education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2007

BIOLOGY P1

STANDARD GRADE

FEBRUARY/MARCH 2007

306-2/1

BIOLOGY SG: Paper 1

MARKS: 150

TIME: 2 HOURS

306 2 1E SG

This question paper consists of 17 pages.

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GAUTENG

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 exactly as the questions are numbered.
5. Write neatly and legibly.
6. If answers are not presented according to the instructions for 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 options are provided as answers for the following questions. Select the correct answer and write only the letter (A – D) next to the question number (1.1.1 – 1.1.7), for example 1.1.8 D.

1.1.1 The function of the gall bladder is to ...

A excrete urea.
B store bile.
C store glycogen.
D form heparin.

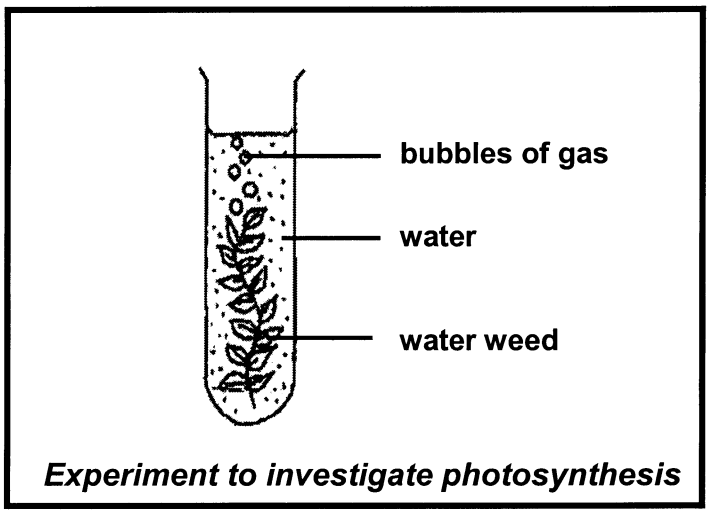
1.1.2 Cellular respiration in green leaves takes place ...

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

1.1.3 All enzymes are ...

A vitamins.
B hormones.
C proteins.
D inorganic.

1.1.4 The diagram below shows an experimental set-up to investigate photosynthesis:



Experiment to investigate photosynthesis

Which conditions will cause the plant to produce most bubbles?

	Dissolved CO_2	**Light**	**Temperature**
A	absent	dim	warm
B	present	bright	warm
C	present	dim	cool
D	present	bright	cool

1.1.5 A destarched plant is one which …

A has had its starch removed by alcohol.
B cannot form starch.
C has used up the starch because it has been left in the dark for some hours.
D can only form sugars and not starch.

1.1.6 The rate of breathing is regulated by the medulla oblongata mainly according to the …

A carbon dioxide level of the blood.
B oxygen level of the blood.
C blood pressure.
D volume of the blood.

1.1.7 The human air passages consist of …

(i) bronchioles.

(ii) trachea.

(iii) pharynx.

(iv) nasal cavities.

(v) larynx.

(vi) bronchi.

Which of the following is the correct sequence of air movement through air passages during inhalation?

A (iv) → (v) → (vi) → (i) → (ii) → (iii)
B (i) → (ii) → (iii) → (iv) → (v) → (vi)
C (iv) → (iii) → (v) → (ii) → (vi) → (i)
D (iii) → (ii) → (i) → (iv) → (v) → (vi)

7 X 2 (14)

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 –1.2.6).

1.2.1 The compound containing iron, that carries oxygen in the human blood

1.2.2 The valve which controls the movement of chyme from the stomach into the duodenum

1.2.3 Essential organic compounds which are present in small quantities in one's diet, necessary for the maintenance of good health

