



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2013

LIFE SCIENCES P1

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 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. 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.

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 1.1.10 D.

1.1.1 Plants absorb oxygen ...

- A continuously.
- B during the day only.
- C during the night only.
- D during photosynthesis only.

1.1.2 Cellular respiration in a green leaf takes place ...

- A during the day only.
- B continuously.
- C during the night only.
- D in tissues without chlorophyll only.

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

- A Proteins
- B Starch
- C Glucose
- D Fats

1.1.4 The concentration of which of the following substances are normally higher in the hepatic portal vein than in most other veins in the human body?

- A Oxygen
- B Glucose
- C Urea
- D Carbon dioxide

1.1.5 Which of the following does not occur during inhalation in a human?

- A Pressure within the thoracic cavity increases
- B The lungs expand
- C The diaphragm contracts
- D Pressure in the abdominal cavity increases

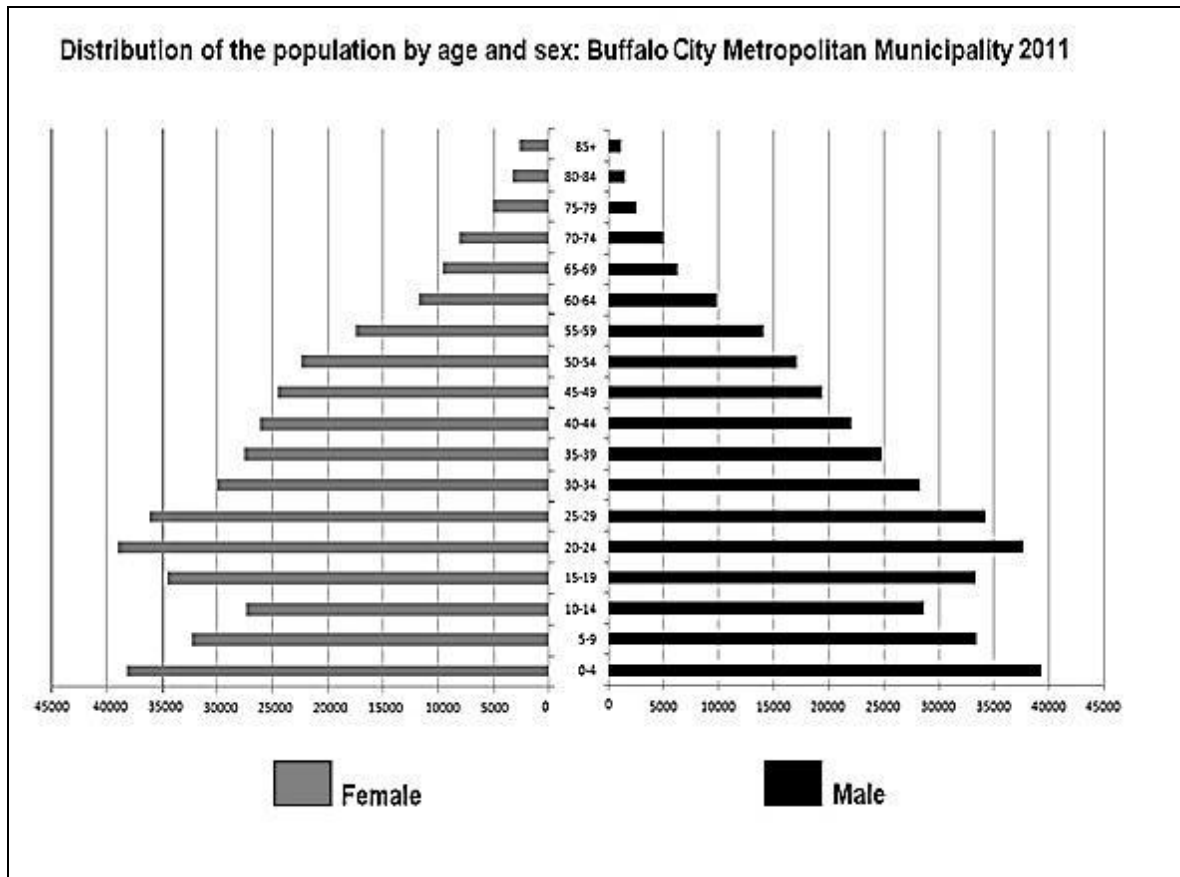
- 1.1.6 The rate of breathing is regulated by the medulla oblongata, mainly ...
- A under voluntary control.
 - B according to the oxygen level of blood.
 - C according to the blood pressure.
 - D according to the carbon dioxide level of blood.
- 1.1.7 Which of the following is the correct sequence of activities that occurs during kidney functioning?
- A pressure filtration → excretion → re-absorption
 - B re-absorption → pressure filtration → excretion
 - C excretion → pressure filtration → re-absorption
 - D pressure filtration → re-absorption → excretion
- 1.1.8 Which of the following is part of the circulatory system of blood?
- A Glomerulus
 - B Convoluted tubules
 - C Loop of Henle
 - D Bowman's capsule
- 1.1.9 Which of the following is a density-dependent factor?
- A Drought
 - B Temperature
 - C Predation
 - D Fire
- (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 one-directional outward movement of individuals of a population from a defined area
- 1.2.2 The kind of competition when individuals of the same species living in the same habitat compete for the same food sources
- 1.2.3 The reagent used to test for the presence of starch
- 1.2.4 The photo-chemical splitting of water during photosynthesis
- 1.2.5 The process during which glucose is converted into pyruvic acid
- 1.2.6 The phase of respiration during which the most ATP is formed
- 1.2.7 The double membrane that covers the outer surface of the lungs
- 1.2.8 The ejection of solid wastes from the body
- (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 ANSWER BOOK.

