

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Q1.

Many biotic and abiotic factors can affect the growth of plants.

(a) Are the factors in **Table 1** biotic or abiotic?

Tick **one** box for each factor.

Table 1

Factor	Biotic	Abiotic
Diseases		
Herbivores		
Temperature		
Water		

(2)

Two students investigated the effect of light intensity on the distribution of small plants.

The plants are growing under a tree in a park.

The students made the following hypothesis:

‘As you move outwards from a tree there will be more plant growth.’

(b) Explain why the students thought their hypothesis would be correct.

(3)

(c) The students used two pieces of equipment.

Give the scientific name of each piece of equipment.

A square frame measuring $0.5\text{ m} \times 0.5\text{ m}$ _____

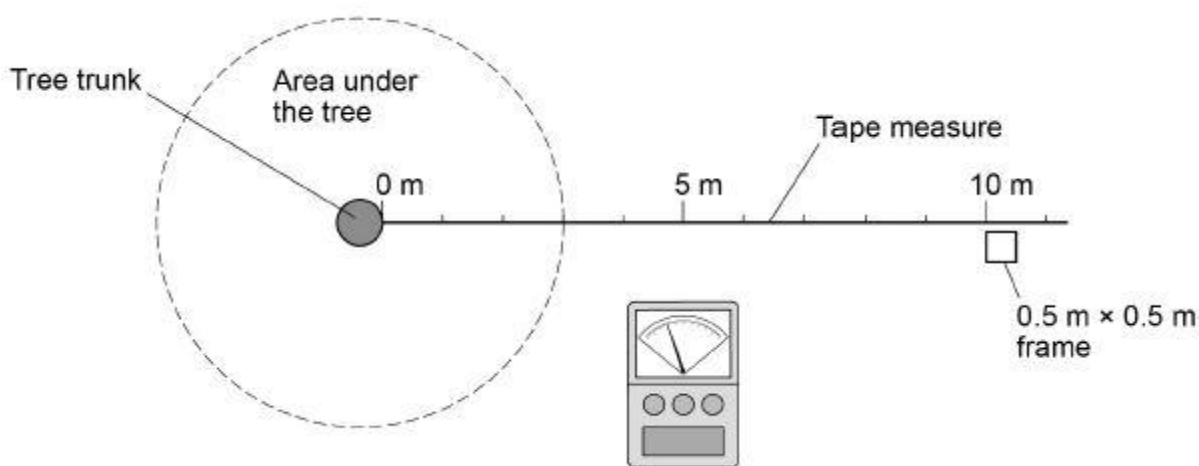
An electronic device to measure light intensity _____

(2)

This is the method used.

1. Fix one end of a tape measure at the base of the tree.
2. Fix the other end of the tape measure 11 metres from the tree.
3. At 0 metres put the square frame on the ground.
4. Identify all the plant species growing inside the frame.
5. Estimate and record the percentage cover of each plant species.
6. Measure the light intensity inside the frame.
7. Put the square frame on the ground every 2 metres along the tape to 10 metres.
8. Repeat steps 4 – 6 in every frame.

The diagram below shows the equipment in this investigation.



(d) Calculate the total area sampled.

Total area sampled = _____ m^2

(1)

(e) The whole investigation was done as quickly as possible on the same day.

Suggest **one** reason why.

(1)

(f) Give **one** way the investigation could be improved.

Table 2 shows the results.

Table 2

	Distance from tree in metres					
	0	2	4	6	8	10
Percentage cover of grass	15	50	35	16	15	15
Percentage cover of plantain	0	5	10	40	25	30
Percentage cover of daisy	0	0	0	4	20	10
Percentage cover of clover	1	10	25	40	40	45
Total percentage cover of plants	16	65	70	100	100	100
Light intensity in arbitrary units	37	59	150	175	>200	>200

- (g) Which plant species in **Table 2** will only grow at high light intensity?

(1)

- (h) What conclusion can be made about the relationship between light intensity and the total percentage cover of plants?

Use data from **Table 2** in your answer.

(2)

- (i) Light intensity might **not** be the cause of this pattern of plant distribution.

Suggest **one** different factor that may cause these results.

Give **one** reason for your answer.

Factor _____

Reason _____

(2)

(Total 15 marks)

Q2.

Plants make glucose by photosynthesis.

- (a) Complete the word equation for photosynthesis.

_____ + _____ → glucose + _____

(1)

- (b) What is the name of the chemical that makes a leaf look green?

Tick **one** box.

Cellulose

☐

Chlorophyll

☐

Chloroplast

☐

Chromosome

☐

(1)

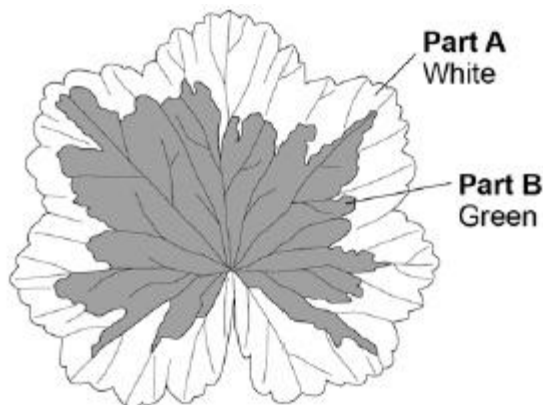
- (c) A test for starch is used to show that a plant has photosynthesised.

How does the presence of starch show that photosynthesis has taken place?

(1)

A student investigated where starch was made in a leaf.

She used a leaf that was part green and part white as shown in the diagram.



This is the method used.

1. Put the leaf in boiling water for 1 minute.
Reason: stops all chemical reactions in the leaf.
2. Transfer the leaf to boiling ethanol for 5 minutes.
Reason: removes the green colour.
3. Dip the leaf in hot water.

Reason: softens the leaf.

4. Spread the leaf on a white tile and test with iodine solution.

Reason: stains any starch.

- (d) If the chemical reactions in the leaf were not stopped, the amount of starch in the leaf would decrease.

Give the reason why.

(1)

- (e) Suggest why it is important to remove the green colour from the leaf before adding iodine solution.

(1)

- (f) Ethanol is flammable.

The student wore safety goggles when testing the leaf for starch.

Give one other safety precaution the student should have taken.

(1)

- (g) Look at the leaf in the diagram.

What colour would part **A** and part **B** stain with iodine solution after the starch test?

A _____

B _____

(2)

(Total 8 marks)