Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2018

LIFE SCIENCES P1

MARKS: **150**

TIME: **2½ hours**

This question paper consists of 18 pages.

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. Start the answers 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. ALL drawings must be done in pencil and labelled in blue or black ink.
7. Draw diagrams, flow charts or tables 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. Round off all calculations to two decimals after the comma.
12. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

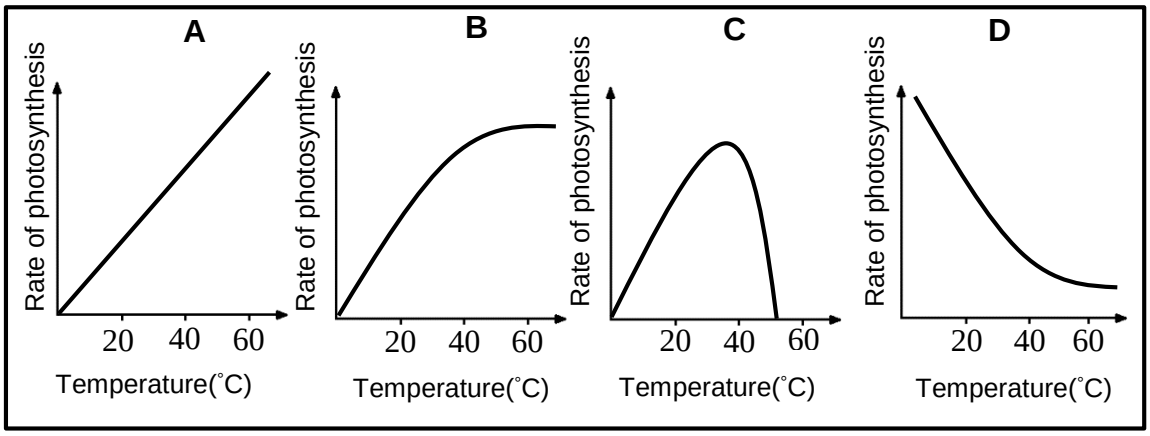
1.1.1 Carbon dioxide is carried in the blood mainly as …

A carb amino haemoglobin.
B carbonic acid in the erythrocytes.
C bicarbonate ions in the red blood cells.
D gas bubbles in the blood plasma.

1.1.2 The blood that exits the liver contains … compared to the blood that enters the liver.

A less glucose
B more oxygen
C more glucose
D less urea

1.1.3 The graphs below (**A, B, C** and **D**) represent the relationship between the rate of photosynthesis and temperature.



Which ONE of the graphs (**A, B, C** or **D**) represent the correct relationship between the temperature and the rate of photosynthesis?

A D
B A
C B
D C

1.1.4 The following components are involved in cellular respiration:

(i) Energy
(ii) Carbohydrates
(iii) Carbon dioxide
(iv) Water
(v) Oxygen

Which ONE of the following combinations show the correct way in which the components are involved?

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

1.1.5 *E.coli* bacteria living in the colon of the human digestive system is an example of …

A parasitism.
B mutualism.
C competition.
D commensalism.

1.1.6 Irritable bowel syndrome (IBS) is a medical term to describe a disease of the digestive system. Symptoms usually occur after certain foods or drinks were consumed. It can cause sudden and severe diarrhoea.

What consequence can this have for a person?

A Too much water and nutrients will be absorbed in the digestive tract
B Too little water will be absorbed, but the nutrients will be absorbed
C Too little nutrients will be absorbed, but water will be absorbed
D Too little water and nutrients will be absorbed

1.1.7 The sequence of plant succession on a bare piece of land is described below:

(i) Trees start to grow
(ii) Mosses and lichens grow and form soil when they die
(iii) Soil thickens and small shrubs grow
(iv) Soil develops and then grasses and small plants grow

Which of the following sequences leads to the emergence of stable climax community?