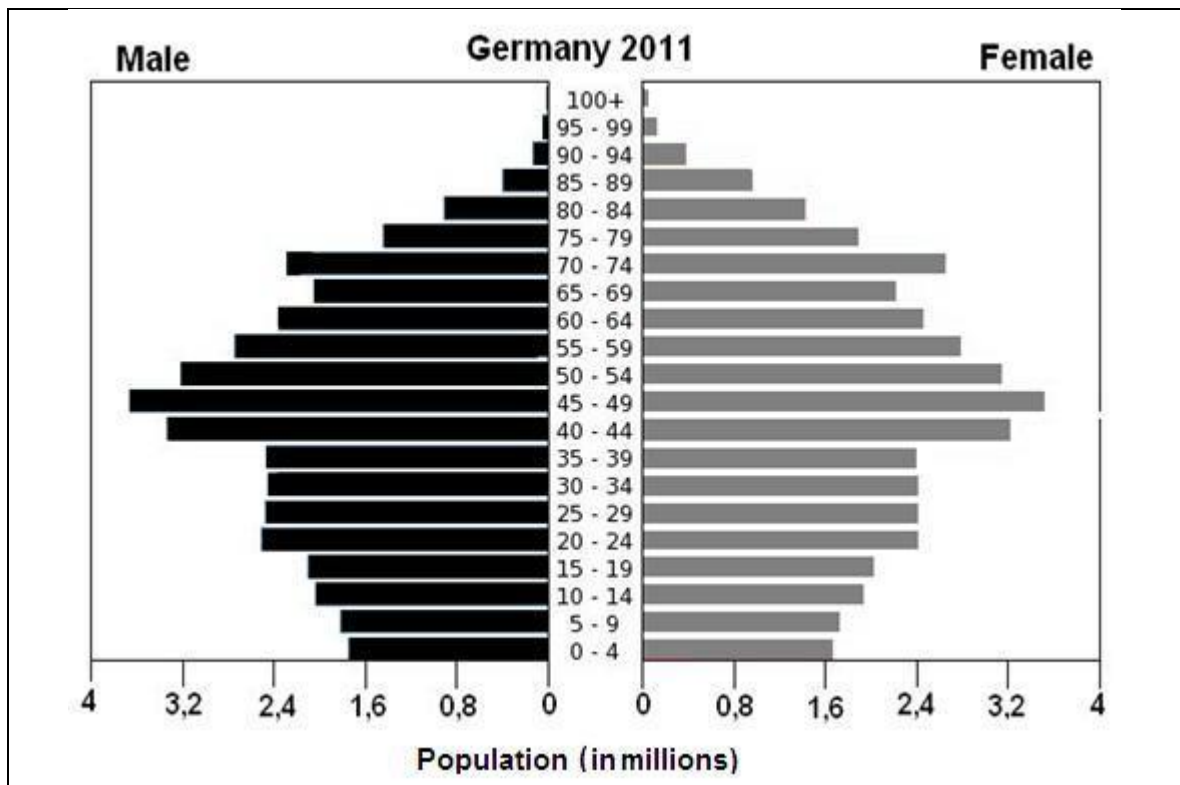
COLUMN I		COLUMN II	
1.3.1	The cartilaginous structure that contains the vocal cords	A	Bronchus
		B	Larynx
1.3.2	A lymph vessel in the villus of the intestine	A	Lacteal
		B	Lymphatic node
1.3.3	The structure that prevents the passage of food particles in the lungs	A	Epiglottis
		B	Glottis
1.3.4	Blood leaving the kidney contains more of this substance than the blood entering the kidney	A	Amino acids
		B	Carbon dioxide
1.3.5	Osmoregulation in kidneys	A	ADH
		B	Sodium ions
1.3.6	"C" shaped cartilaginous rings	A	Oesophagus
		B	Bronchioles
1.3.7	Muscular wall separating thoracic cavity from abdominal cavity.	A	Internal inter-costal muscles
		B	External inter-costal muscles
1.3.8	The general energy carrier in the cells of living organisms	A	ATP
		B	NADP
1.3.9	Site of glycolysis	A	Ribosome
		B	Leucoplast

