

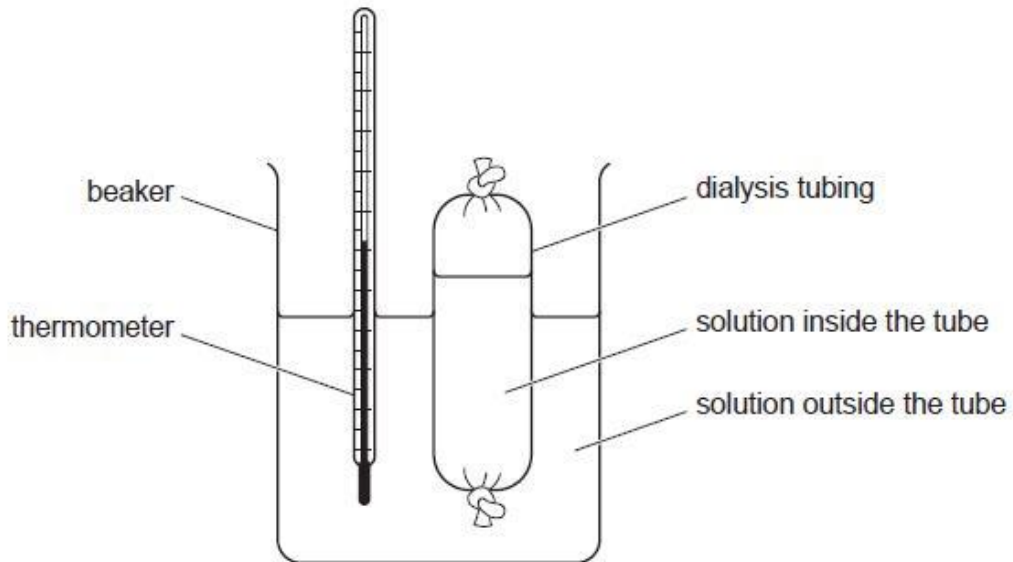
GCSE Biology B (Twenty First Century Science)
J257/04 Depth in biology (Higher Tier)

Question Set 2

1 Eve sets up three experiments using dialysis tubing.

Dialysis tubing is a partially-permeable membrane.

Each experiment is set up as shown in the diagram:



(a) What is the purpose of the thermometer?

Tick (✓) **one** box.

To control the temperature.

To record the temperature.

To measure the temperature.

To stir the solution.

[1]

- (b) Eve wants to do each of her three experiments at exactly 30 °C.

Describe how Eve could ensure the temperatures of the solutions in each experiment are kept at exactly 30 °C.

Place beakers in electric water bath set to 30°C.

[1]

- (c) Eve sets up the solutions as shown in **Table**

2.1. Amylase is an enzyme.

Experiment	Solution inside the tube	Solution outside the tube
1	starch + tap water	tap water
2	glucose + tap water	tap water
3	starch + amylase + tap water	tap water

Table 2.1

After 3 minutes she removes a small sample of each solution.

Describe how she could test each sample for the presence of glucose.

Add Benedict's solution in each sample and look for red-brown precipitate.

[2]

- (d) She also uses iodine solution to test each sample for the presence of

starch. Her results are shown in **Table 2.2.**

Experiment	Sample from inside the tube		Sample from outside the tube	
	Test for starch	Test for glucose	Test for starch	Test for glucose
1	positive	negative	negative	negative
2	negative	positive	negative	positive
3	positive	positive	negative	positive

Table 2.2

(i) What conclusions can you make from Eve's results?

Glucose can diffuse through the tubing/membrane but starch is too large to do the same.
Amylase breaks down starch into molecules of sugar.

[4]

(ii) Eve repeats experiment 3, but this time she boils the amylase before using it. Write a testable prediction for this repeat of experiment 3.

Explain the science behind your prediction

Prediction → The tests for glucose will be negative.

Explanation → The amylase enzyme has been denatured so can no longer bind.

[3]

(e) Eve sets up one more experiment as shown in Table 2.3.

Experiment	Solution inside the tube	Solution outside the tube
4	starch + tap water	tap water + iodine solution

Table 2.3

The molecules of iodine in the iodine solution are smaller than

molecules of glucose. Eve watches this experiment for 5 minutes.

Describe and explain the changes she is likely to observe during the 5 minutes. [4]

At the start the solution^{the} outside tube will be pale brown and inside will be colourless. The solution inside will start to turn blue/black because iodine will diffuse through the tubing membrane.

Total Marks for Question Set 2: 15

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