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

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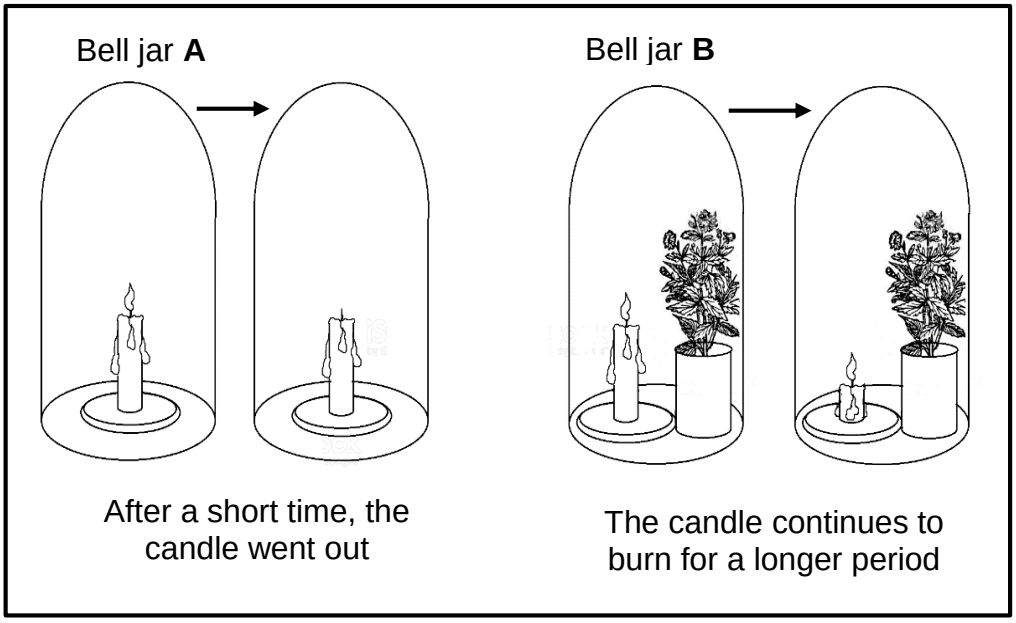
1.1.8 An experiment was set up to investigate whether oxygen is released during photosynthesis. The result of the experiment is represented in the following diagram.



The following deductions were made before arriving at the final conclusion.

(i) Photosynthesis reduces the amount of CO_2 inside bell jar **B**
(ii) The oxygen in bell jar **A** was completely used up and the burning is not supported
(iii) The photosynthesis increases the amount of oxygen inside bell jar **B**
(iv) The vapour produced inside bell jar **A** due to combustion extinguished the burning candle

Which ONE of the following set of deductions is correct?

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

1.1.9 Which ONE of the following represents an example of where there is no social organisation and the chances of survival are reduced?

A Division of labour in a bee hive
B A school of fish moving in various formations
C A predator hunting alone
D An alpha male in a lion pack is the only one to reproduce with the females

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1.1.10 A child is taken to the hospital and diagnosed with a form of malnutrition. Upon further investigation, doctors learnt that the child used only maize meal as food. From what type of malnutrition is this child most likely to suffer?

A Anorexia
B Kwashiorkor
C Marasmus
D Bulimia (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 number (1.2.1–1.2.9) in the ANSWER BOOK.

1.2.1 A type of malnutrition in which the person consumes large quantities of high-energy food

1.2.2 The form in which excess glucose is stored in a plant

1.2.3 Different populations occurring in a particular area

1.2.4 The one-way movement of organisms out of a population to a new area

1.2.5 The anaerobic respiration that occurs in yeast cells

1.2.6 The type of energy absorbed by chlorophyll

1.2.7 The type of relationship between two organisms where one completely outcompetes the other

1.2.8 The type of competition between members of different species

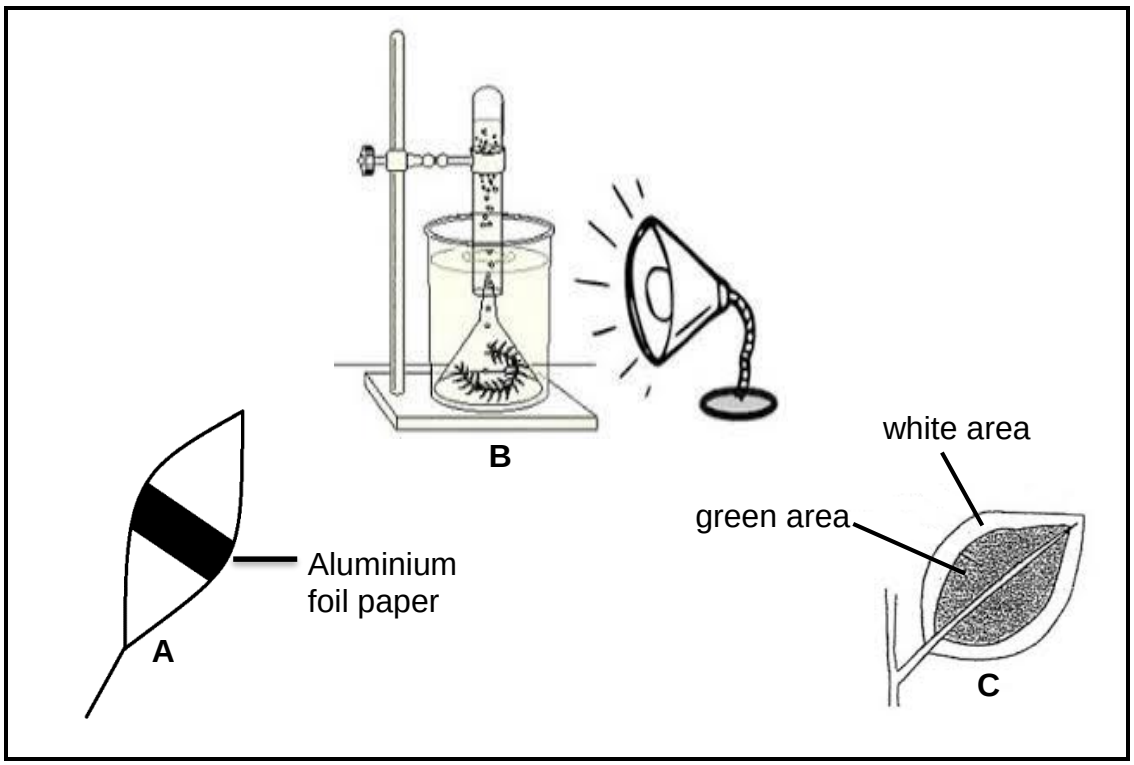
1.2.9 The position an organism occupies in an ecosystem (9 x 1) (9)