1.2.4 The type of anaerobic respiration in yeast cells

1.2.5 An organic acid that accumulates in muscle cells under anaerobic conditions during strenuous exercise

1.2.6 The process by which food is chewed into a fine pulp and mixed with saliva

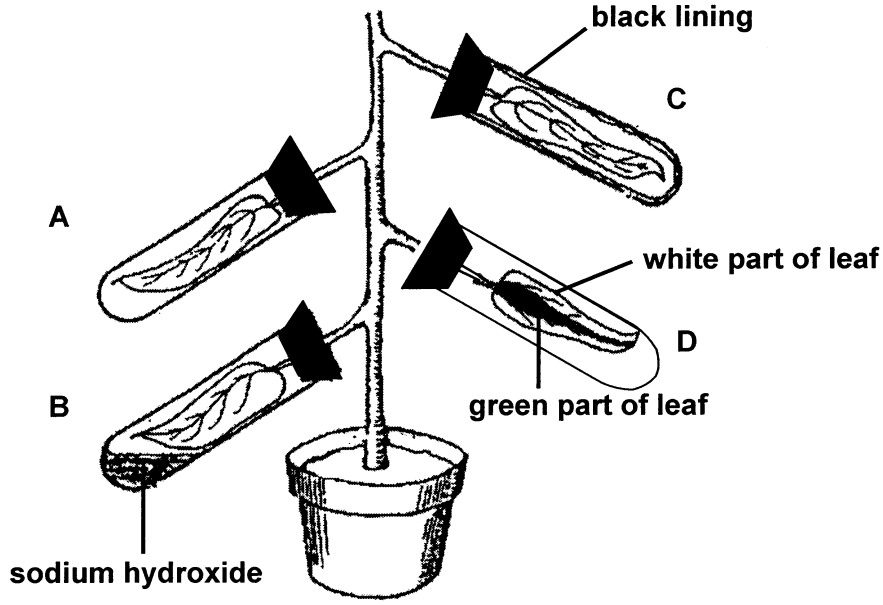
6 X 1 (6)

1.3 Match the items in COLUMN II with the statements in COLUMN I. Write only the letter of the correct answer next to the question number (1.3.1 – 1.3.5).

COLUMN I	COLUMN II
1.3.1 Occurs as a result of insufficient proteins in your diet	A Assimilation
1.3.2 End product of carbohydrate digestion	B Immigration
1.3.3 A one-way movement of organisms into a habitat	C Glucose
1.3.4 Prevents food from entering the trachea during swallowing	D Migration
1.3.5 The process by which absorbed substances become part of body cells	E Kwashiorkor
	F Absorption
	G Epiglottis
	H Chitin

5 x 2 (10)

1.4 Study the apparatus which was used in an investigation to determine factors necessary for photosynthesis. Green leaves were used in test tubes A – C while a variegated leaf was used in test tube D.



Apparatus used to investigate photosynthesis

1.4.1 Which factor was tested for in:

(a) B?

(b) C?

(c) D? (3)

1.4.2 Give the function of sodium hydroxide. (1)

1.4.3 Which test tube (A - D) represents the control apparatus? (1)

1.4.4 Indicate the colour changes that would be observed when iodine solution is poured on the leaves at the end of the investigation in the following test tubes:

(a) A (1)
(b) D (2)
(8)

1.5 Listed in the frame below are examples of some kinds of food.

guavas; spinach; margarine; cane sugar; oranges; milk; fish; egg white; table salt; liver

Select from the list:

1.5.1 TWO foods which are rich in iodine (2)

1.5.2 TWO foods which are rich in Vitamin D (2)

1.5.3 TWO foods which can be used in the synthesis of haemoglobin (2)
(6)

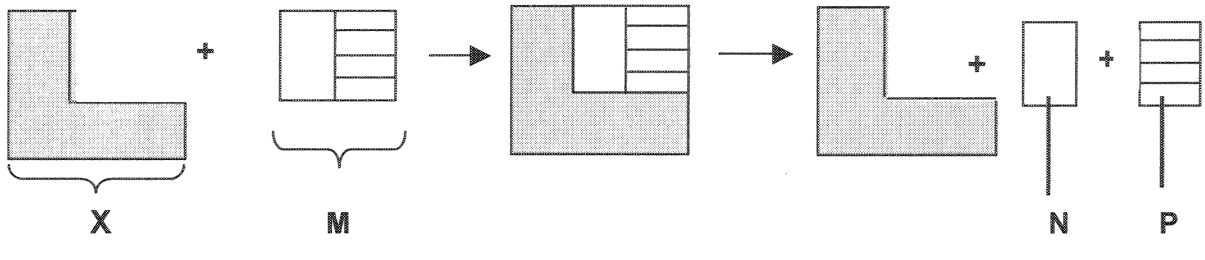
1.6 Make a labelled drawing of the structure of an alveolus with its blood supply. **(6)**

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The following diagrams represent a typical enzyme-controlled reaction. Study these diagrams and answer the questions that follow:



An enzyme-controlled reaction

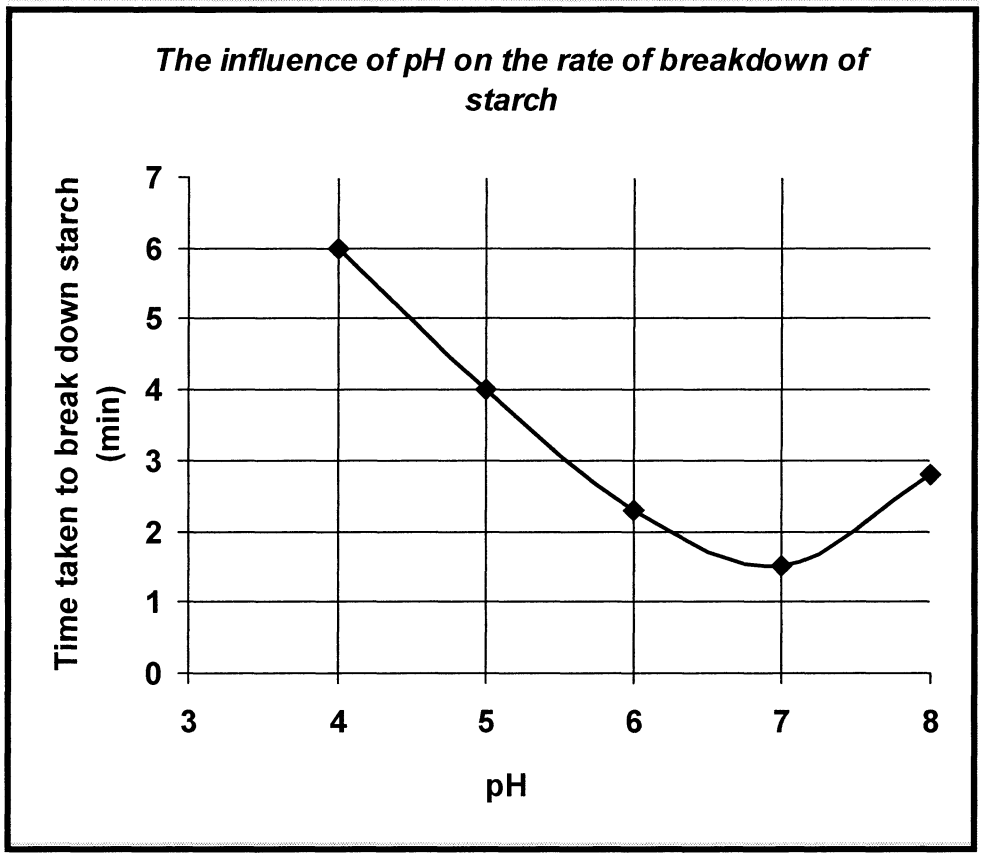
2.1.1 State whether the reaction represented by the diagram is anabolic or catabolic. (1)

2.1.2 Explain your answer to QUESTION 2.1.1. (2)

2.1.3 What does X in the diagram represent? (1)

2.1.4 The reaction of the enzyme in the diagram is reversible. Explain this statement using the letters M, N and P in the diagram. (2)
(6)

2.2 The accompanying graph shows the time taken for the complete breakdown of one gram of starch in the presence of an enzyme in solutions of different pH values. Study the graph and answer the questions that follow:



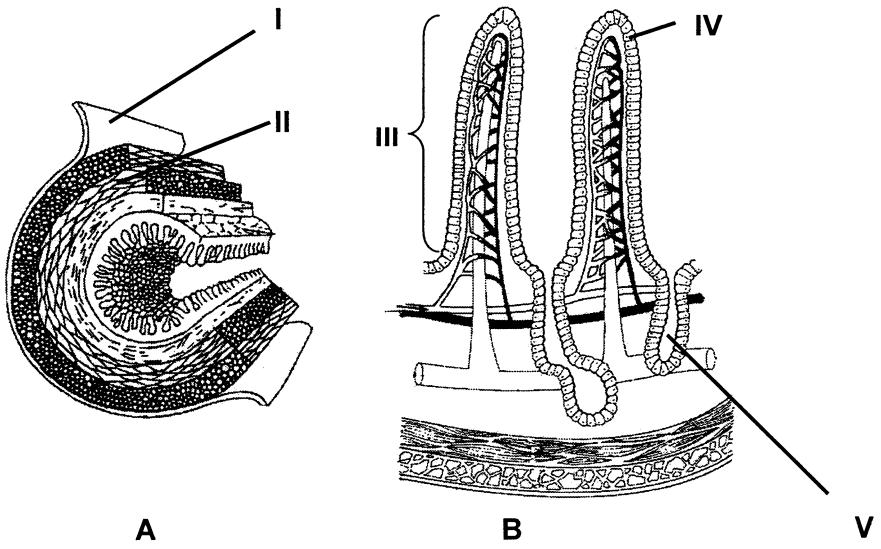
2.2.1 Identify the pH value at which the breakdown of starch was the fastest. (1)

