education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2006

BIOLOGY P1

STANDARD GRADE

OCTOBER/NOVEMBER 2006

MARKS: 150

TIME: 2 hours

This question paper consists of 17 pages.

INSTRUCTIONS AND INFORMATION

Read the following 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 exactly as the questions are numbered.
5. Write neatly and legibly.
6. If answers are not presented according to the instructions of each question candidates will lose marks.
7. All drawings should be done in pencil and labelled in ink.
8. Only draw diagrams or flow charts when requested to do so.
9. The diagrams in the question paper may not necessarily be drawn to scale.
10. The use of graph paper is NOT permitted.
11. Non-programmable calculators, protractors and compasses may be used.

SECTION A

QUESTION 1

1.1 Various possible answers are provided for each question. Indicate the correct answer by writing only the **letter** of your choice next to the relevant question number.

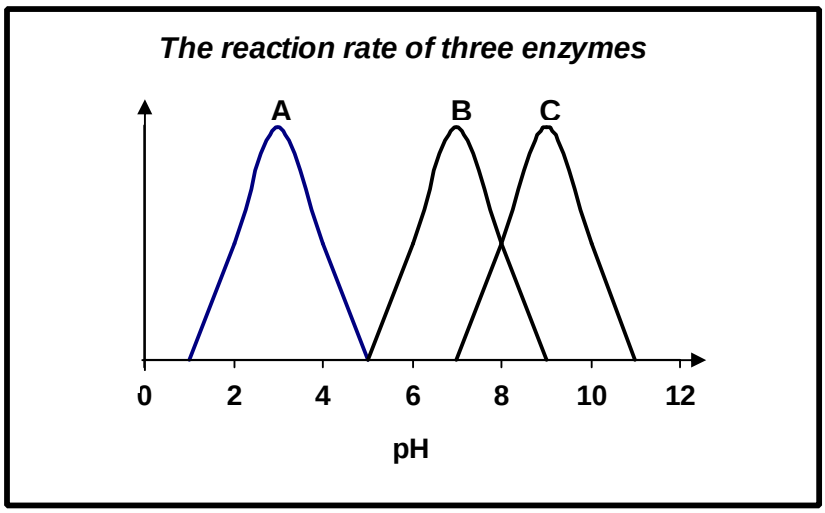
1.1.1 The inner walls of the trachea and the bronchioles have a lining of …

A squamous epithelium.
B ciliated columnar epithelium.
C stratified epithelium.
D cuboidal epithelium.

1.1.2 The movement of oxygen from the alveoli into the blood vessels around them takes place through …

A reabsorption.
B active absorption.
C diffusion.
D ventilation.

QUESTIONS 1.1.3 and 1.1.4 are based on the following graphs:



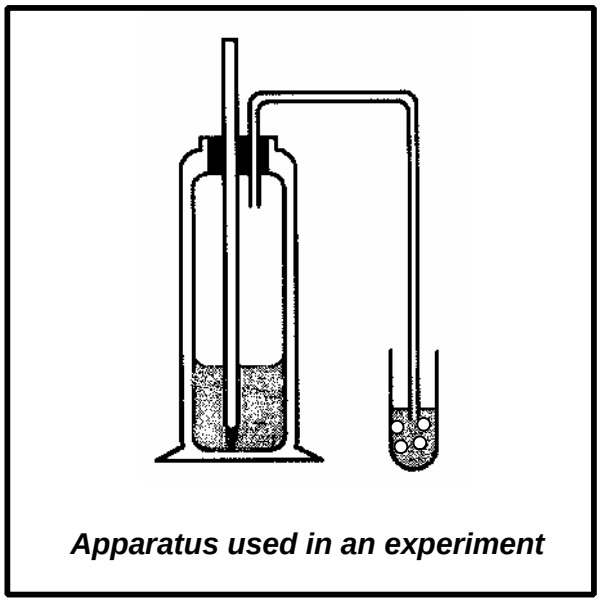
1.1.3 The graphs above illustrate that enzymes ...

A are denatured at high pH.
B are sensitive to temperature.
C function within narrow pH limits.
D are specific in terms of the substrate on which they work.