(9 x 2) (18)

1.4 Study the following age-gender pyramids of one of the Eastern Cape Municipalities and Germany to answer the questions that follow.



Graph 1



Graph 2

1.4.1 Which graph represents:

(a) An increasing population? Supply a reason. (2)

(b) A declining population? Give a reason. (2)

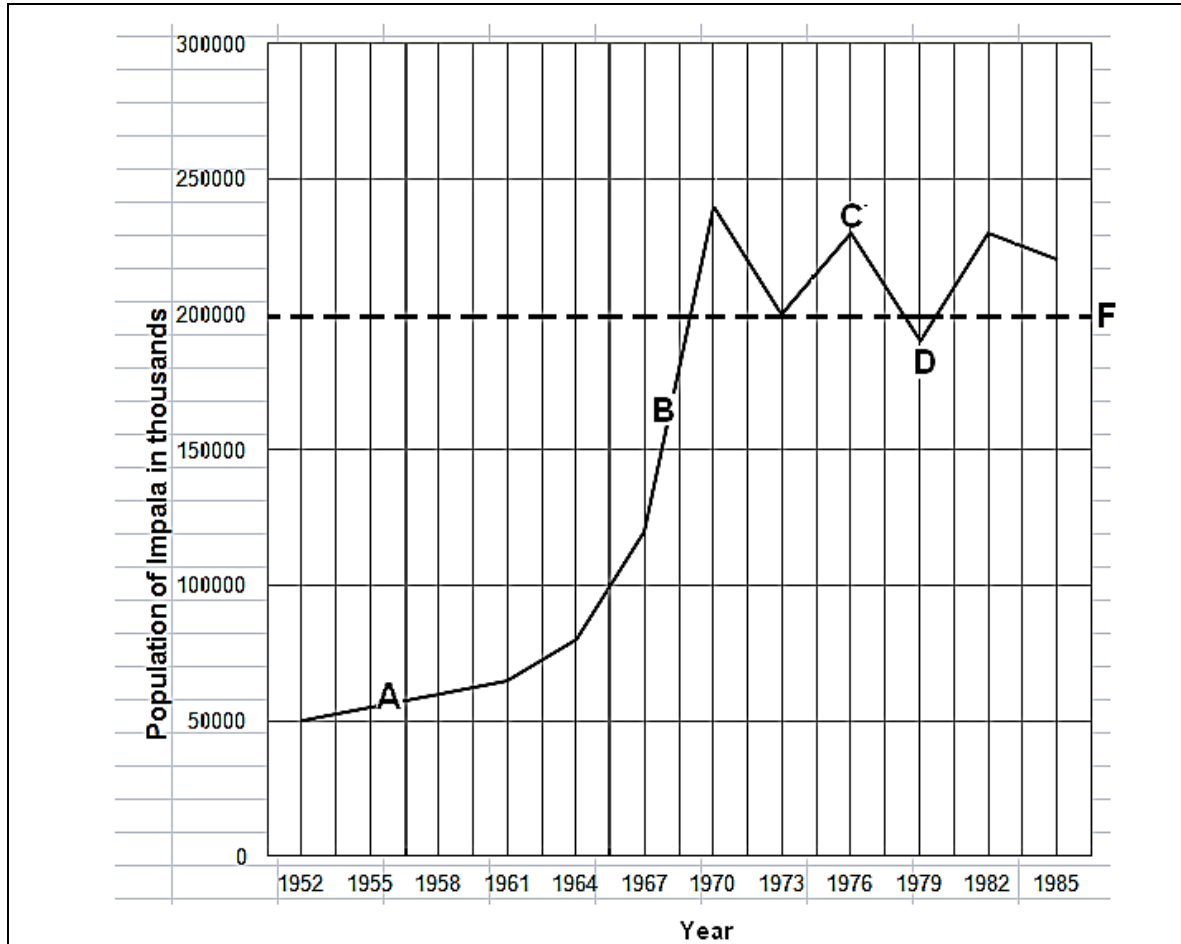
1.4.2 What is the main significance of this type of graphical representation of a population? (2)