2.2.2 How long did it take for the starch to be completely broken down when the pH was 5,5? (2)

2.2.3 After the starch was completely broken down, glucose was formed as a product. Describe a simple test that could be performed to identify this product. (3)

2.2.4 Name ONE region in the alimentary canal where this enzyme will not work very quickly. Give a reason for your answer. (3)
(9)

2.3 Study the following diagrams of structures found in the human digestive system and answer the questions that follow:



Structures found in the human digestive system

2.3.1 Identify structures represented by A and B. (2)

2.3.2 Which liquid is secreted at V? (1)

2.3.3 Provide labels for parts I and IV. (2)

2.3.4 Explain TWO ways in which structure III is adapted for its function. (4)

2.3.5 State ONE function of part II. (1)
(10)

TOTAL QUESTION 2: 25

QUESTION 3

3.1 The following table shows the average daily diet of a 15-year-old teenager. Study the information and answer the questions that follow:

Organic Nutrient	Sources of food	Average daily servings eaten by the teenager	Recommended daily servings for teenagers
I	Bread, cereal, rice	11	7 – 12
II	(a) Dairy products	2	2 – 3
	(b) Meat, fish, beans, nuts	2	2 – 3
III	(a) Vegetables	1	3 – 5
	(b) Fruit	1	2 – 4
IV	Lipids	8	Use sparingly

3.1.1 Use numbers I to IV to indicate an organic nutrient of which the teenager has:

(a) Extremely few servings (1)

(b) Sufficient servings (1)

3.1.2 Briefly explain how this diet will affect the teenager's:

(a) Physical development (2)

(b) Energy requirements (2)

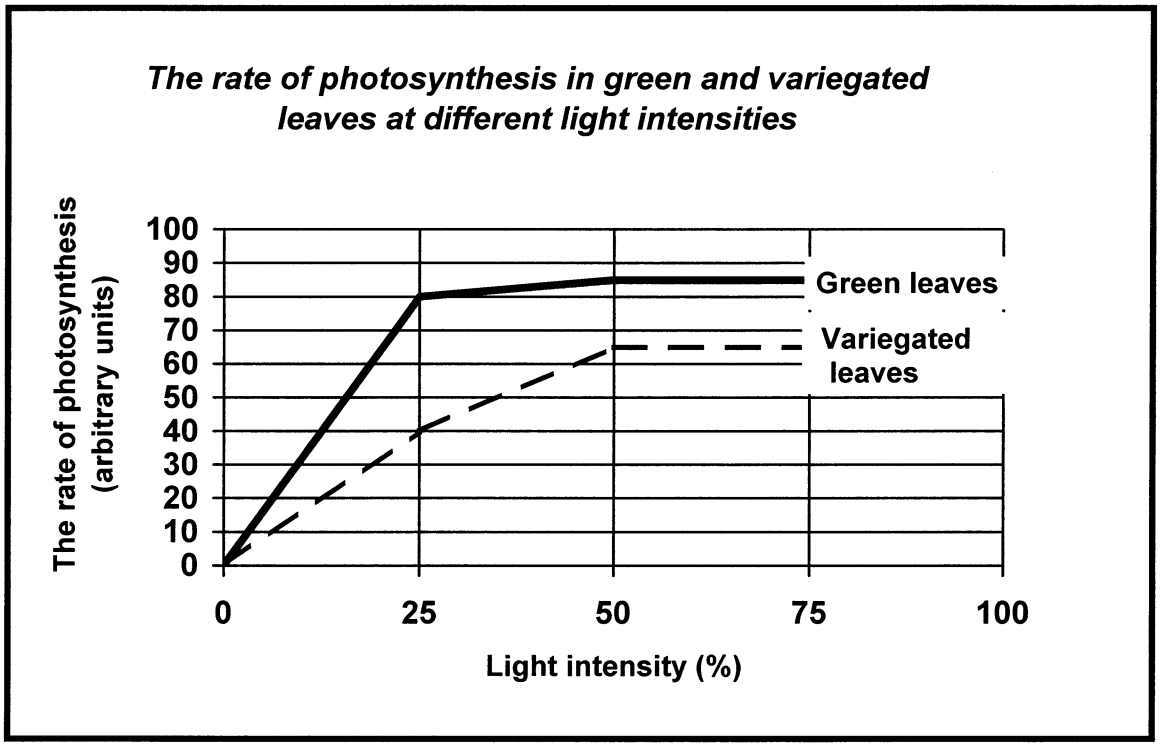
(c) Resistance to infections and diseases (2)

