1 The table shows the area of land used, in hectares, to grow tea plants at different altitudes (height above sea level) in Sri Lanka between the years 1990–2000.

	Area of land used in hectares			
Year	**High altitude**	**Medium altitude**	**Low altitude**	**Total**
1990	73 138	83 223	65 397	221 758
1992	74 141	85 510	62 185	221 836
1994	51 443	56 155	79 711	187 309
1996	52 272	56 863	79 836	188 971
1998	51 444	58 155	79 711	189 310
2000	52 272	56 863	79 836	188 971

(a) Describe the changes that have taken place in the area of land used to grow tea plants between 1990 and 2000.

(3)

(b) (i) An area of land at high altitude is cooler than an area of land at low altitude.

Suggest and explain how this difference in temperature might affect the growth of tea plants.

(2)

(ii) Give two factors, other than temperature, that could affect the growth of tea plants.

(2)

1 .....

2 .....

(c) Describe how the tea grower could use a quadrat to estimate the total mass of tea plants growing in a large area of land.

(3)

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(Total for Question = 10 marks)

2 Aphids are insect pests. They feed on broad bean plants.

The aphids can be controlled by lacewing larvae.



Photographer: Joaquim Alves Gaspar, May 2010

(a) Use this information to draw a food chain in the space below.

(2)

(b) A student wanted to compare the ability of two different species of predator, lacewings and hoverflies, to control aphids. Lacewings were released, on day 0, into one field of broad beans (field X), and hoverflies were released into a different field of broad beans (field Y).

The table shows his results.

Field X			Field Y		
Time in days	Number of individuals per m^2		Time in days	Number of individuals per m^2	
	aphids	lacewings		aphids	hoverflies
0	762	22	0	752	22
3	770	112	3	740	112
6	768	180	6	470	240
9	770	260	9	90	230
12	520	260	12	2	120
15	30	255	15	40	0
18	0	255	18	240	0

Use information in the table to answer the following questions.

(i) Suggest two reasons why lacewings might be better predators to use to control aphids than hoverflies.

(2)

1 .....

2 .....

(ii) Suggest one reason why hoverflies might be better predators to use to control aphids than lacewings.

(1)

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(c) (i) Other than predation, name two biotic (living) factors that may affect aphid numbers.

(2)

1 .....

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2 .....

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(ii) Name two abiotic (non-living) factors that may affect aphid numbers.

(2)

1 .....

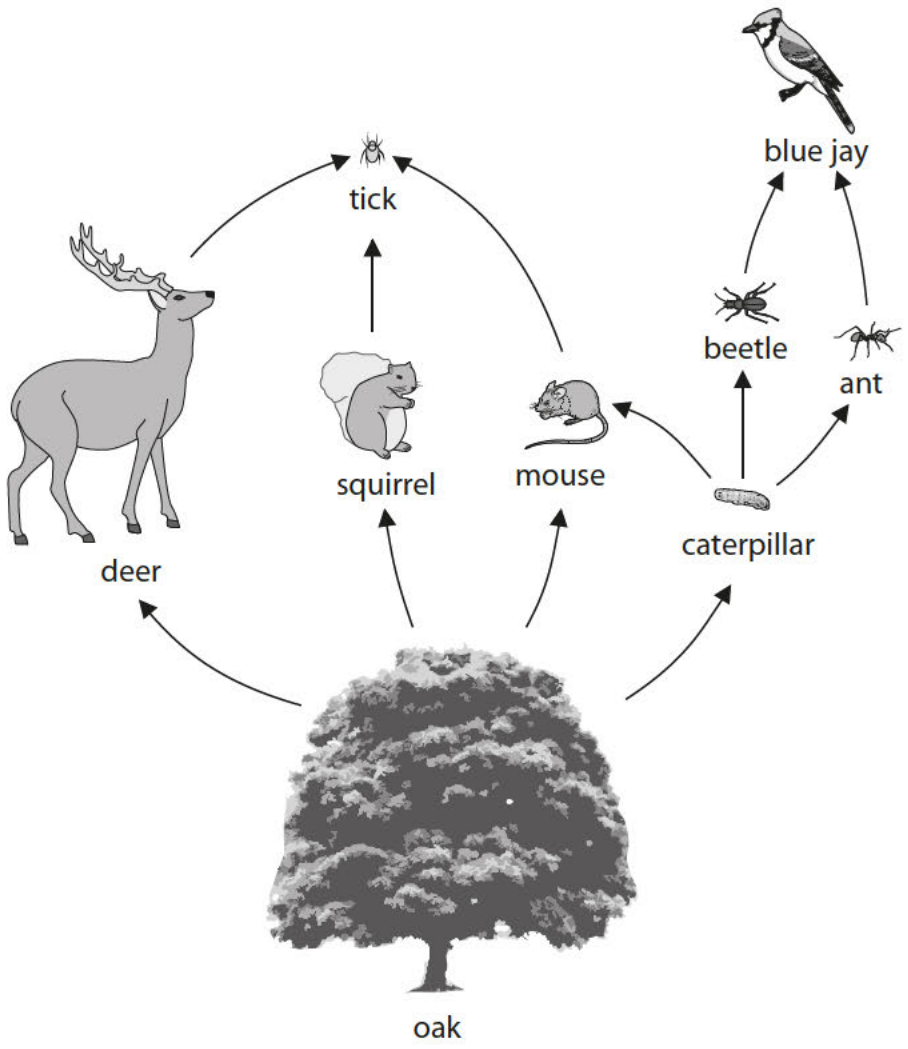
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2 .....

