

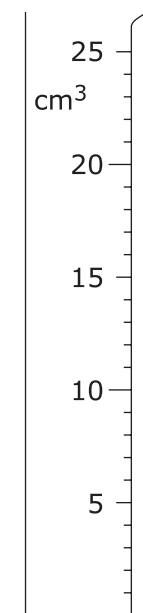
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Answer ALL the questions. Write your answers in the spaces provided.

1. Jill tests some food samples for protein.

(a) She uses the piece of apparatus shown below to measure the reagent.



(i) Name this piece of apparatus.

..... (1)

(ii) She measures out 5 cm³ of the reagent. Draw a line on the diagram to show the level of the reagent. (1)

(b) Jill tested two foods, A and B, for protein.

(i) Name a reagent she could use.

..... (1)

(ii) She obtained the following results. Complete the table to show the colours she obtained.

Food	Colour	Conclusion
A		no protein
B		protein present

(2)

Q1

(Total 5 marks)



2. Sunita wanted to see if light is needed for photosynthesis. As part of this experiment she tested a leaf from a plant to see if it contained starch.

The list below shows how she wrote down the steps in her method, but they are not in the correct order.

- Heat the leaf in boiling ethanol
- Add iodine solution
- Dip the leaf in hot water again
- Remove a leaf from the plant
- Place the plant in darkness for 24 hours
- Put the leaf in boiling water for 1 minute
- Place the plant in bright sunshine for 12 hours

(a) Complete the table to show all these steps in the correct order.

Step
1. Place the plant in darkness for 24 hours
2. Place the plant in bright sunshine for 12 hours
3.
4. Put the leaf in boiling water for 1 minute
5.
6. Dip the leaf in hot water again
7.

(3)



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(b) Explain why the plant was placed in darkness for 24 hours at the beginning of the experiment.

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(2)

(c) One of the steps involves heating the leaf in boiling ethanol. Sunita did this by placing her test tube of ethanol in a beaker of hot water. Explain why she did not heat the tube using a Bunsen burner.

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(2)

(d) If the leaf contained starch, what result would Sunita expect to see after she added the iodine solution to the leaf?

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(1)

(Total 8 marks)

Q2



3. Mark wants to see how his pulse rate and his temperature change during exercise.

(a) Describe how Mark could measure his pulse rate.

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(2)

(b) Mark took his pulse rate before he started the exercise and every two minutes during the exercise. Here are his results.

Time in minutes	Pulse rate in beats per minute
0	68
2	74
4	64
6	84
8	92
10	94
12	96

(i) Describe the general pattern shown by these results.

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(2)

(ii) One result in the table is anomalous (does not fit the general pattern).

Draw a circle round this result.

(1)



(iii) After 12 minutes Mark stopped the exercise. Explain what would happen to Mark's pulse rate.

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(2)

(c) Mark took his temperature every two minutes. He found that his temperature increased over the 12 minutes of the experiment.

This is how Mark wrote down his results.

after 4 mins = 37.0 c
before exercise = 36.6 c
37.4 after 10 mins 2 mins = 36.8
6 mins = 37.2 8 mins = 37.2
at end = 12 mins = 37.5 c

Organise Mark's results into a table giving correct headings and units.

(4)

Q3

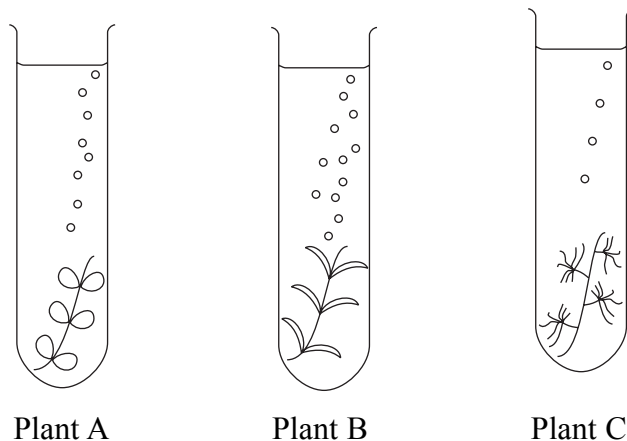
(Total 11 marks)



4. Rakesh had three different species of water plant (A, B and C).

He carried out an investigation to find out which of the three species of water plant had the fastest rate of photosynthesis.