TOTAL SECTION A: 50

SECTION B

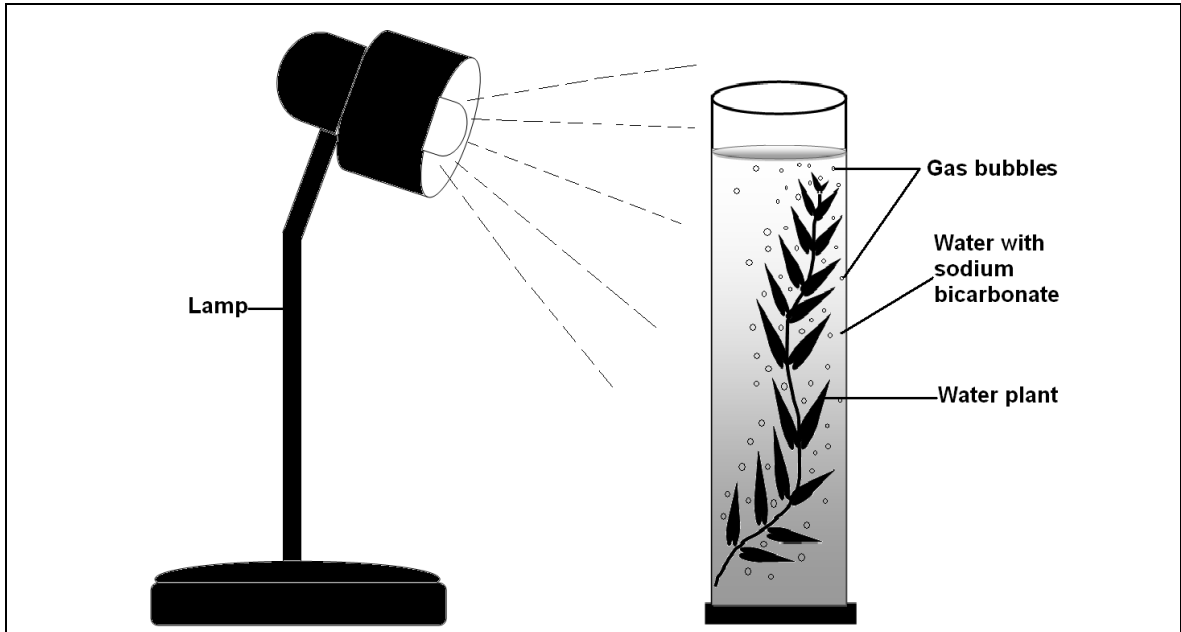
QUESTION 2

- 2.1 The graph below shows the size of an impala population between 1952 and 1985 at a game reserve. Study the graph and answer the questions.