3.1.3 What would happen if the teenager continued to consume an average of eight servings of lipids daily until adulthood? (2)

3.1.4 Name the organic nutrients I and II, respectively. (2)

3.1.5 List THREE reasons why organic nutrient IV is important for the body. (3)
(15)

3.2 The graph below shows the rate of photosynthesis in green and variegated leaves at different light intensities. Study the graph and answer the questions that follow:



3.2.1 Indicate the rate of photosynthesis when the light intensity is 50% in:

(a) Green leaves (2)

(b) Variegated leaves (2)

3.2.2 What can be concluded about the difference in the rate of photosynthesis in green and variegated leaves? (2)

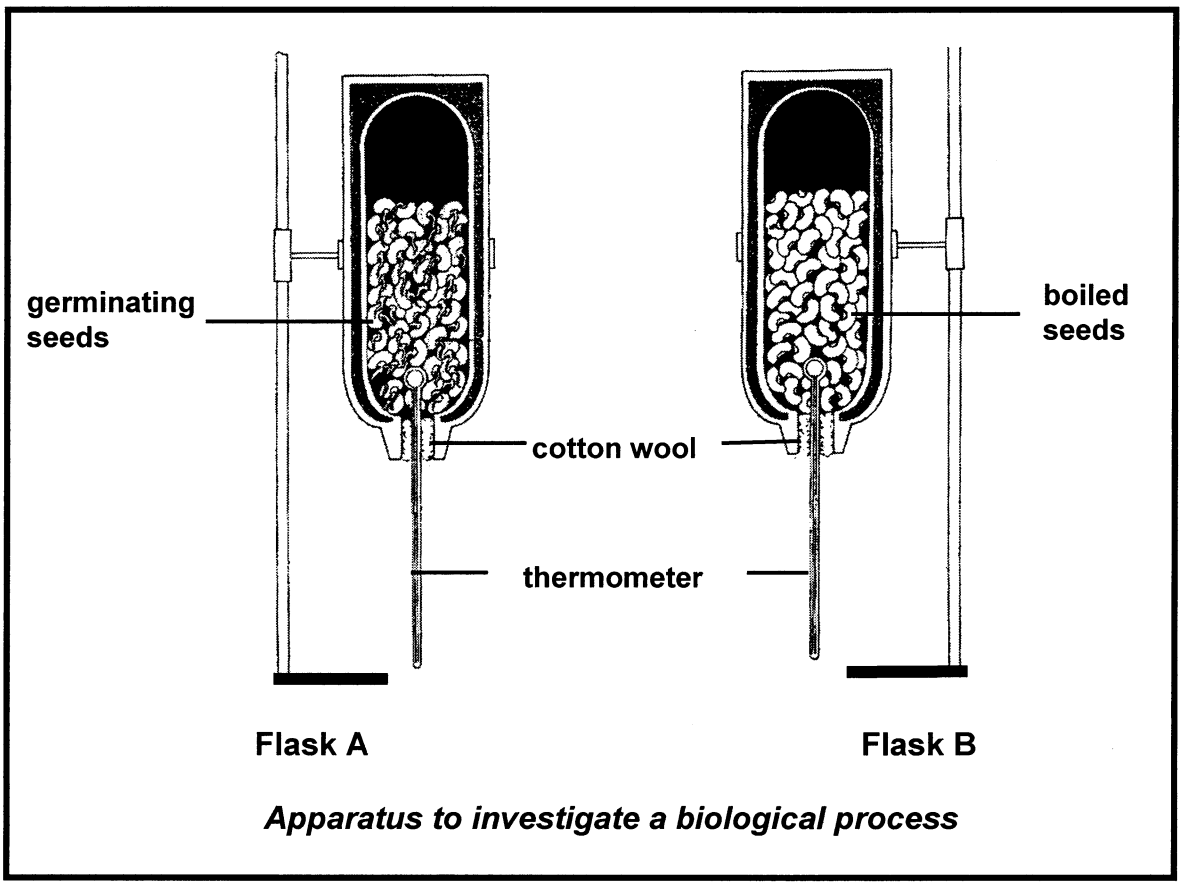
3.2.3 Give ONE reason for the difference in the rate of photosynthesis between the two types of leaves. (2)

