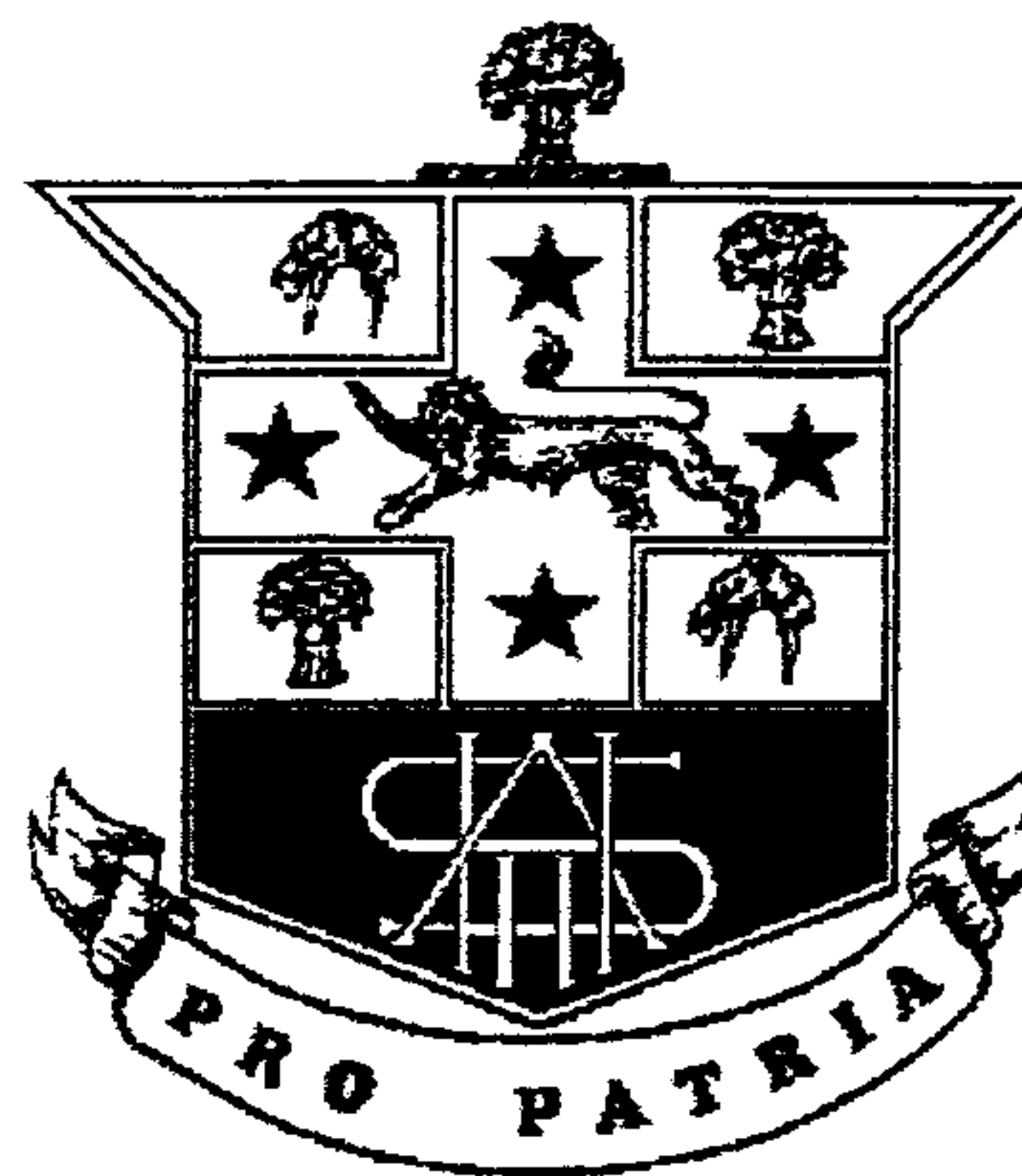


HURLSTONE AGRICULTURAL HIGH SCHOOL

AGRICULTURE

Half Yearly Examination

2007



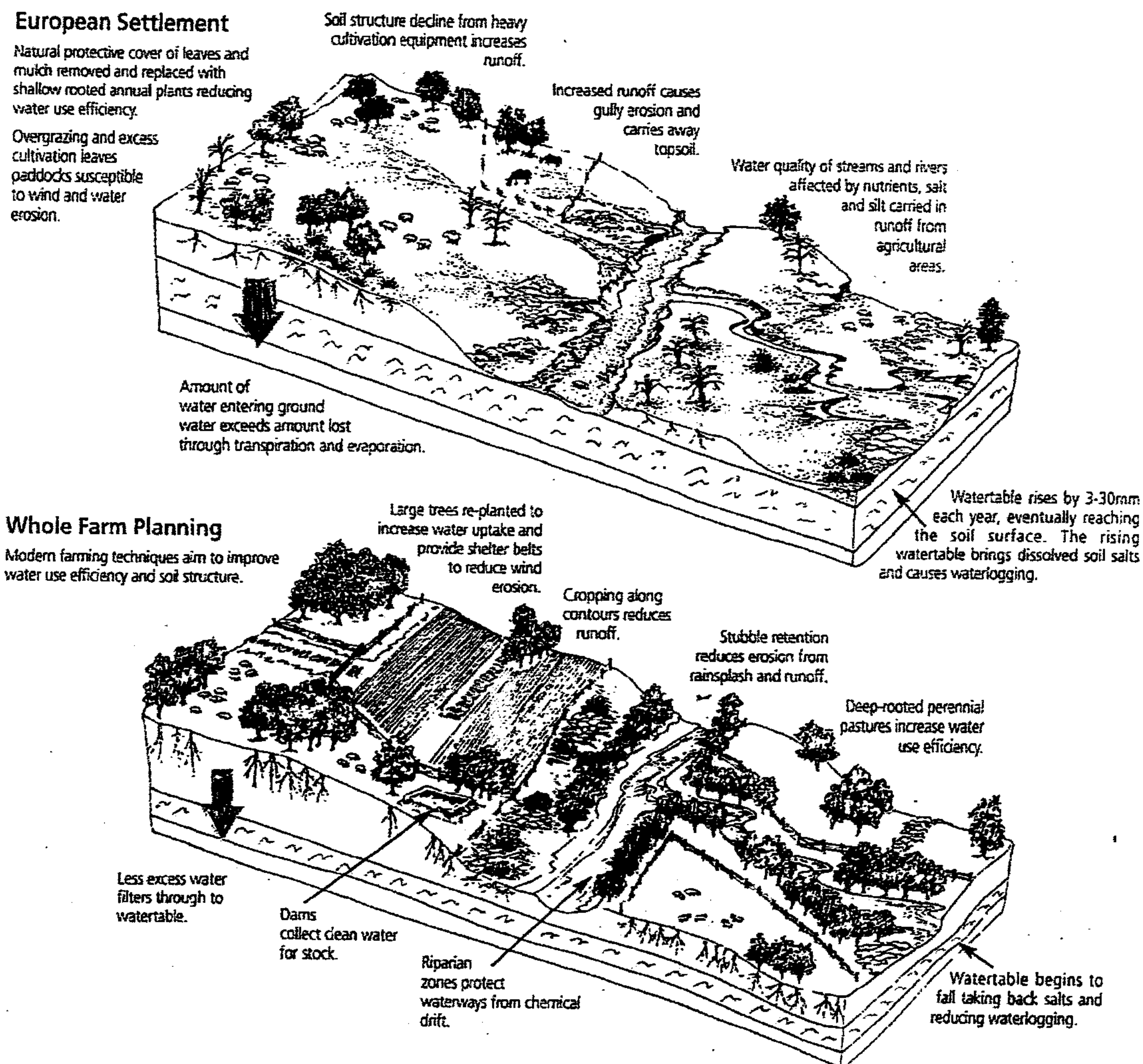
Time allowed: 90 minutes plus 5 minutes reading time

- Instructions:**
- * Place your name or student number on each of Sections 1, 2, 3 and 4.
 - * Answer all questions.
 - * Write in blue or black pen ONLY.

Value of exam: 80 marks

SECTION 1.

Question 1. The diagram shows how the use and care of farm lands has changed.



(a) From the diagrams complete the following table. (3 marks)
 Each of your answers is to be different.

Poor farming practice (non - sustainable) that has led to the problem	Resulting problem	Modern or sustainable farming practice to reverse problem
XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX	Groundwater rises bringing dissolved salts to root zone of trees and crop and pasture plants	XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX	Gully erosion	XXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX	River or stream water degraded by soil containing nutrients (from fertilizers) and salts washing into the stream.	XXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX

(b) Aboriginal land management practices, before Europeans arrived, were sustainable.

(i) Describe ONE of their land management practices.

(ii) Explain how it was sustainable.

(2 marks)

Question 2.

Evaluate the use of introduced pasture species in sustainable pasture management systems.

(5 marks)

Recommended Response Length (this is a guide only).	
Value of the question (marks)	Recommended length of answer (number of lines)
1	2
2	4
3	7
4	10
5	13
6	16
7	19
8	22

DO NOT WRITE IN THIS BOOKLET – use your own paper

DO NOT WRITE ON THIS EXAM PAPER
SECTION 2.

Question 3.

- (a) Explain how the surface area of clay and organic matter particles give them the ability to supply plants with their nutrient needs. (2 marks)