1.1.4 Which ONE of the following is the most likely pH for enzyme B to function at its best?

A 2
B 6
C 7
D 8

QUESTION 1.1.5 is based on the following diagram of apparatus used in an experiment:



Apparatus used in an experiment

1.1.5 Apart from alcohol and heat energy, which other substance is also a product of the process shown in the experiment?

A Glucose
B Carbon dioxide
C Enzymes
D Lactic acid

1.1.6 Germinating seeds have a high rate of respiration because they ...

A are lacking leaves.
B require energy for rapid growth.
C photosynthesise very slowly.
D consist of a few cells only.

1.1.7 A plant needs oxygen only during ….

A cellular respiration .
B photosynthesis.
C the day.
D the night. **(7 x 2)** **(14)**

1.2 Give the correct biological term for each of the following descriptions. Write only the term next to the relevant question number (1.2.1 - 1.2.5).

1.2.1 The movement of air in and out of the lungs

1.2.2 Respiration that takes place in the absence of oxygen

1.2.3 The red pigment in blood responsible for the transport of oxygen

1.2.4 A carbohydrate which is a component of plant cell walls

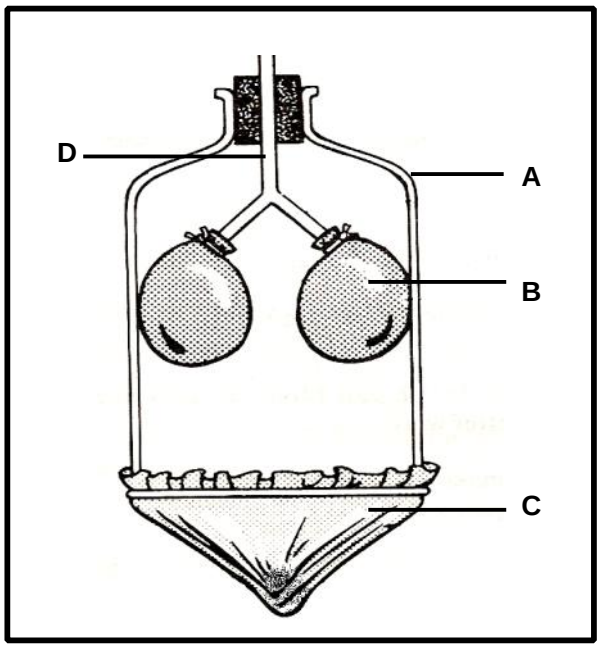
1.2.5 The valve that controls movement of chyme from the stomach into the small intestine **(5)**

1.3 Match the items in COLUMN II with the statements in COLUMN I. Write only the **letter** of the correct answer, next to relevant question number.

	COLUMN I	**COLUMN II**
1.3.1	The structure which prevents food from entering the trachea during swallowing	A Mortality
		B Natality
1.3.2	A compound from which energy is released during respiration	C Glucose
1.3.3	The number of deaths in a population	D Pleura
1.3.4	An inorganic compound which is a reagent in hydrolysis	E Epiglottis
		F Appendix
1.3.5	A non-functional part of the caecum in the human alimentary canal	G Water
1.3.6	A gas needed for cellular respiration to take place	H Colon
1.3.7	Protective membranes surrounding the lungs	I Oxygen
		J Carbon dioxide

(7 x 2) (14)

1.4 The following diagram shows a model that represents the human respiratory system.



1.4.1 Name the specific mechanism that is illustrated by the diagram. (1)

1.4.2 What parts of the human respiratory system are represented by letters B, C and D respectively on the diagram? (3)

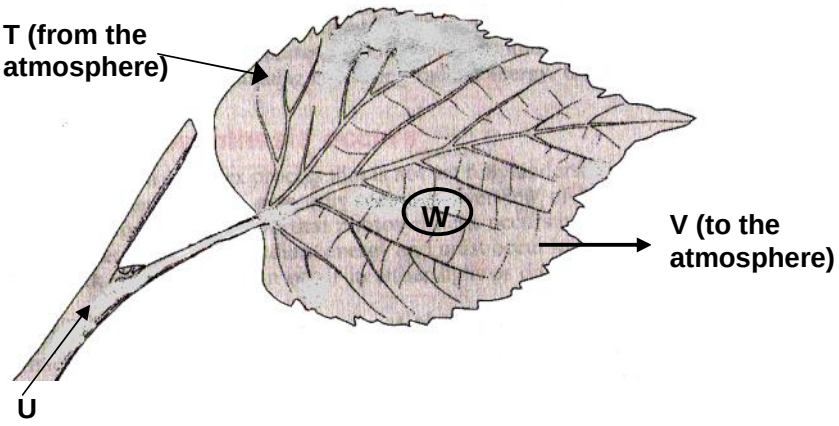
1.4.3 Give a reason why each of the following parts on the diagram will not allow the apparatus to function like the normal respiratory system:

(a) A (2)

(b) B (2)

(c) C (2)
(10)

1.5 Study the following diagram of a leaf in which the process of photosynthesis takes place and answer the questions that follow.



Leaf in which photosynthesis takes place

1.5.1 Identify:

(a) The products of photosynthesis represented by V and W (2)

(b) The inorganic substances T and U that are needed for photosynthesis (2)

1.5.2 What is the source of inorganic substance U? (1)

1.5.3 Name the process by which inorganic substance T is absorbed into the leaf. (1)

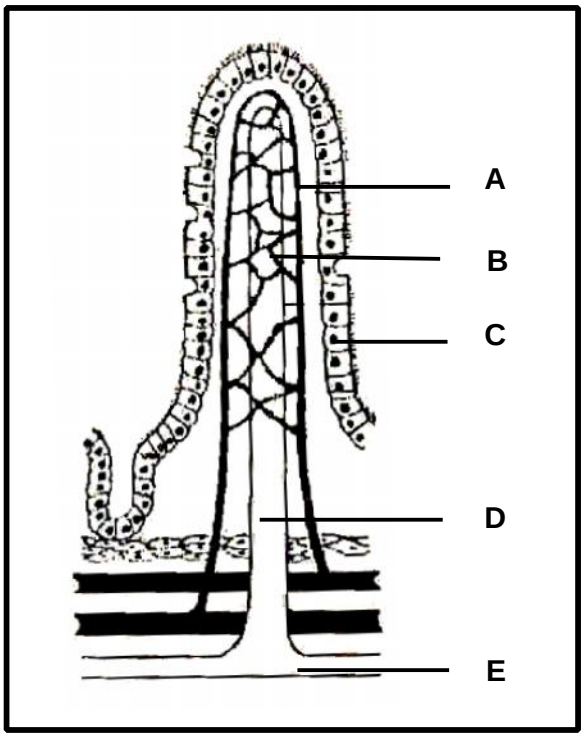
1.5.4 Name the tissue in the leaf that is mainly responsible for photosynthesis. (1)
(7)

TOTAL QUESTION 1: 50
TOTAL SECTION A: 50

SECTION B

QUESTION 2

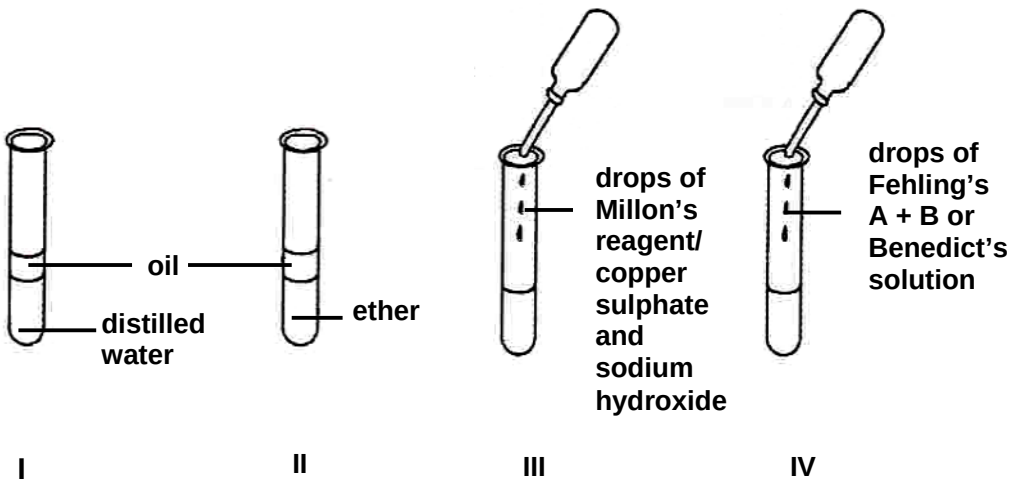
2.1 Study the following diagram and then answer the questions that follow by filling in the missing words. Write only the missing words next to the question number (2.1.1 - 2.1.10) in your answer book.