- 2.1.1 Supply a suitable caption for the above graph. (1)
- 2.1.2 Identify the growth phases indicated by **A** and **B** on the graph. (2)
- 2.1.3 Give any TWO reasons for the shape of the growth indicated by.
- growth phase A. (2)
 - growth phase B. (2)
- 2.1.4 What does the dotted line **F** represent? (1)
- 2.1.5 Name ONE direct method that could be used to estimate the population size of the impala. (1)

- 2.1.6 List any TWO density dependent factors (other than predation) that could have resulted in the decrease from **C** to **D**. (2)
- 2.1.7 Supply a trend that shows that the population of impala will not be drastically reduced or become extinct in the near future. (2)
- 2.2 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.



- 2.2.1 What is the aim of the above experiment? (1)
- 2.2.2 What is the function of sodium bicarbonate? (1)
- 2.2.3 Name the gas released during the experiment. (1)
- 2.2.4 Explain a simple test that can be done to confirm the presence of the gas mentioned in QUESTION 2.2.3. (2)
- 2.2.5 Name any TWO environmental factors, besides light intensity, that could affect the chemical process shown in the diagram above. (2)

2.2.6 Plot a line graph to represent the following data obtained during the experiment.

(8)

Number of air bubbles counted when the distance between the lamp and 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

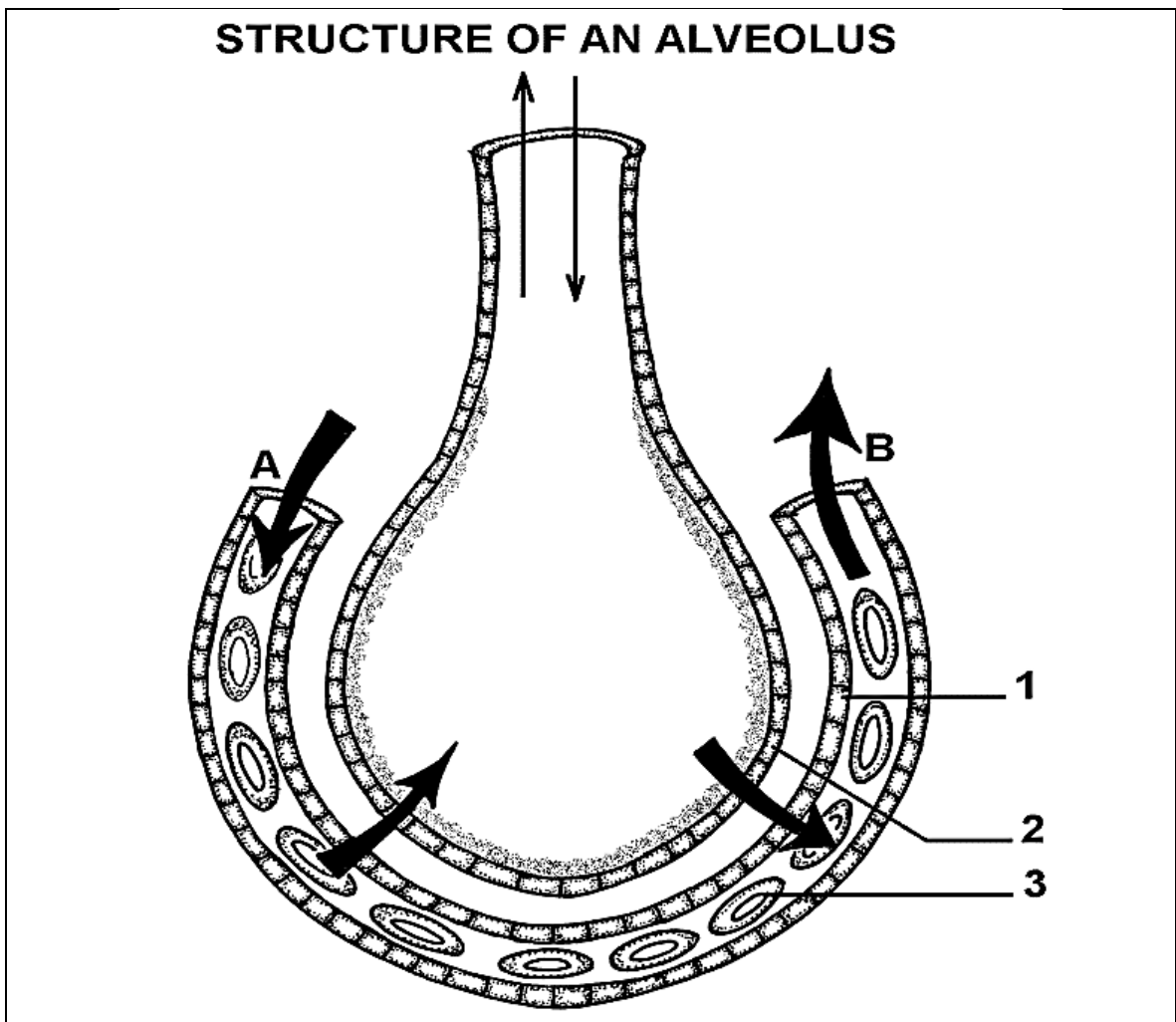
2.2.7 Name an independent factor that should be kept constant during this experiment.