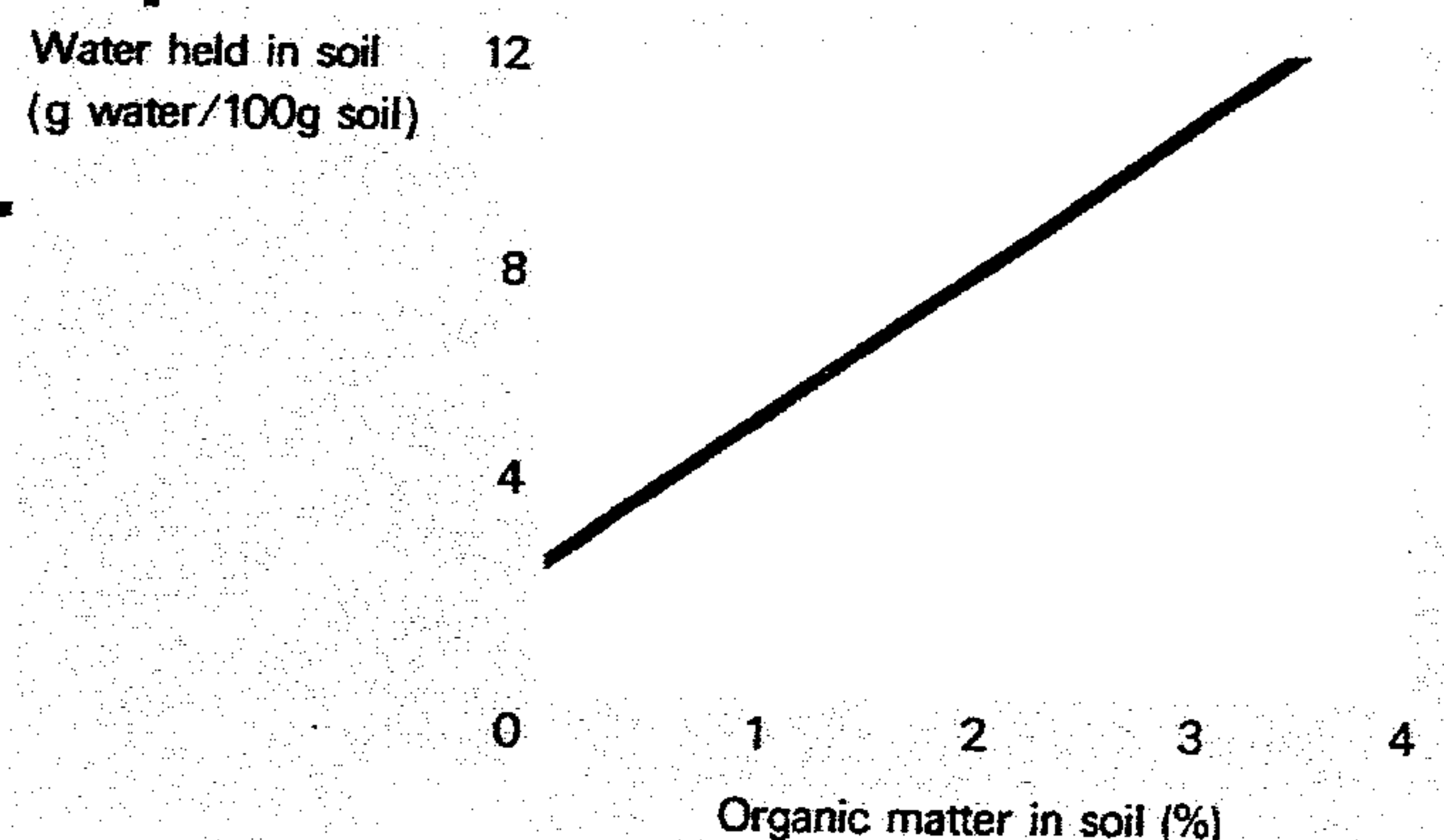
Surface areas of soil particles	
Particle	Square cm per gram
Coarse sand	23
Fine sand	90
Very fine sand	230
Silt	450
Clay	around 8,000,000
Organic matter	around 8,000,000

- (b) Clay soils tend to have many physical problems. Explain using examples what is meant by this. (3 marks)

- (c) A fertile soil contains many nutrients. State **four other** characteristics of a fertile soil. (2 marks)

- (d) State THREE conclusions that can be drawn from the following table and graph. (3 marks)