3.2.4 List TWO ways in which photosynthesis is biologically important. (2)
(10)

TOTAL QUESTION 3: 25

QUESTION 4

4.1 In an experiment to investigate a certain biological process, two thermos flasks (A & B) were set up as illustrated below. Both the seeds and thermos flasks used in the investigation were washed in formalin.



Apparatus to investigate a biological process

4.1.1 What is the aim of this investigation? (2)

4.1.2 State and explain the results of this investigation in both flasks (A & B) after five days. (4)

4.1.3 Give an explanation for each of the following:

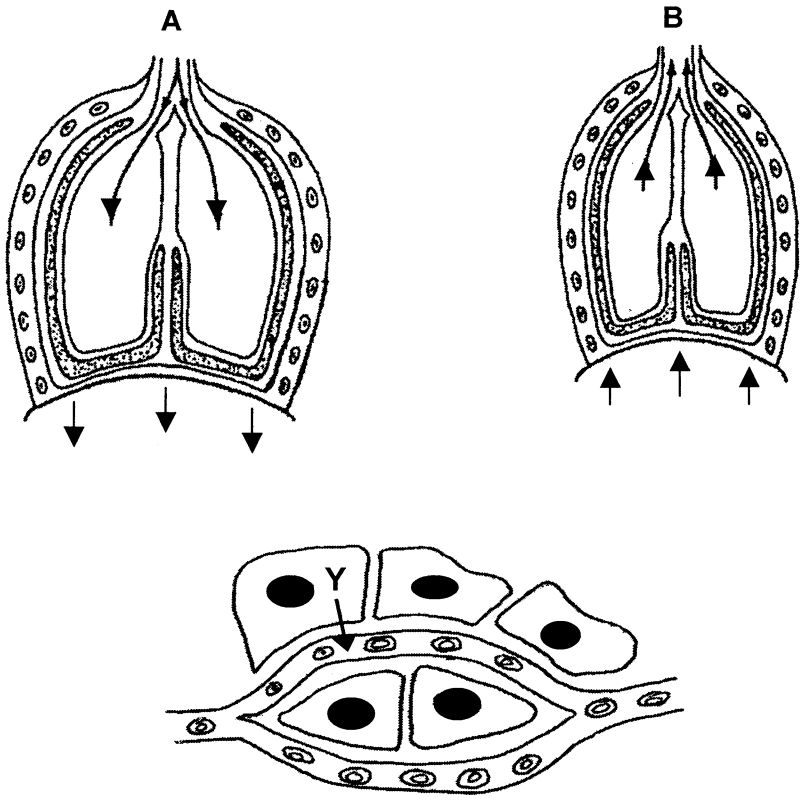
(a) The flasks were turned upside down. (2)

(b) The cotton wool in both flasks was kept moist. (2)

(c) Both flasks and the seeds were washed in formalin. (2)

4.1.4 Explain what would happen if the cotton wool in flask A was replaced with a rubber stopper. (2)
(14)

4.2 The following diagrams are based on the breathing mechanism and gaseous exchange in the human body. Study the diagrams and answer the questions that follow:



Breathing mechanism and gaseous exchange in the human body

4.2.1 Identify the phases in the breathing mechanism as represented by:

(a) A (1)

(b) B (1)

4.2.2 State the muscular activities that occur to bring about the process represented by B. (2)

4.2.3 Define the term *gaseous exchange*. (2)

4.2.4 Briefly describe the path taken by CO_2 from Y to the alveoli. Also refer to the different ways in which CO_2 is carried by blood. (5)
(11)