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 (1.3.1–1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Substances that need to be digested before absorption	A: Amino acids B: Glucose
1.3.2	Raw material(s) essential for photosynthesis	A: Oxygen B: Carbon dioxide
1.3.3	Examples of mutualism	A: Nitrogen fixing bacteria on the roots of legumes B: Barnacles on whales

(3 x 2) (6)

1.4 The following diagrams represent investigations involved in a process which takes place in green plants. The plant/leaves represented as **A** and **C** were exposed to sunlight for 4–5 hours.



1.4.1 Which investigation (**A**, **B** or **C**) is designed to test for the following?

(a) Chlorophyll is necessary for photosynthesis (1)

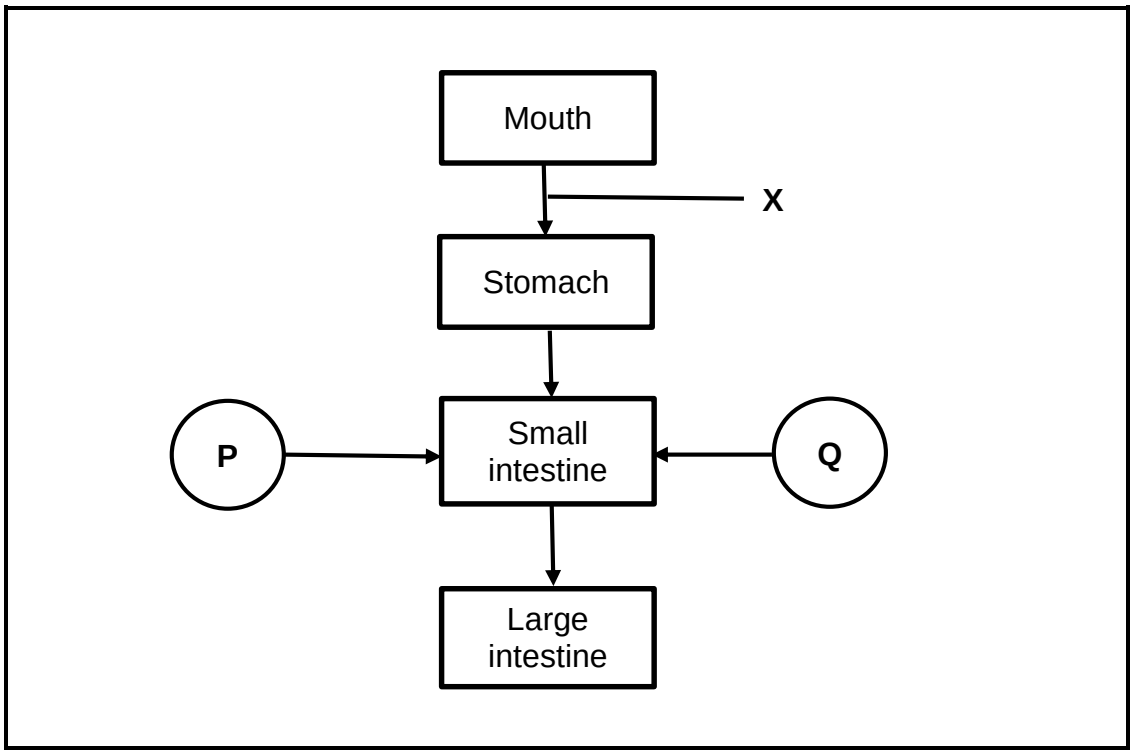
(b) Light is required for photosynthesis (1)