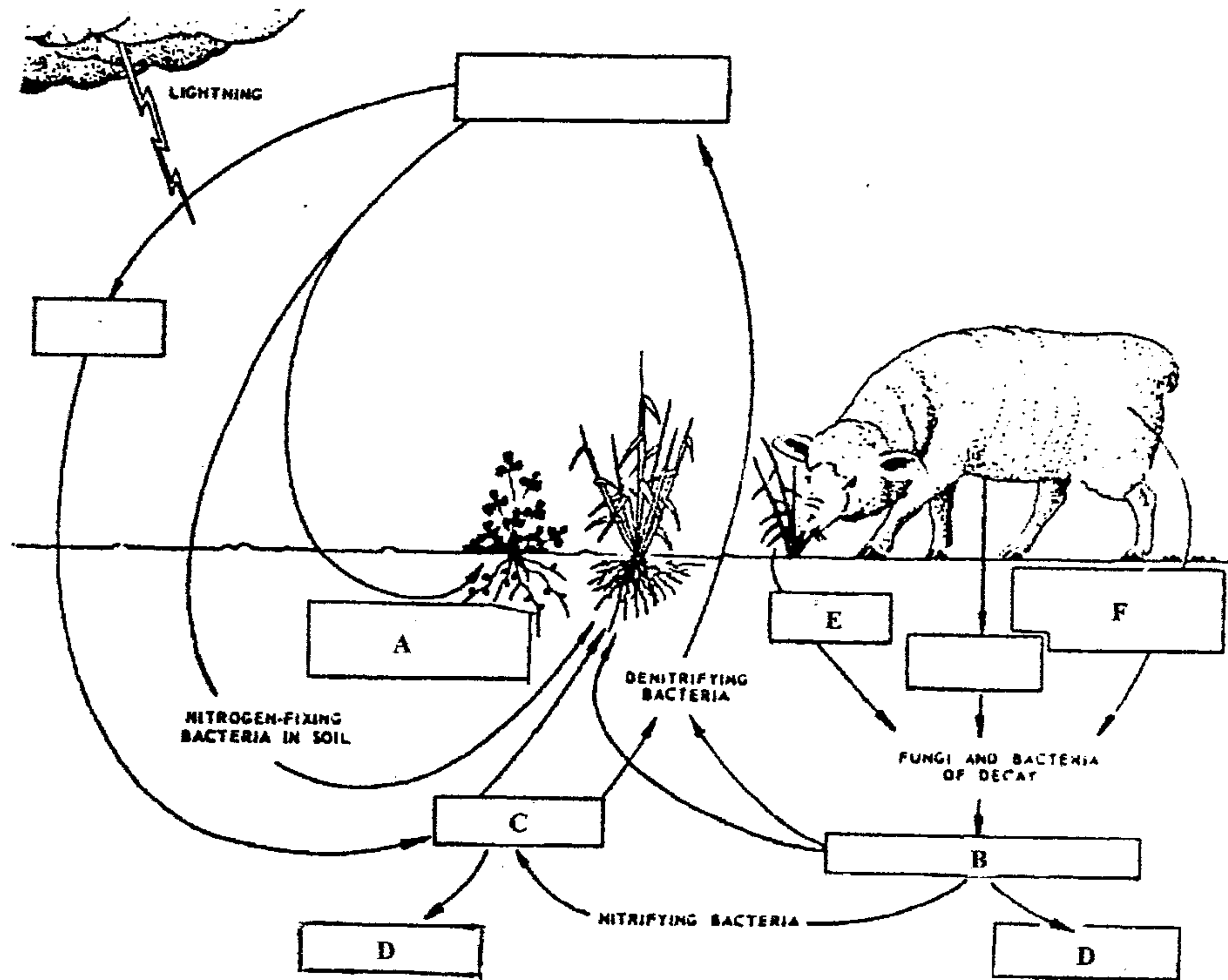
pH	Exchange units per 100 g	
	Clay	Organic matter
5	50	200
6	56	245
7	60	290
8	65	340



- (e) Describe two methods that a farmer can use to improve the organic matter levels in soils. (2 marks)

Question 4.

The diagram represents the Nitrogen cycle.



(a) Correctly label parts A to F.

(3 marks)

(b) Describe FOUR practices that can be used by the farmer to improve the nitrogen cycle on the farm.

(4 marks)

Question 5.

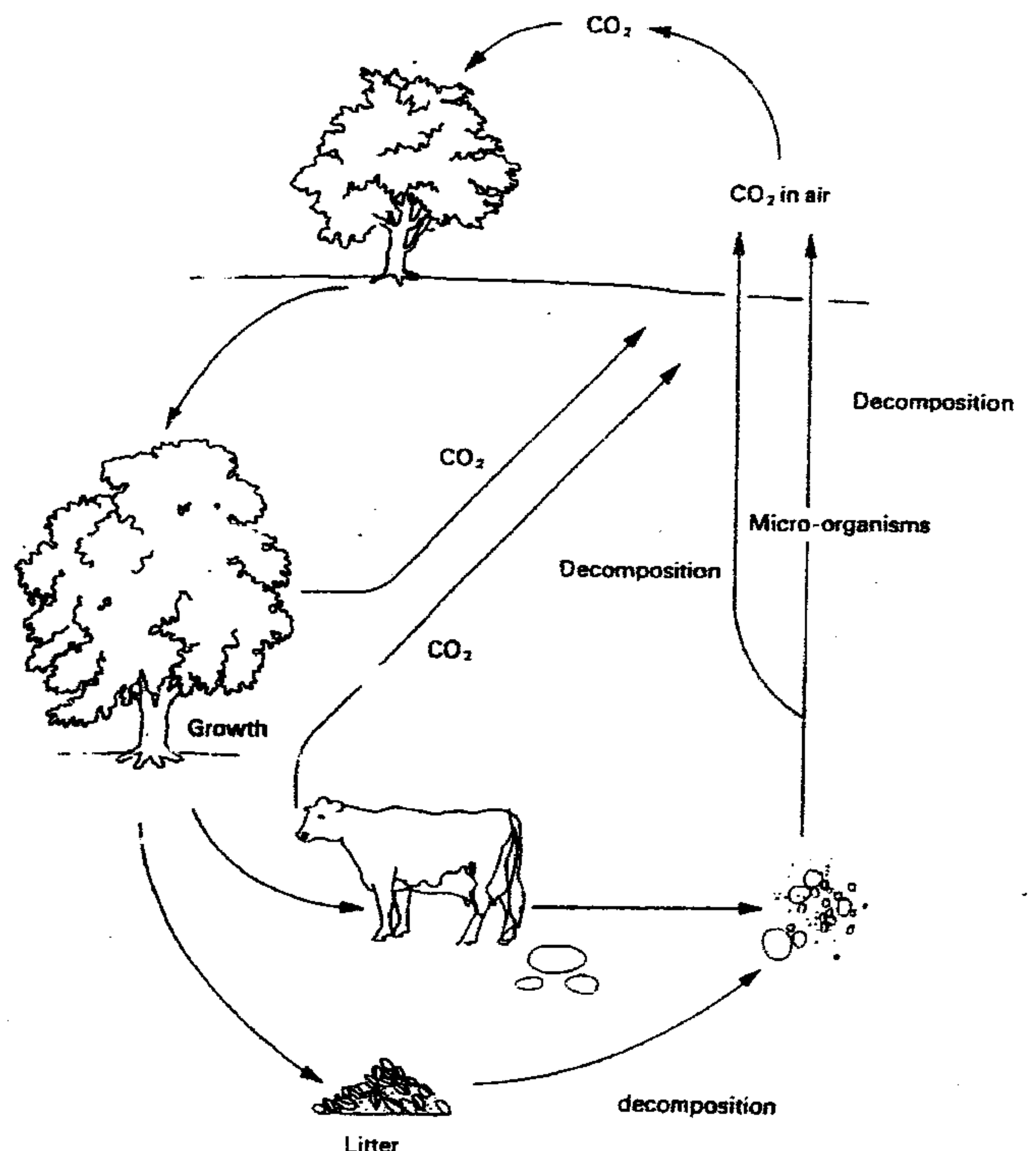
The diagram shows the Carbon cycle.