(1)

2.2.8 What conclusion can be derived at, from the above information supplied in QUESTION 2.2.6?

(2)

2.3 The diagram below represents a section through an alveolus and a surrounding blood capillary in the human body. Study the diagram and answer the questions.



- 2.3.1 Name the type of epithelial tissue numbered **1** and **2**. (2)
- 2.3.2 Identify the blood cell labeled **3**. (1)
- 2.3.3 What pigment is found in the cell mentioned in QUESTION 2.3.2? (1)
- 2.3.4 Which type of blood:
- (a) enters the blood capillary at **A**? (1)
 - (b) leaves the blood capillary at **B**? (1)
- 2.3.5 Supply any **THREE** structural adaptations of the alveoli which make them well suitable for gaseous exchange. (3)

[40]

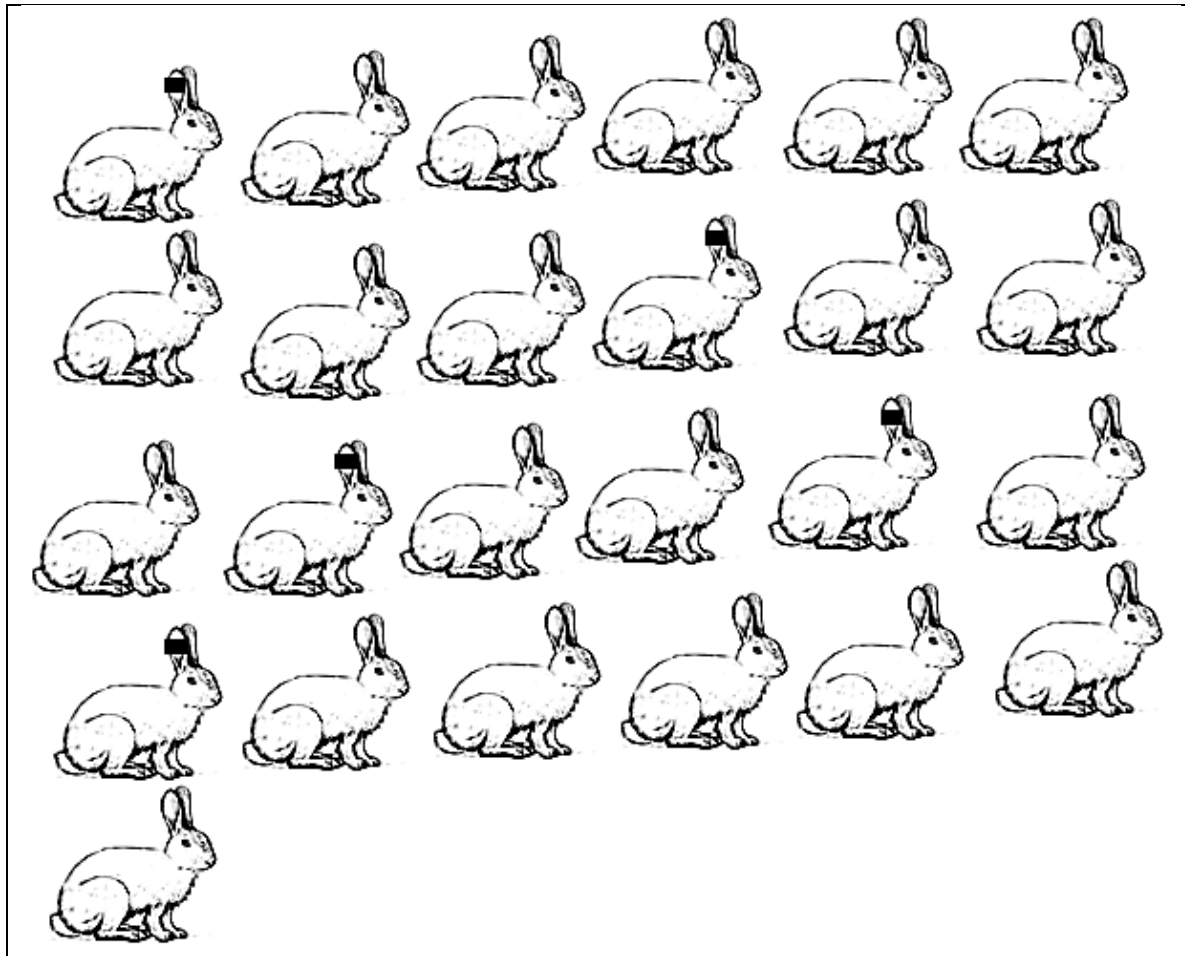
QUESTION 3

- 3.1 Tabulate any **THREE** differences between aerobic and anaerobic respiration. (7)
- 3.2 Study the following table that shows the flow rate and concentration of certain substances taken at regions A, B, C and D of the nephron in the human kidney.

Part of nephron	Flow rate (cm ³ /min)	Solute concentrations (g/100 cm ³)				
		Proteins	Glucose	Sodium ions	Ammonium ions	Urea
A	4	0	0	0,6	0,04	1,80
B	200	0	0,10	0,72	0	0,05
C	40	0	0	0,3	0	0,15
D	2000	7	0,10	0,72	0	0,05

- 3.2.1 State, with a reason which of the parts (**A**, **B**, **C** or **D**) of the nephron represent the following:
- (a) Afferent arteriole (2)
 - (b) Bowman's capsule (Capsular space) (2)
 - (c) Loop of Henle (2)