(c) Oxygen is produced during photosynthesis (1)

1.4.2 Give the LETTER of the investigation that does not show a control. (1)

1.4.3 Which investigation(s) need(s) a chemical to test for whether photosynthesis took place? (2)

1.5 The diagram below shows a diagrammatic representation of the digestive system.



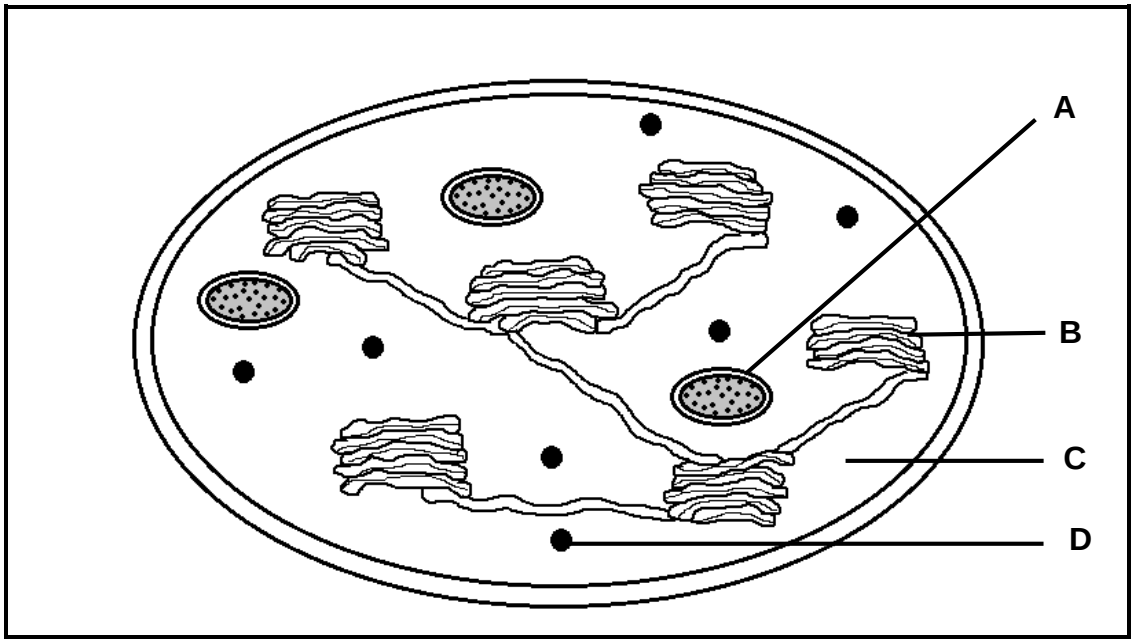
1.5.1 Name the part of the alimentary canal represented by **X**. (1)

1.5.2 By which process is food moved through structure **X?** (1)

1.5.3 Name the glands **P** and **Q** that release their secretions into the small intestine. (2)

1.5.4 Name the part of the alimentary canal where the digestion of proteins begins. (1)

1.6 The diagram below represents the structure of a chloroplast.



1.6.1 Identify:

(a) Part **C** (1)

(b) Structure **D** (1)

1.6.2 Give the function of the part labelled **A**. (1)

1.6.3 Name the part that will be active in light only. (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The table below shows a comparison between the fertility rates of people in developed and developing countries from 1950 to 2010.

Year	Developed countries	Developing countries
1950	2,8	6,1
1960	2,7	6,1
1970	2,2	5,4
1980	2,0	4,1
1990	2,0	3,4
2000	2,0	3,0
2010	2,1	2,7

2.1.1 Define the term *fertility rate*. (2)

2.1.2 Describe the trend in the fertility rates of both developed and developing countries. (3)

2.1.3 Give any TWO possible reasons for the trend in the fertility rates mentioned in QUESTION 2.1.2. (2)

2.1.4 If the trend shown in developed countries continues, explain the likely effects on their economies over the next 60 years. (3)