(4 marks)

(a) Name the process that uses carbon dioxide (CO₂)

(b) Name the plant and animal process that releases CO₂.

(c) Describe the role that farmers can play with carbon credits and debits.

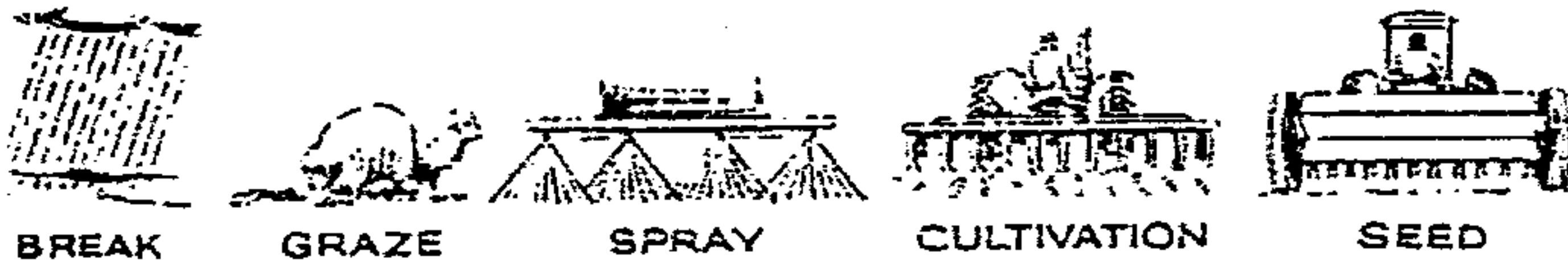


Question 6.

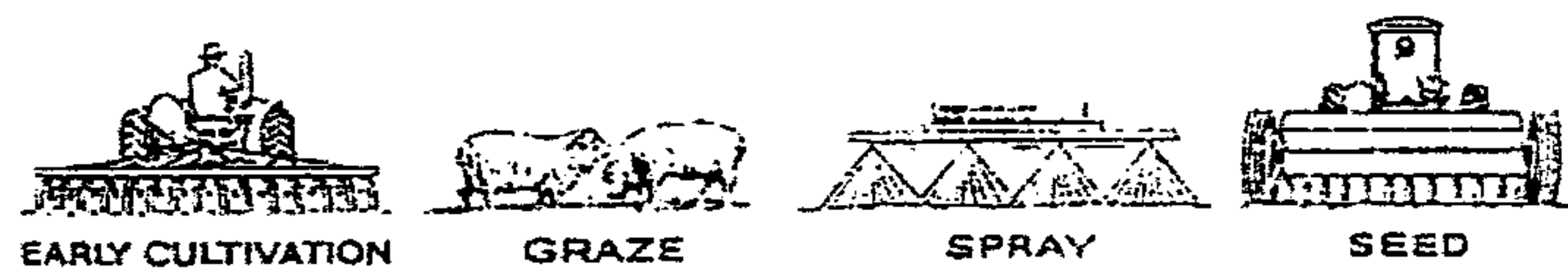
(a) Minimum tillage (soil preparation before sowing seeds) is a sustainable practice that many farmers have adopted to reduce the number of times the soil is cultivated or ploughed.

Diagrams: Showing two minimum till methods. The "break" represents rainfall that stimulates weed growth.

Spray – cultivate – seed



Cultivate – spray – seed



Evaluate minimum tillage as a sustainable practice.

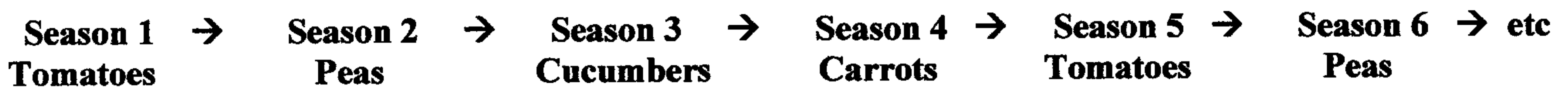
Show in your answer an understanding of the meaning of sustainable farming.