(a) He counted the number of bubbles coming from each plant in 10 seconds. The diagrams represent what he saw.



(i) Count the number of bubbles of gas coming from each plant in 10 seconds. Complete the tally chart below.

Plant A has been done for you.

Plant	Tally	Number of bubbles
A	III	8
B		
C		

(2)

(ii) In Plant A, each bubble has a volume of 4 mm³. Calculate the volume of oxygen given off by plant A in one minute, assuming that the rate remains constant. Show your working.

Answer mm³
(2)



(b) Rakesh concluded that plant B had the fastest rate of photosynthesis. Explain why he may not be justified in reaching this conclusion.

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(3)

(Total 7 marks)

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Q4



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6. Suzie carried out an experiment to find out how changes in sucrose concentration affect the mass of cut cylinders of potato.

Using a cork borer, she cut some cylinders out of a potato. She measured the mass of each cylinder and then placed them in sucrose solutions of different concentrations for one hour.

She obtained the following results, but the table is incomplete.

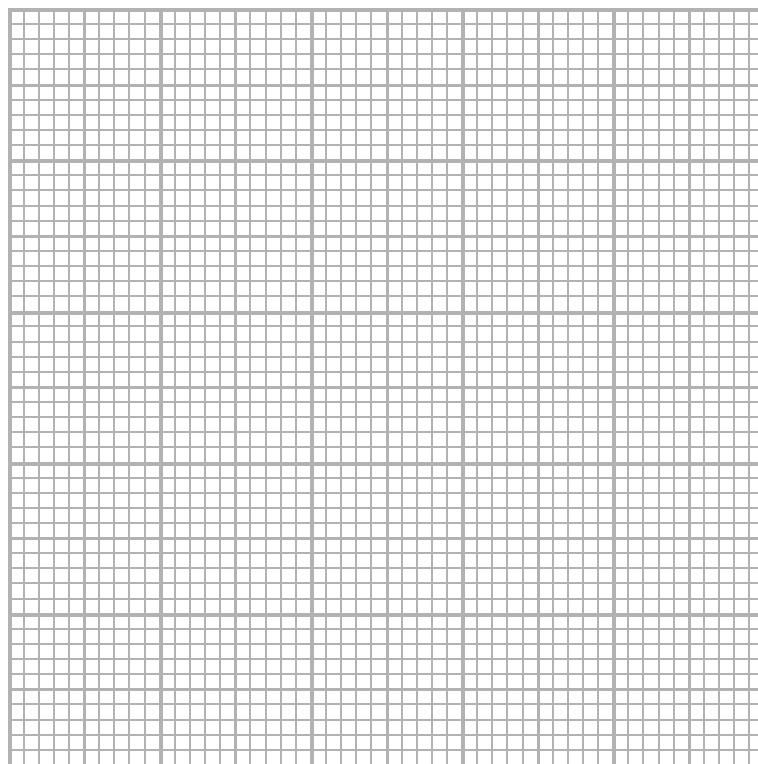
- (a) Fill in the missing results in the table.

Sucrose concentration in moles (M)	Mass of potato cylinder in g		Difference in mass in g	Percentage change in mass
	At start	After one hour		
0	2.40	3.00	+0.60	+25.0
0.2		2.98	+0.42	+16.4
0.4	3.00	3.12	+0.12	+4.0
0.6	3.00	2.85	-0.15	-5.0
0.8	3.41		-0.23	-6.7
1.0	2.88	2.45	-0.35	12.2

(2)



- (b) (i) Plot a line graph to show how the results of the percentage change in mass of the potato cylinders varied in the different concentrations of sucrose solution. Join your points with straight lines.



(5)

- (ii) Use your graph to determine the sucrose solution concentration in which the potato cylinders did not gain or lose mass.

.....
(1)

- (c) What can you tell about the concentrations of sucrose inside and outside the potato when it neither gained nor lost mass?

.....
(1)



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(d) Use your scientific knowledge to explain the increase in mass of the potato cylinder in the 0.2 M sucrose solution.

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(3)

(e) (i) Suggest **one** way that this experiment could be modified to improve the accuracy of Suzie's results.

.....
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(1)

(ii) Suggest **one** way that this experiment could be modified to improve the reliability of Suzie's results.

.....
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(1)

Q6

(Total 14 marks)

TOTAL FOR PAPER: 50 MARKS

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