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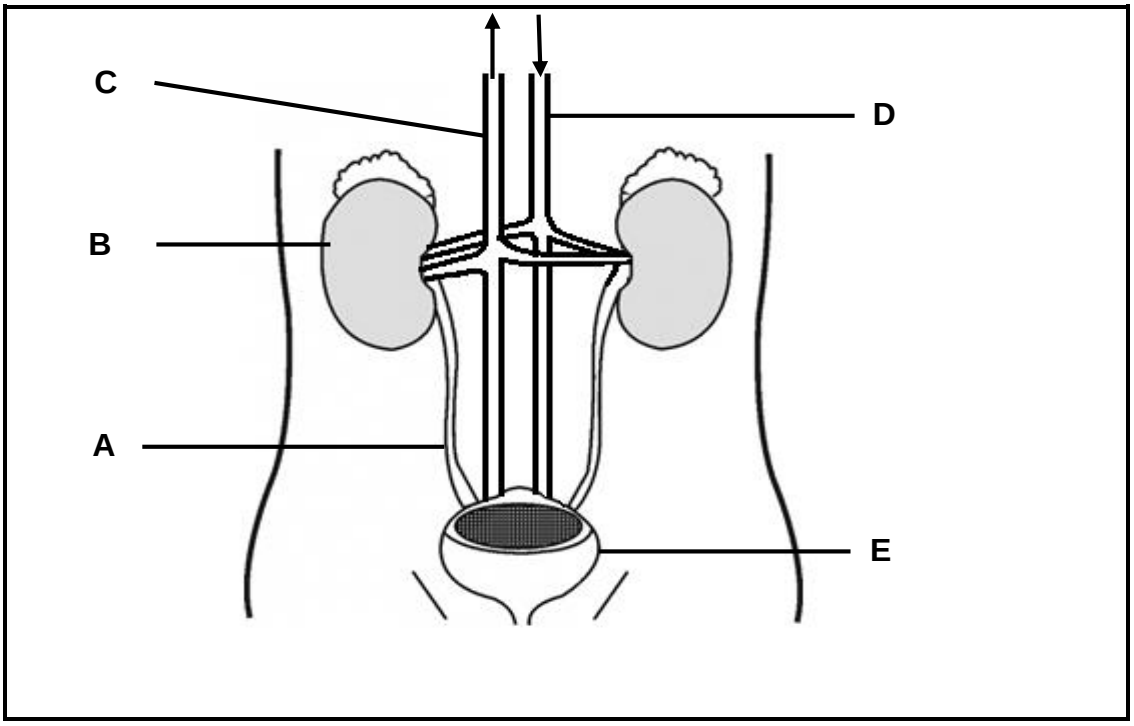
2.2 The diagram below shows the structure of the human urinary system.



2.2.1 Give labels for the following parts:

(a) **A** (1)

(b) **B** (1)

(c) **E** (1)

2.2.2 Give ONE difference between the composition of blood in **C** and **D**. (2)

2.2.3 The part labelled **B** consists of millions of micro-tubules called nephrons where blood is being filtered and purified. A part of the nephron is the Malpighian corpuscle/body.

Draw a labelled diagram of a Malpighian corpuscle/body. (4)

2.2.4 The flow of urine into the urinary bladder can be blocked at the part labelled **A**. The blockage causes severe pain and possible infection.

(a) What is the possible cause of blockage of urine in the part labelled **A**? (1)

(b) Give a possible preventative measure to avoid such blockages in the urinary system. (1)

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2.3 An investigation was performed to calculate the number of locusts in a maize field. Fifty locusts were caught in little cages, marked with little dots and then released again. Two weeks later 96 locusts were caught and 8 of them had dots on them.