(4 marks)

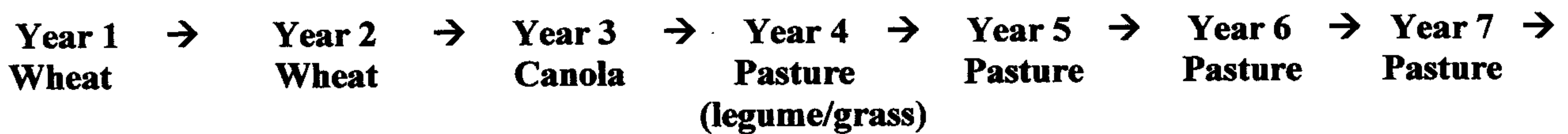
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(b) The diagram shows some examples of the sustainable practice of crop rotation.

Example 1: Vegetable growing



Example 2: Crop - pasture rotation



Describe three advantages that are gained through the use of crop rotation.

(3 marks)

SECTION 3

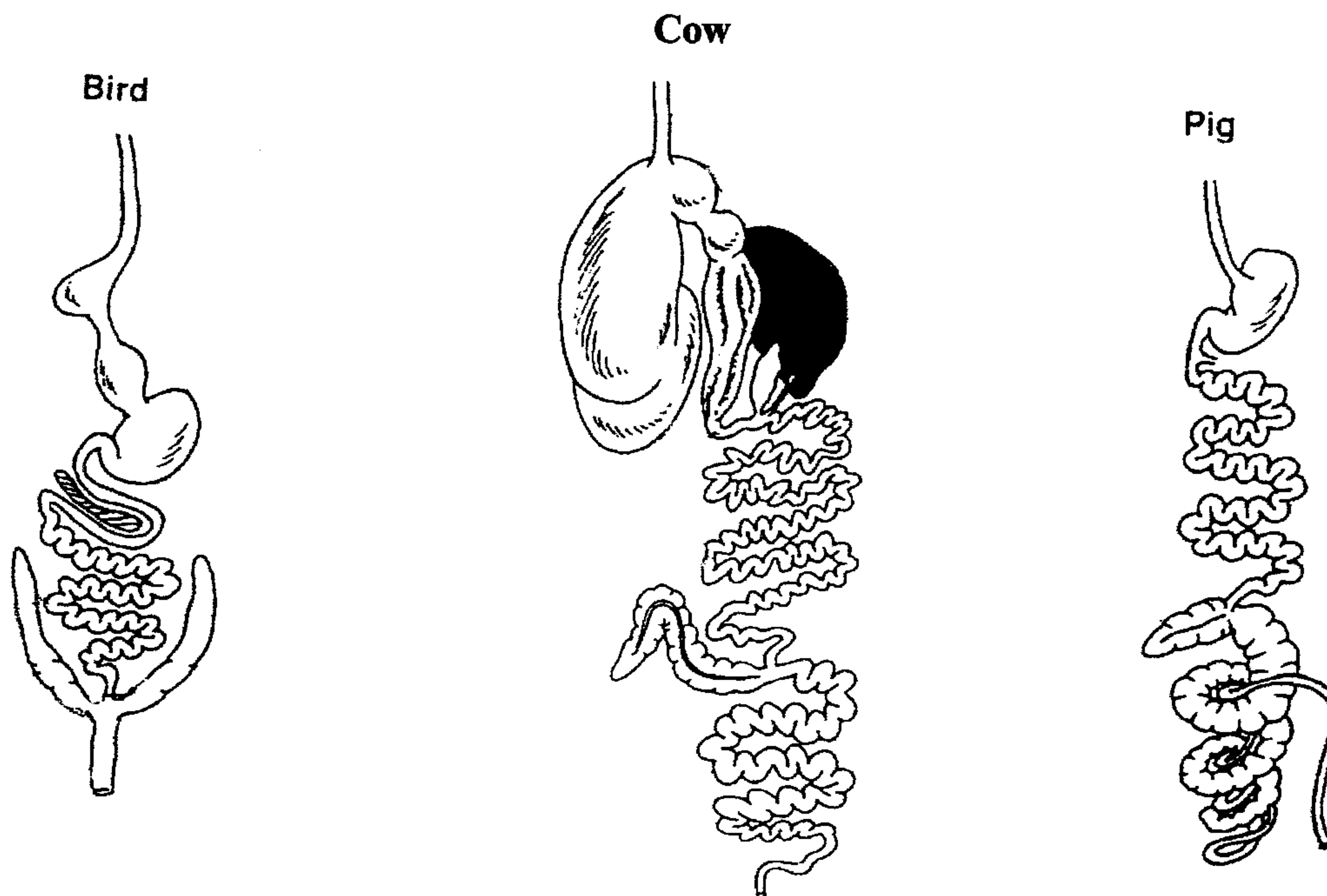
Question 7.

(a) On the ruminant diagram and on ONE of the monogastric diagrams, label correctly the following using arrows.

Make your labeling very clear.

