Person A) and on a diabetic (Person B). After fasting for ten hours they each were given a drink of a glucose solution containing 50 g glucose. The amount of glucose in their blood was then measured every 30 minutes for the next three hours.



- 2.3.1 What was the greatest concentration of glucose in the diabetic's blood? (1)
- 2.3.2 Predict from the graph how long it would take for the glucose concentration of:
  - (a) The healthy person to return to the level when the glucose solution was taken. (2)
  - (b) The diabetic person to return to the level when the glucose solution was taken in. (2)
- 2.3.3 What effect would injecting insulin into the diabetic person have on the results of the test? (1)
- 2.3.4 Into which compound does insulin change the blood glucose? (1)
- 2.3.5 Explain briefly why insulin, which is a protein, is injected into a diabetic person, rather than given orally. (2)

- 2.4 The accompanying diagram represents a structure associated with the human digestive system. Study the diagram and answer the questions that follow.



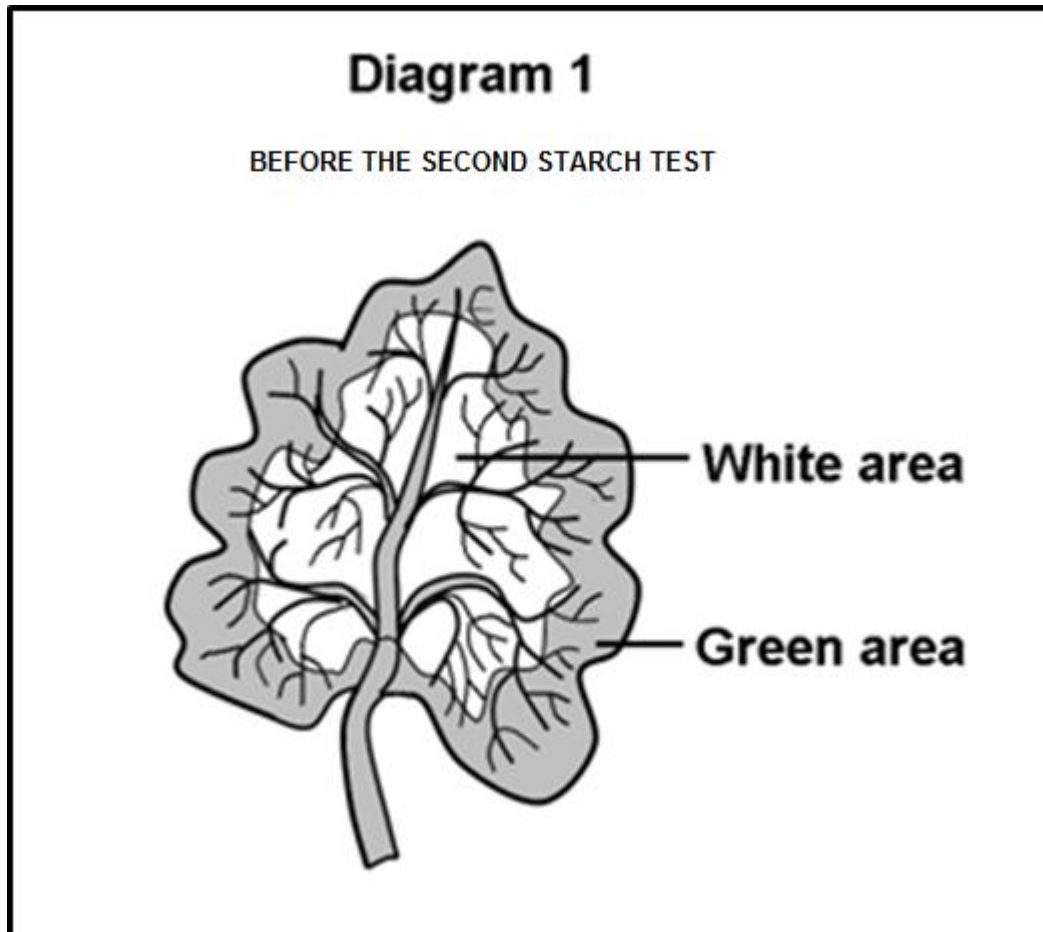
- 2.4.1 Identify the above structure. (1)
- 2.4.2 In which organ is this structure found? (1)
- 2.4.3 What is the main function of the structure shown in the above figure? (1)
- 2.4.4 Name TWO substances which are found in higher concentration in C than in D. (2)
- 2.4.5 Label parts A and B. (2)
- 2.4.6 State any ONE structural feature of the above diagram that enables it to perform its function effectively. (2)

**QUESTION 3**

- 3.1 The table below represents a certain kind of ecological interaction between two wild animals in a game reserve. Study the table of data and answer the questions.