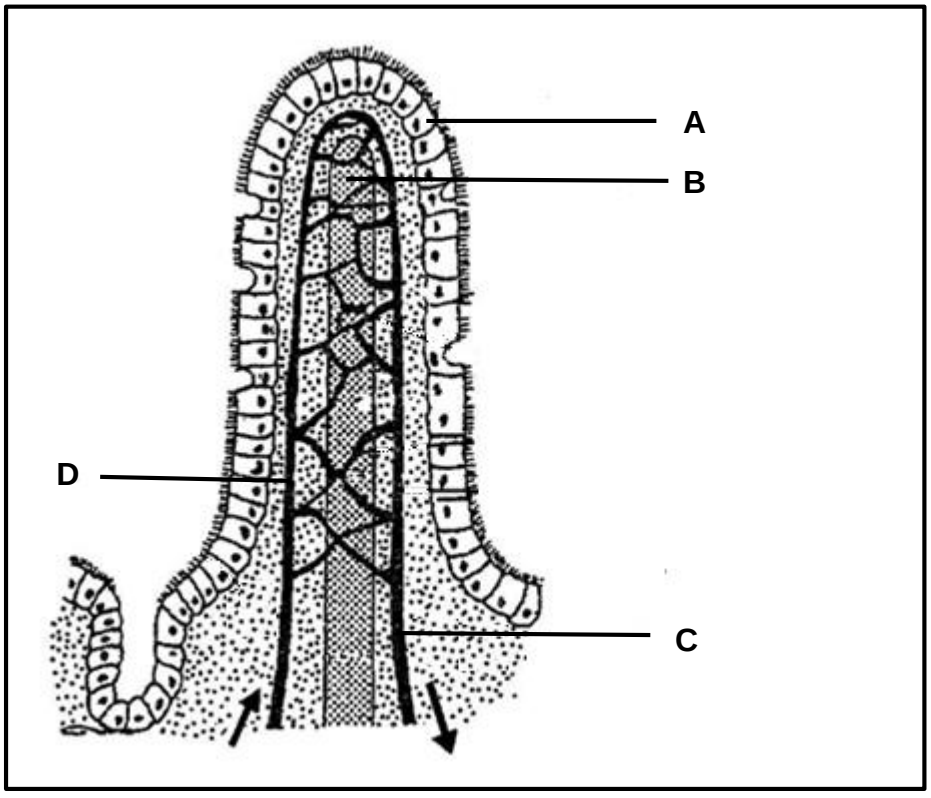
2.3.1 Which method was used to determine the population size? (1)

2.3.2 By using the formula below, calculate the estimated number of locusts in the maize field. Show all calculations.

$$P = \frac{M \times C}{R}$$ (3)

2.3.3 Mention TWO ways in which the accuracy of this investigation could be improved. (2)

2.4 The diagram below shows a structure associated with the digestive system.



2.4.1 Identify the structure shown in the diagram. (1)

2.4.2 Name the following parts:

(a) **A** (1)

(b) **B** (1)

2.4.3 In which part of the digestive tract would this structure be found? (1)

2.4.4 Explain TWO structural adaptations of the part mentioned in QUESTION 2.4.3 that enables it to perform its functions. (4)

2.4.5 In which part (**C** or **D**) would you expect to find more nutrients? (1)

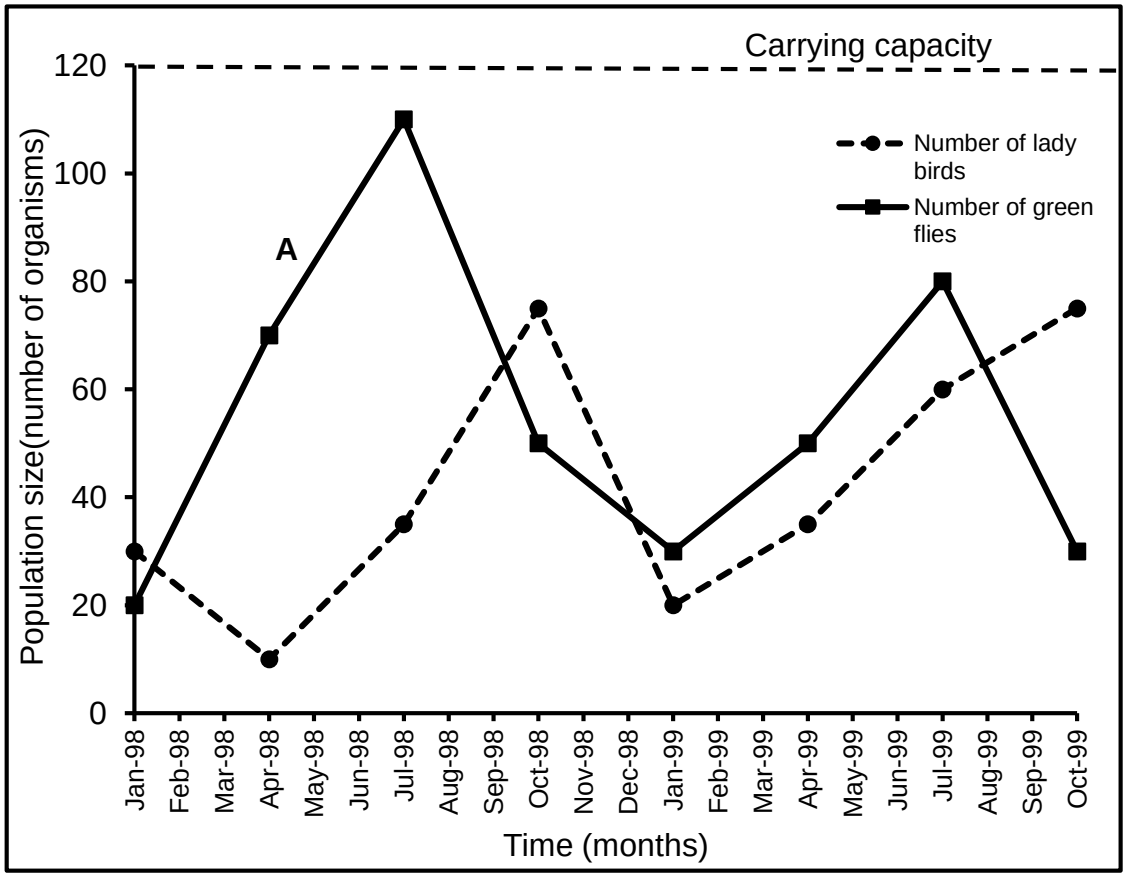
2.4.6 Explain your answer in QUESTION 2.4.5. (2)