The parts to label are - true stomach, small intestine, caecum (or caeca) and large intestine.

(2 marks)



DO NOT write in this booklet!

(b) For the following -

- Carbohydrate (cellulose, starch) digestion;
- Providing in the diet the vitamins needed.

Compare the ruminant with the monogastric animal.

(4 marks)

(c) Ruminant animals are special in that Non-Protein-Nitrogen (NPN) and By-pass protein can be added to their diet.

Explain how and why these supplements are used.

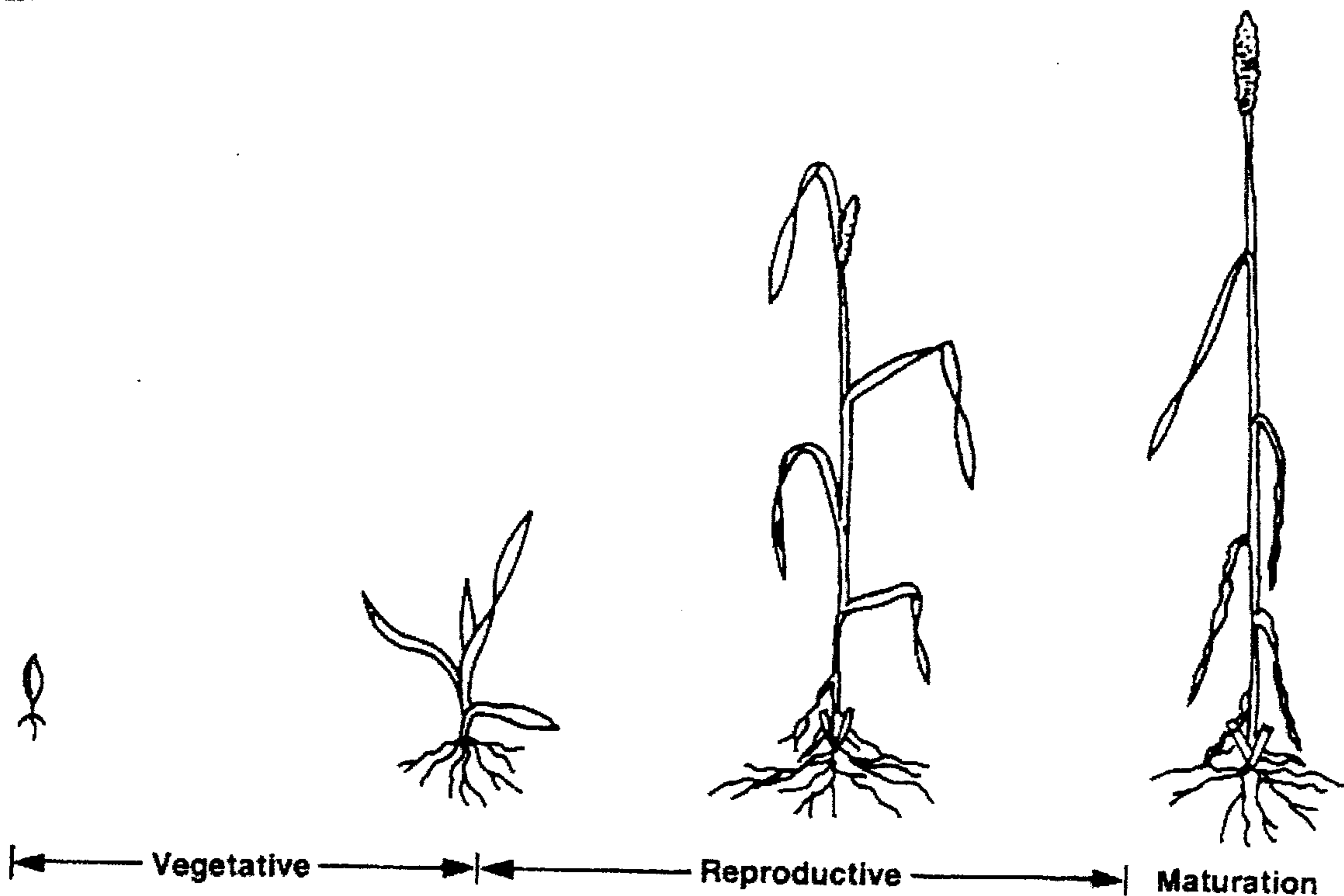
(4 marks)

<i>Recommended Response Length (this is a guide only).</i>	
Value of the question (marks)	Recommended length of answer (number of lines)
1	2
2	4
3	7
4	10
5	13
6	16
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8	22

SECTION 4.

Question 8.

(a) The diagram below shows the growth of a typical agricultural crop plant.



- (i) One of the processes that results in the growth of plants is photosynthesis. Write a word equation for photosynthesis. (1 mark)
- (ii) Describe the relationship between Net Assimilation Rate (NAR), Photosynthesis and Respiration. (3 marks)
- (b) Environmental constraints or factors can prevent the plant shown in the diagram above, from reaching its genetic potential.
- (i) State FOUR of these constraints or factors. (2 marks)
- (ii) For ONE of these environmental factors, outline TWO management strategies that could be used to reduce the impact of the environmental constraints. (3 marks)
- (c) Using ONE named crop that you have studied, describe how an understanding of the interaction of genotype with the environment can be used to enhance plant productivity. (2 marks)

(d) The diagram that follows, illustrates one aspect of plant interference.