TOTAL QUESTION 4: 25

QUESTION 5

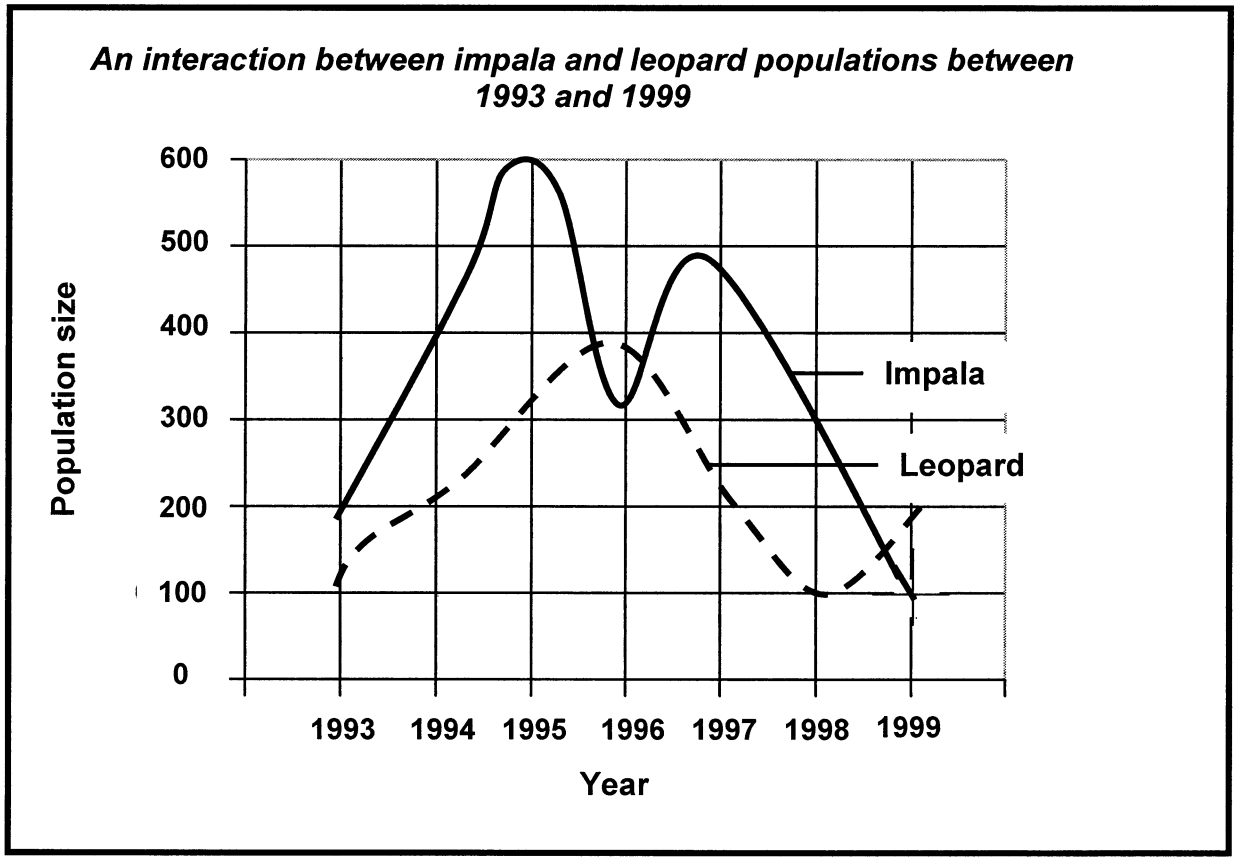
5.1 Provide a definition for each of the following concepts:

5.1.1 Population dynamics (2)

5.1.2 Density-independent factors (2)

5.1.3 Intra-specific competition (2)
(6)

5.2 The graph below shows an interaction between populations of impala and leopard. Study the graph and answer the questions that follow:



5.2.1 Identify the feeding interaction illustrated by the graph. (1)

5.2.2 Describe the feeding interaction referred to in QUESTION 5.2.1. (5)

5.2.3 How many of each of the following were there in 1997?

(a) Impala (2)

(b) Leopard (2)

5.2.4 State the maximum number of each of the following in this habitat:

(a) Impala (2)

(b) Leopard (2)

5.2.5 In which year did the impala population reach its lowest level? (2)

5.2.6 Calculate the difference in the population size of leopards between 1995 and 1998. Show ALL the calculations. (3)
(19)

TOTAL QUESTION 5: 25
TOTAL SECTION B: 100

GRAND TOTAL: 150