2.4.7 Celiac disease is a disorder that makes human bodies react to gluten (a protein found in wheat, rye, barley and grains). The response by the immune system eventually damages the structures illustrated in the diagram above.

Explain the effects of this disease in the human body. (2)
[40]

QUESTION 3

3.1 The graph below represents an interaction between two organisms in an ecosystem.



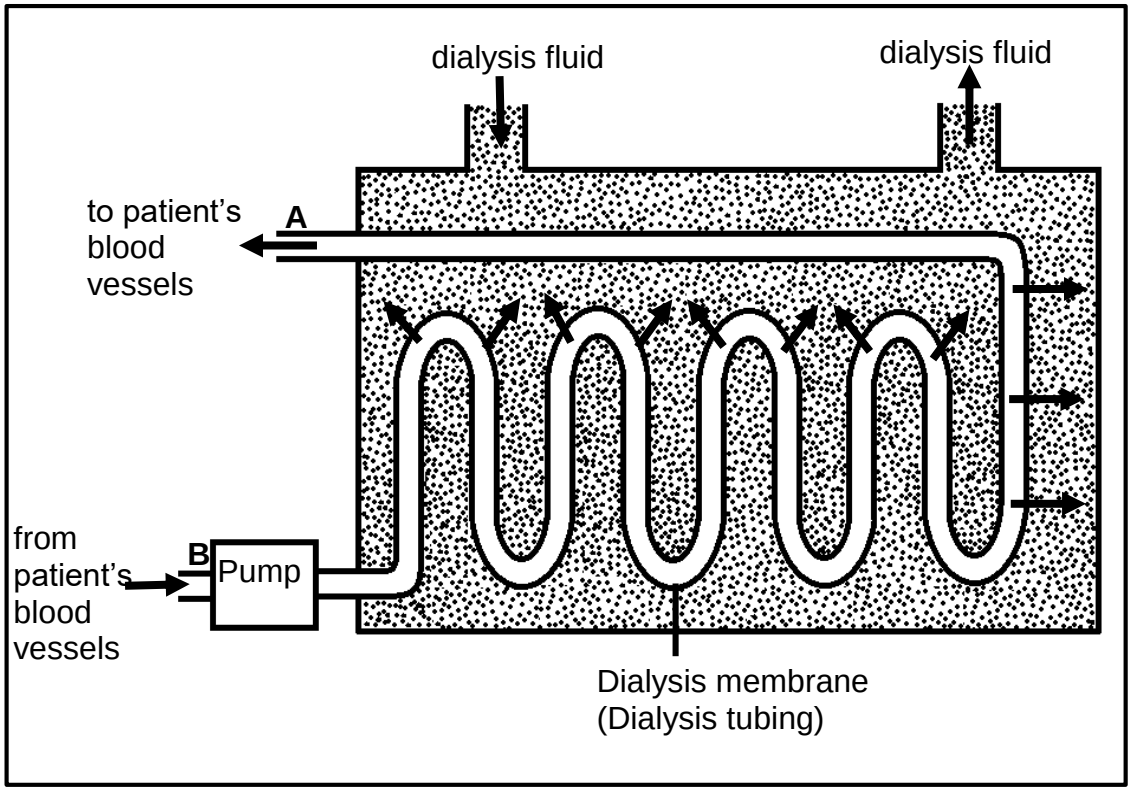
3.1.1 Give a suitable heading for the graph. (2)

3.1.2 What phase of growth is represented by **A**? (1)

3.1.3 Identify the prey population in the above graph. (1)

3.1.4 Explain why the chances of lady birds and green flies reaching the carrying capacity is limited. (3)

3.2 An extract on renal failure and its treatment is given below. (The diagram below represents a dialysis machine, used to treat patients with renal failure.)