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(Total for Question = 9 marks)

3 The diagram shows part of a food web in an oak forest.



(a) Use the information in the food web to complete the statements in the table. The first one has been done for you.

(4)

Statement	Number
the number of animals is	8
the number of producers is	
the number of herbivores is	
the number of secondary consumers is	
the number of food chains is	

(b) (i) What effect would a decrease in the population size of caterpillars have on the population size of blue jays?

(1)

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(ii) What is meant by the term **population**?

(1)

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(c) The tick feeds on deer by sucking their blood.

Name two different molecules that are found in the blood of deer that the tick could feed on.

(2)

1 .....

2 .....

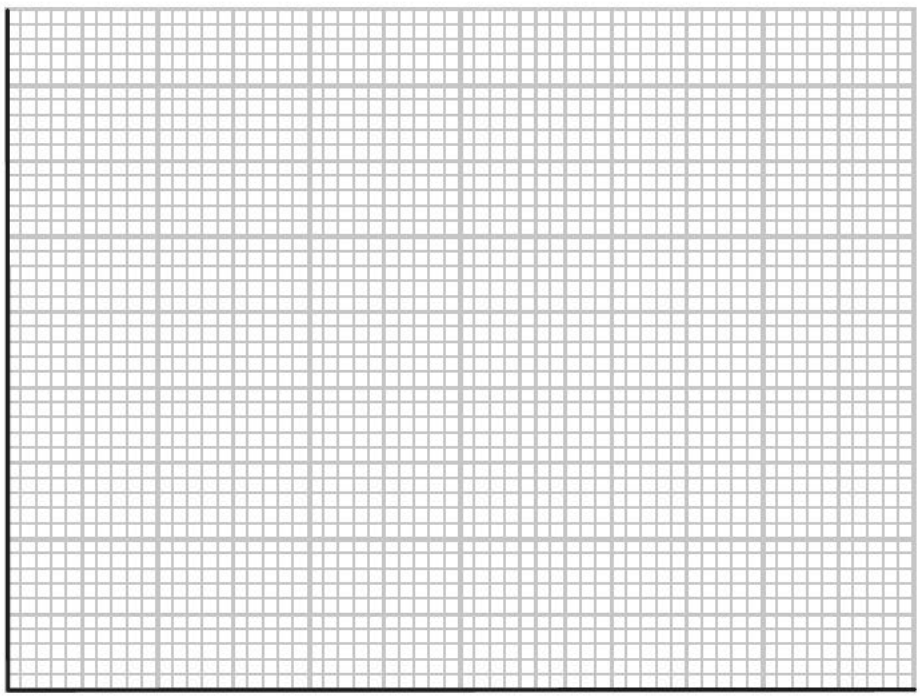
(Total for Question = 8 marks)

4 The table describes four different geographical regions. It also gives the amount of energy converted into plant biomass each year in each region.

Region	Description of region	Energy converted into plant biomass in kJ per m^2 per year
A	woodland in the UK	26 000
B	tropical forest in Indonesia	40 000
C	grassland in the UK	15 000
D	farmed land in the UK	30 000

(a) Plot a bar graph on the grid to show the amount of energy converted into plant biomass each year in each region.

(5)



(b) The amount of energy converted into plant biomass each year depends on the effect that abiotic (non-living) factors have on the rate of photosynthesis.

Carbon dioxide is one of these abiotic factors.

Name three other abiotic factors likely to affect the rate of photosynthesis.

(3)

1 .....

2 .....

3 .....

(c) Regions C and D have the same climate. Plants grown in region D have more energy converted into plant biomass than plants grown in region C. One reason for this is the use of selective breeding to produce high yielding crops.

(i) Suggest two other reasons for more energy being converted into plant biomass in region D.

(2)

1 .....

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2 .....

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(ii) What is meant by the term **selective breeding**?

(4)

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(d) Describe how you could use a quadrat to estimate the plant biomass in one of the regions.

(4)

(Total for Question = 18 marks)

5 Describe an investigation to find out if keeping chickens indoors increases their growth.

(6)

(Total for Question = 6 marks)