The diagram shows the structure of a 2.1.1 ... which is found lining the 2.1.2 ... . Layer C consists of 2.1.3 ... cells. The part labelled D is called a 2.1.4 ... . Parts A and B represent 2.1.5 ... into which the products of digestion, 2.1.6 ... and 2.1.7 ... pass so that they can be transported away. E represents a 2.1.8 ... vessel through which products of digestion such as 2.1.9 ... and 2.1.10 ... are transported to the thoracic duct. **(10)**

2.2 Describe THREE ways in which the above structure is adapted for absorption. **(6)**

2.3 The following diagrams represent apparatus used to investigate some organic nutrients. Study the diagrams and answer the questions that follow:



Apparatus used to investigate some organic nutrients

2.3.1 Test tubes I and II were shaken for a while and then placed on a test tube rack. What will be observed in each of these test tubes after 30 minutes? (2)

2.3.2 State the aim of each of the following investigations:

(a) Investigation III (1)

(b) Investigation IV (1)

2.3.3 Write the colours that will indicate positive results for:

(a) III (1)

(b) IV (1)

2.3.4 State THREE functions of fats in the human body. (3)
(9)

TOTAL QUESTION 2: 25

QUESTION 3

3.1 The following table represents part of the nutritional information that appears on the label of a well-known nutritional drink.
Study the table and then answer the questions that follow:

Nutrient	**Per 100 g powder**
Vitamin A (Retinol)	2 µg
Vitamin C (Ascorbic acid)	98 µg
Vitamin B_1 (Thiamine)	1,3 µg
Vitamin D	0,4 µg
Iodine	20 µg
Iron	1,3 mg
Calcium	540 mg
Phosphorus	570 mg
Protein	14 mg

3.1.1 From the table identify:

(a) THREE nutrients which will promote formation of strong bones and teeth (3)

(b) TWO micro-nutrients contained in the drink (2)

3.1.2 State THREE ways in which the body can use the protein present in this drink. (3)

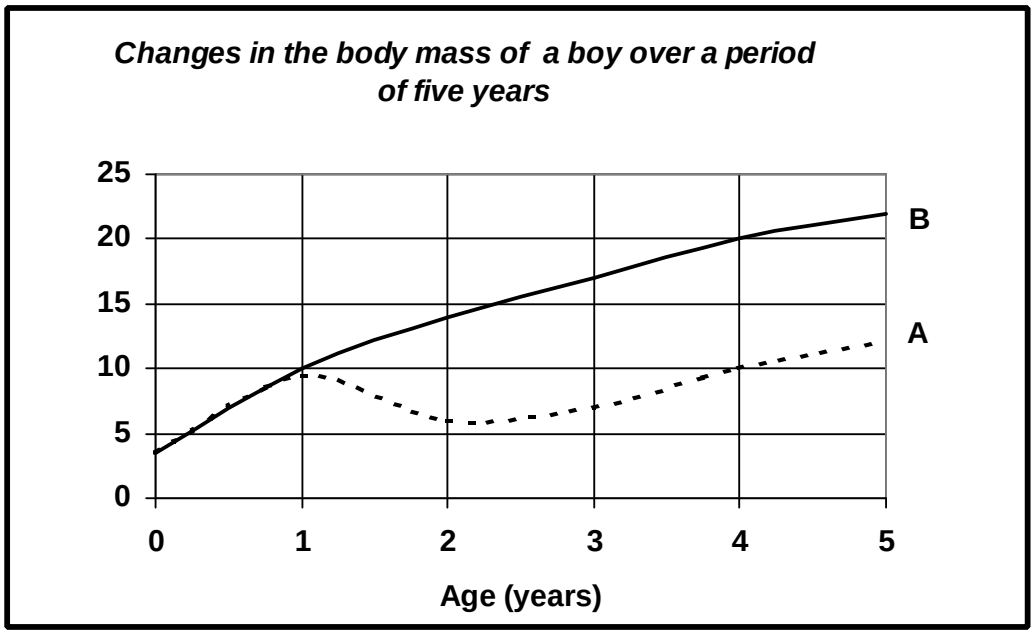
3.1.3 Which nutrient:

(a) Prevents goitre

(b) Regulates the rate of metabolism in the body

(c) Prevents beri-beri (3)
(11)

3.2 The following graph shows the changes in the body mass of a young boy over a period of five years. Curve B shows what the boy would weigh if he had been fed a balanced diet. Curve A shows the actual mass of a boy who has been fed mainly white bread at every meal with very little meat, vegetables, fruit and milk. He has developed a swollen stomach, and he is often too tired to run around like other young children.



Use the information provided in the text and the graph above to answer the following questions:

3.2.1 Name the TWO nutritional disorders the child is most likely suffering from. Give an explanation for each disorder named. (6)

3.2.2 Name the major nutrient contained in the child's diet. (1)

3.2.3 What did the child weigh at birth? (2)

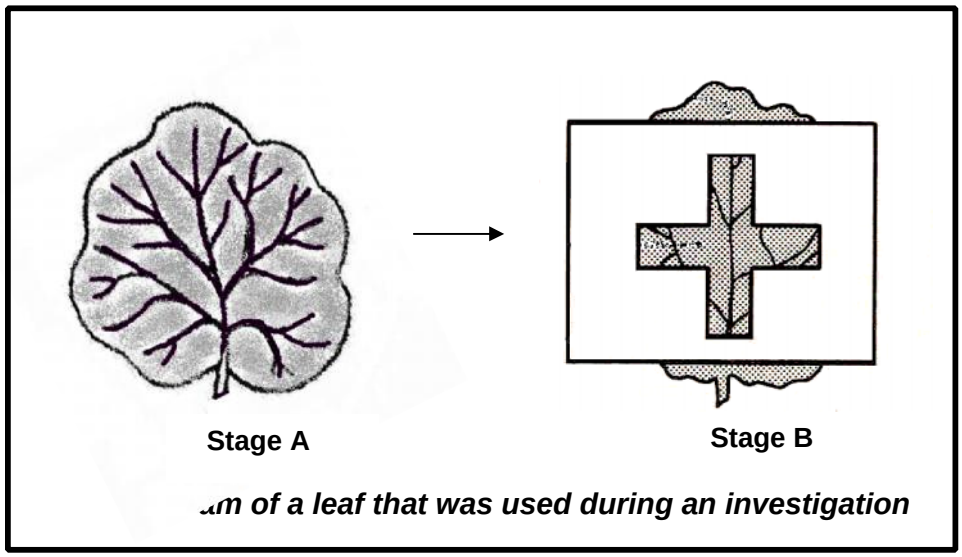
3.2.4 At what age did the child's nutritional problem begin?
Give a reason for your answer. (3)

3.2.5 Calculate the difference between the child's actual mass and projected mass at age four from the graph.
Show ALL working. (2)
(14)

TOTAL QUESTION 3: 25

QUESTION 4

4.1 Study the following diagrams (A and B) which illustrate an investigation and answer the questions that follow.



…m of a leaf that was used during an investigation

4.1.1 State the aim of this investigation. (2)

4.1.2 Give ONE reason for each of the following steps in this investigation:

(a) In the beginning of the investigation, the plant was kept in a dark cupboard for 48 hours. (2)

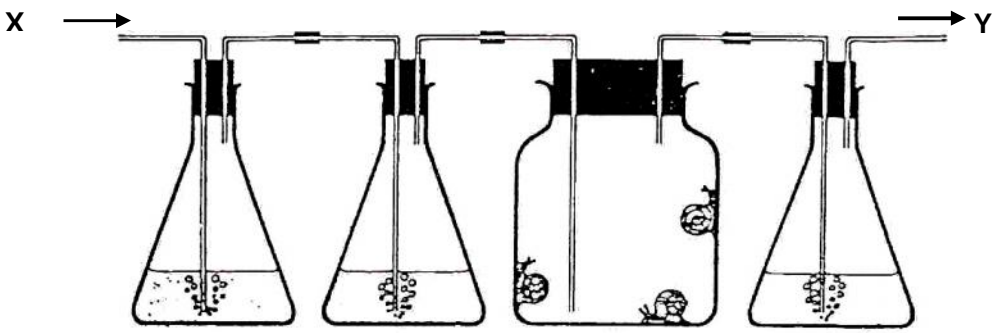
(b) The leaf was boiled in water. (2)