 - (d) Duct of Bellini/Collecting duct (2)
- 3.2.2 Explain the difference in the flow rate between **B** and **D**. (4)
- 3.2.3 State **TWO** functions of the kidneys, other than pH regulation, that can be supported by the data given in the table. (2)

3.3 In an attempt to determine the size of a rabbit population, 15 rabbits were caught and tags were attached to their ears. Two weeks later, a sample of 25 rabbits were re-captured from the same area. The diagram below shows the rabbits that were re-captured. Study the diagram below and answer the following questions.



- 3.3.1 Calculate the size of rabbit population in the area. Show all working. (5)
- 3.3.2 Suggest the reasons why the estimated size of the population may differ from the real population size. (2)
- 3.3.3 State TWO ways in which the reliability of this method can be improved. (2)
- 3.4 Define the following biological terms:
 - 3.4.1 Carrying capacity of a habitat (2)
 - 3.4.2 Ecological succession (2)
- 3.5 Photosynthesis takes place within the chloroplasts of green plants. Discuss any THREE structural adaptations of chloroplasts. (6)

[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

- 4.1 Write a short essay to explain the homeostatic control of glucose in the human body. Briefly discuss the symptoms and management of the resultant chronic conditions that develop due to a dysfunctional system. (17)
- Synthesis (3)

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

TOTAL SECTION C: 20

GRAND TOTAL: 150