YEARS	HARE POPULATION	LYNX POPULATION
1975	350	200
1980	450	210
1985	250	350
1990	400	150
1995	250	370
2000	500	100
2005	250	400
2010	400	200

- 3.1.1 Plot a line graph to show the ecological relationship between the hare and lynx population. (7)
- 3.1.2 From the graph, identify the growth phase representing the lynx population between 1975 and 1980. (1)
- 3.1.3 Supply any TWO reasons for the shape of the graph mentioned in QUESTION 3.1.2. (2)
- 3.1.4 Briefly explain the interaction between the hare and lynx population. (4)
- 3.1.5 Calculate the percentage decrease of hare population between 1990–1995. Show ALL calculations. (3)
- 3.2 A learner has conducted an experiment in his classroom by following various steps. Study the procedure and the diagram below to answer the questions that follow.
- (a) A variegated plant was left in the dark for 3–4 days.
- (b) A starch test was conducted by removing one of the leaves.
- (c) The plant was then left in the light for 4 hours.
- (d) A leaf was removed and a drawing of it was made to show the distribution of green and white areas. (Diagram 1)
- (e) The leaf was then tested for the presence of starch.
- (f) After the addition of few drops of diluted iodine solution, a second drawing of the leaf was made to show the distribution of blue-black and brown areas of the leaf. (Diagram 2)



- 3.2.1 State the aim of this experiment. (1)
- 3.2.2 Why was the plant left in the dark for 3–4 days? (1)
- 3.2.3 Why should the plant have been tested for the presence of starch after step (a), that is before exposing the plant to light? (2)
- 3.2.4 Draw and label Diagram 2 that shows the result of the second starch test as mentioned in step (f). (Diagram 1 should be used as a template.) (5)
- 3.2.5 Is it necessary to set up a control for this investigation? (1)
- 3.2.6 Supply a reason for your answer in QUESTION 3.2.5. (2)
- 3.2.7 What conclusion can be drawn from this experiment? (2)

- 3.3 In many developing countries, the human population is increasing at an exponential rate. An increase in human population leads to a proliferation of various industries and subsequent carbon emission. Study the passage below and answer the questions that follow:

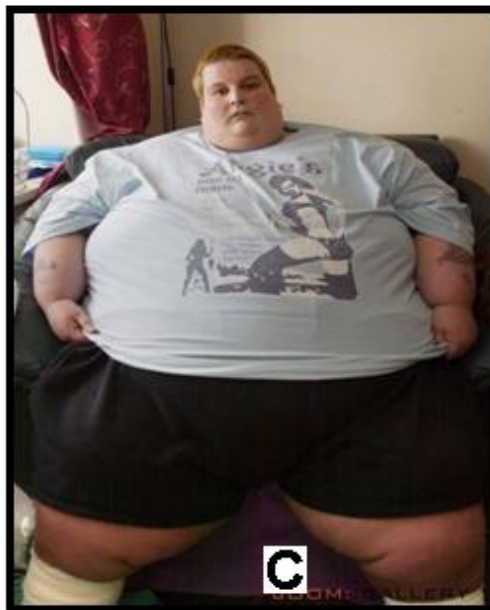
Scientists of the University of Almeria are developing a new system to eliminate carbon dioxide emissions using microalgae photosynthetic activity.

The process is explained by the researchers: "By the gas emission point a water tank would be installed in order to retain the pollutant gases resulting from a specific industrial process. This polluted water would go through a system of bioreactors with microalgae culture system, which would then transform the CO<sub>2</sub> emissions into vegetal matter and oxygen through the photosynthesis process."

[Source:[http://www.science20.com/news\\_releases/using\\_microalgae\\_photosynthesis\\_to\\_eliminate\\_CO<sub>2</sub>\\_emissions](http://www.science20.com/news_releases/using_microalgae_photosynthesis_to_eliminate_CO2_emissions)]

- 3.3.1 According to researchers, which natural process can be utilised to reduce carbon emission from industries? (1)
- 3.3.2 Identify the living organisms that can be employed to transform polluted industrial gases into less hazardous air. (1)
- 3.3.3 Name TWO useful end-products generated during this process. (2)

- 3.4 The images below represent various types of malnutrition. Study the images and answer the questions.



- 3.4.1 Identify the type of malnutrition illustrated by images **A**, **B** and **C** respectively. (3)
- 3.4.2 What is the main cause of the conditions shown in images **B** and **C**? (2)

[40]

**TOTAL SECTION B: 80**



**SECTION C**

**QUESTION 4**

Write a short essay describing the homeostatic functioning of the nephron if a person consumes excessive amounts of water in a short period of time. (17)

**Synthesis** (3)

**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**