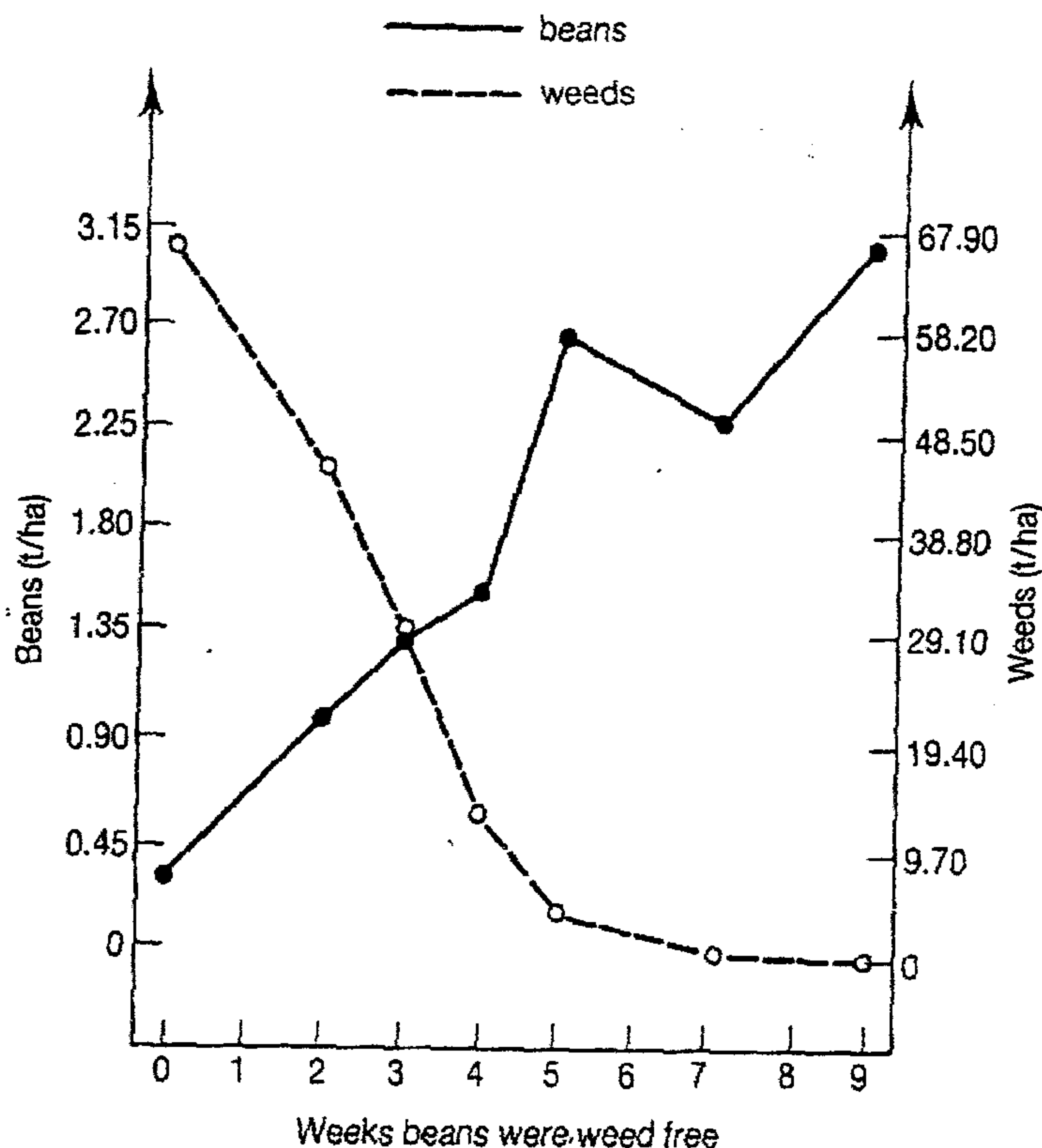


Figure 52 *Effect of weeds on a crop of field beans*

- (i) Interpret the diagram above. (2 marks)
 - (ii) Name the type of interference illustrated in the above diagram. (1 mark)
 - (iii) Name ONE other type of plant interference that can reduce plant productivity and for a named crop example, explain how the plant crop is affected. (3 marks)
- (e) Describe the pattern of pesticide use that is most likely to lead to pesticide resistance problems. (2 marks)
- (f) "A plant pest or disease problem involves complex interactions between the problem organism, the host and the environment."
For a crop pest OR disease you have studied, explain the meaning of the above quote. (2 marks)
- (g) With reference to a named plant or cropping system you have studied, explain how Integrated Pest Management (IPM) can minimize the problems associated with pesticide use. (3 marks)
- (h) Plant breeding is a significant aspect of plant production.
- (i) State FOUR characteristics that a plant breeder may aim to improve. (2 marks)
 - (ii) For TWO named plant breeding systems or methods, describe the genetic basis of each system and for each, explain how it benefits plant production. (4 marks)

END OF EXAM.