Kidneys can become so damaged that they no longer function properly, and we say that the person has renal failure. People with severe renal failure can be treated by dialysis, using a dialysis machine, to purify the blood. Dialysis is the separation of molecules by size, the smaller molecules diffusing through a dialysis tubing (selectively permeable membrane). The process takes between three and six hours and needs to be done two or three times a week.

3.2.1 Describe what *renal failure* is. (2)

3.2.2 Which process is illustrated in the diagram above? (1)

3.2.3 At what point in the diagram (**A** or **B**) would you expect the highest concentration of urea? (1)

3.2.4 Describe how the purification of blood takes place in the dialysis machine. (3)

3.2.5 Explain why dialysis tubing needs to be selectively-permeable. (2)

3.2.6 Renal failure affects the osmoregulatory function of the kidney, so that it no longer excretes water efficiently. Explain the effect of renal failure on the patient's blood pressure. (3)

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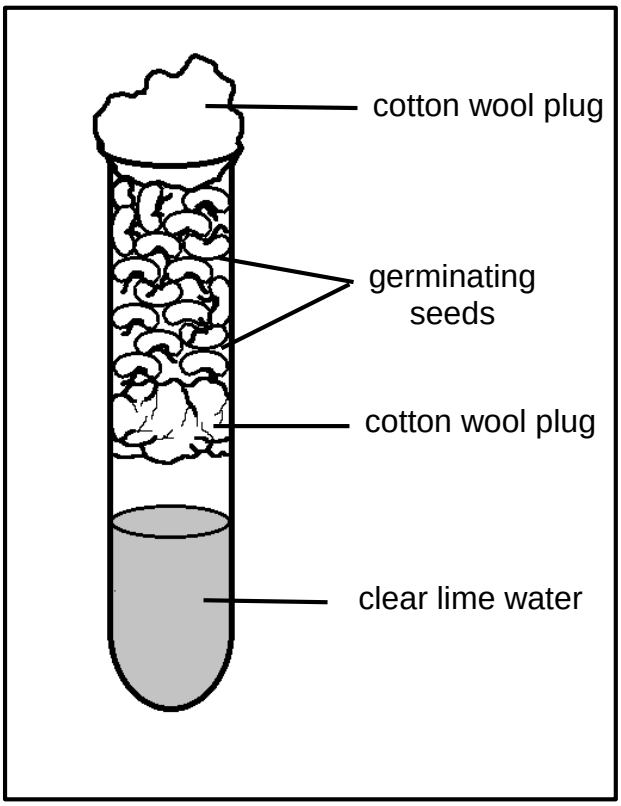
3.3 The apparatus below was used to carry out an investigation on aerobic respiration.

The experiment was set up as follows:

- 17 seeds of the same kind were used.
- The seeds and the apparatus were sterilised before the investigation.
- Once set up, the apparatus was placed in a dark cupboard at 35 °C
- A control was also set up.



3.3.1 Formulate a hypothesis for this investigation. (2)

3.3.2 What is the significance of sterilising the seeds before they are used? (1)

3.3.3 Give TWO controlled variables in this investigation. (2)

3.3.4 Explain how you would set up a control for this investigation. (3)

3.3.5 Explain why germinating seeds were used in this investigation. (2)

3.4 An experiment was carried out to calculate the rate of photosynthesis in a group of plants at different concentrations of carbon dioxide. This was repeated at two different light intensities. The results are given below.

CO_2 concentration (%)	Rate of photosynthesis (Arbitrary units)	
	Low light intensity	High light intensity
0,00	0	0
0,02	20	20
0,04	29	35
0,06	35	47
0,08	39	68
0,10	42	84
0,12	45	89
0,14	46	90
0,16	46	90
0,18	46	90

3.4.1 Identify the dependent factor in the above graph. (1)

3.4.2 Up to what values does CO_2 concentration act as a limiting factor at high light intensities? (1)

3.4.3 Name TWO limiting factors of photosynthesis other than the ones mentioned in QUESTION 3.4.2. (2)

3.4.4 Draw a line graph to represent the rate of photosynthesis under various concentrations of CO_2 at low light intensity. (7)

TOTAL SECTION B: 80

SECTION C

QUESTION 4

James is training for a race by running 20 km every day. Describe how oxygen is taken into his body and how it moves into his blood stream. Also describe how the carbon dioxide produced in his body during training is controlled to maintain normal levels.

Content: (17)
Synthesis: (3)

NOTE: No marks will be awarded for answers in the form of a chart or diagram.

TOTAL SECTION C: 20
GRAND TOTAL: 150

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