(c) The leaf was boiled in alcohol or methylated spirits. (2)

4.1.3 Draw a diagram of the leaf in stage B at the end of the investigation after it was treated with iodine solution and shade the parts which tested positive. (4)
(12)

4.2 The apparatus for an experiment was set up as illustrated in the accompanying diagram. Air is pumped through the apparatus from X to Y. Observations were made after an hour.

Study the diagram carefully and answer the questions that follow:



Apparatus for an experiment

4.2.1 State ONE function of potassium/sodium hydroxide solution that was used in the experiment. (1)

4.2.2 If the investigation was working correctly, indicate what would be observed after an hour in:

(a) Flask B (2)

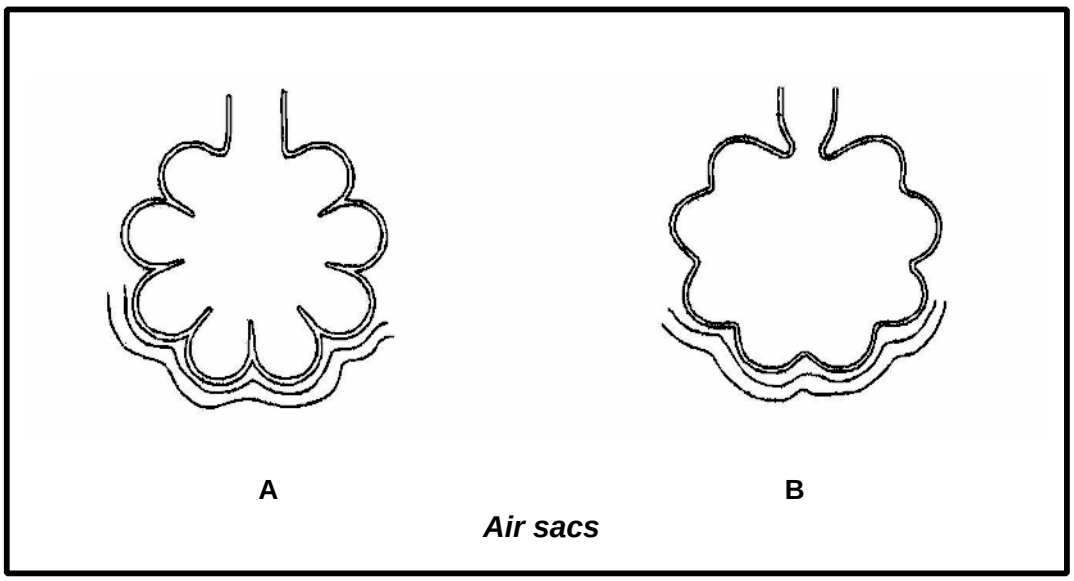
(b) Flask D (2)

4.2.3 What difference in observation would be made in flask D if snails were removed? Explain your answer. (3)

4.2.4 What physiological process is being investigated in this experiment? (1)
(9)

4.3 Emphysema is a smoking-related disease.

The following diagram shows two air sacs A from the lung of a healthy person and B from a person with emphysema:



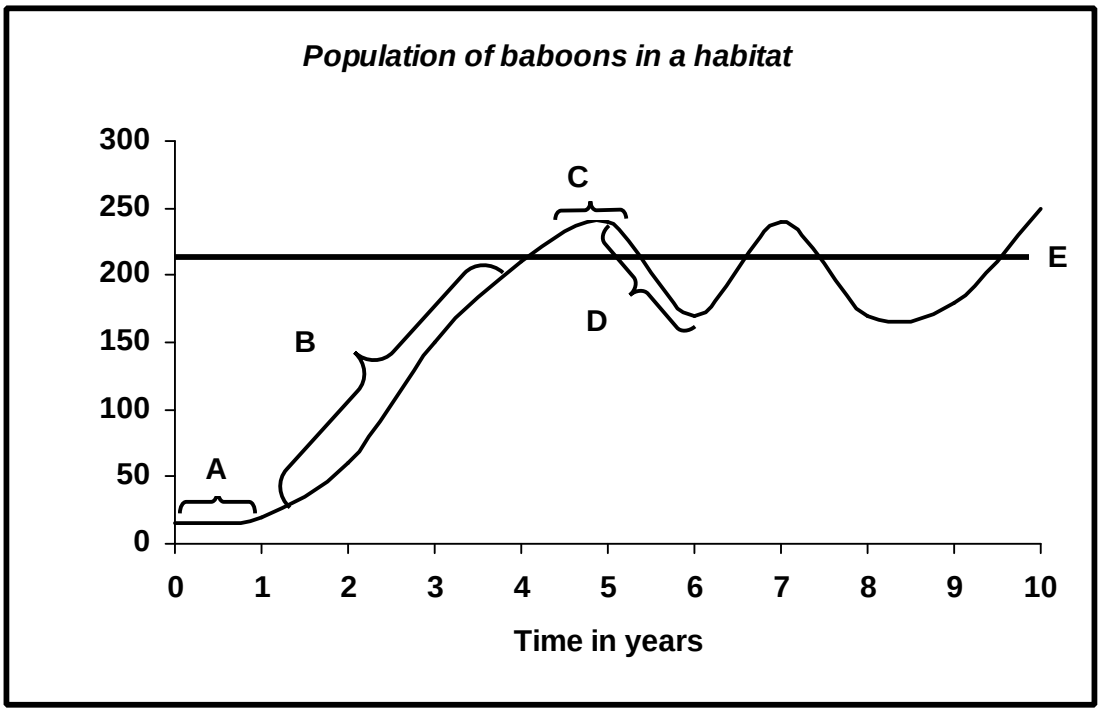
4.3.1 State the observed differences between the two air sacs in the diagram. (2)

4.3.2 Briefly explain why the change in the structure of the air sacs makes breathing difficult for a person suffering from emphysema. (2)
(4)

TOTAL QUESTION: 4 25

QUESTION 5

5.1 Study the following graph which represents a population of baboons in a specific habitat and answer the questions that follow:



5.1.1 Identify the phases labelled A and B, and factor E. (3)

5.1.2 Give ONE reason for each of the following:

(a) Slow growth at A (2)

(b) Fast growth at B (2)

5.1.3 Name ONE direct method which could be used to determine the number of baboons. (1)

5.1.4 At which labelled part is it most likely that:

(a) Natality equals mortality (1)

(b) Mortality exceeds natality (1)

5.1.5 List FOUR factors, other than food, that may cause the population size to decrease. (4)
(14)

5.2 The following results were obtained during an estimation of the rabbit population in a specific area:

Letter	Item	Number
M	Rabbits caught and marked in 1st catch	20
S	Rabbits caught in the second catch	30
T	Marked rabbits caught in the second catch	5

5.2.1 Use the following formula and calculate the size (Z) of the rabbit population in the area:

$$Z = \frac{M \times S}{T}$$

Show ALL working. **(3)**

5.3 Study the following information on Avian Influenza (Bird Flu) and answer the questions that follow:

Avian Influenza is a disease caused by the Avian Influenza virus. Wild birds world-wide carry the virus in their intestines. Infected birds shed the virus in their saliva, nasal secretions and faeces. Birds become infected when they come in contact with contaminated secretions, excretions or with surfaces that are contaminated with these secretions or excretions.

The Avian influenza virus is not transmitted between humans. However, confirmed cases of human infection from several subtypes of the virus have been reported since 1997. Symptoms of bird flu in humans have ranged from fever and sore throat to eye infections, pneumonia and several respiratory diseases.

Some of the medicines prescribed for human flu virus should work in treating bird flu infections. Additional studies are needed to determine the effectiveness of these medicines.

5.3.1 State TWO ways in which birds can become infected with the bird flu virus. (2)

5.3.2 Name THREE symptoms of bird flu in affected humans. (3)

5.3.3 Indicate whether bird flu should be considered a density-dependent or density-independent factor. Give a reason for your answer. (3)
(8)

TOTAL QUESTION 5: 25

TOTAL SECTION B: 100
GRAND TOTAL: 150