Human Biology ATAR – Task 1: Science Inquiry

Osmosis Practical and Validation Test (5%)

Name:			
Time allowed: 2 Lessons			
Section	Your Mark	Marks available	Percentage of Investigation
Section 1: Practical	-	-	-
Section 2: Validation Test		39	100
		39	**100%**

Declaration of Authenticity

I (Student Name) _____ declare that this work is my own and I have not plagiarised from any source.

Signature:

Date:

Effect of Concentration on Osmosis

Background:

To learn more about osmosis, Human Biology students Tim and Fatima conducted an experiment using decalcified chicken eggs (eggs with the shell removed) as a model for cell membranes.

First, the students carefully weighed the eggs to find the initial mass and recorded this in the table below. Tim and Fatima then placed the eggs in beakers containing 200mL of glucose solutions of different concentrations - 15%, 20%, 25%, 30%, and 35%. They left the eggs for 24 hours to allow osmosis to occur.

The next day the eggs were removed, gently patted dry to remove moisture, and weighed again to find the final mass. Tim and Fatima's results are in the table below:

Results:

The Effect of Glucose Concentration on Osmosis

Glucose Concentration (%)	Initial Egg Mass (g)	Final Egg Mass (g)	Percentage Change in Mass (%)
15	52.0	49.8	-4.23
20	51.5	48.9	-5.05
25	53.0	49.7	-6.23
30	50.5	46.2	-8.51
35	49.0	44.1	-10

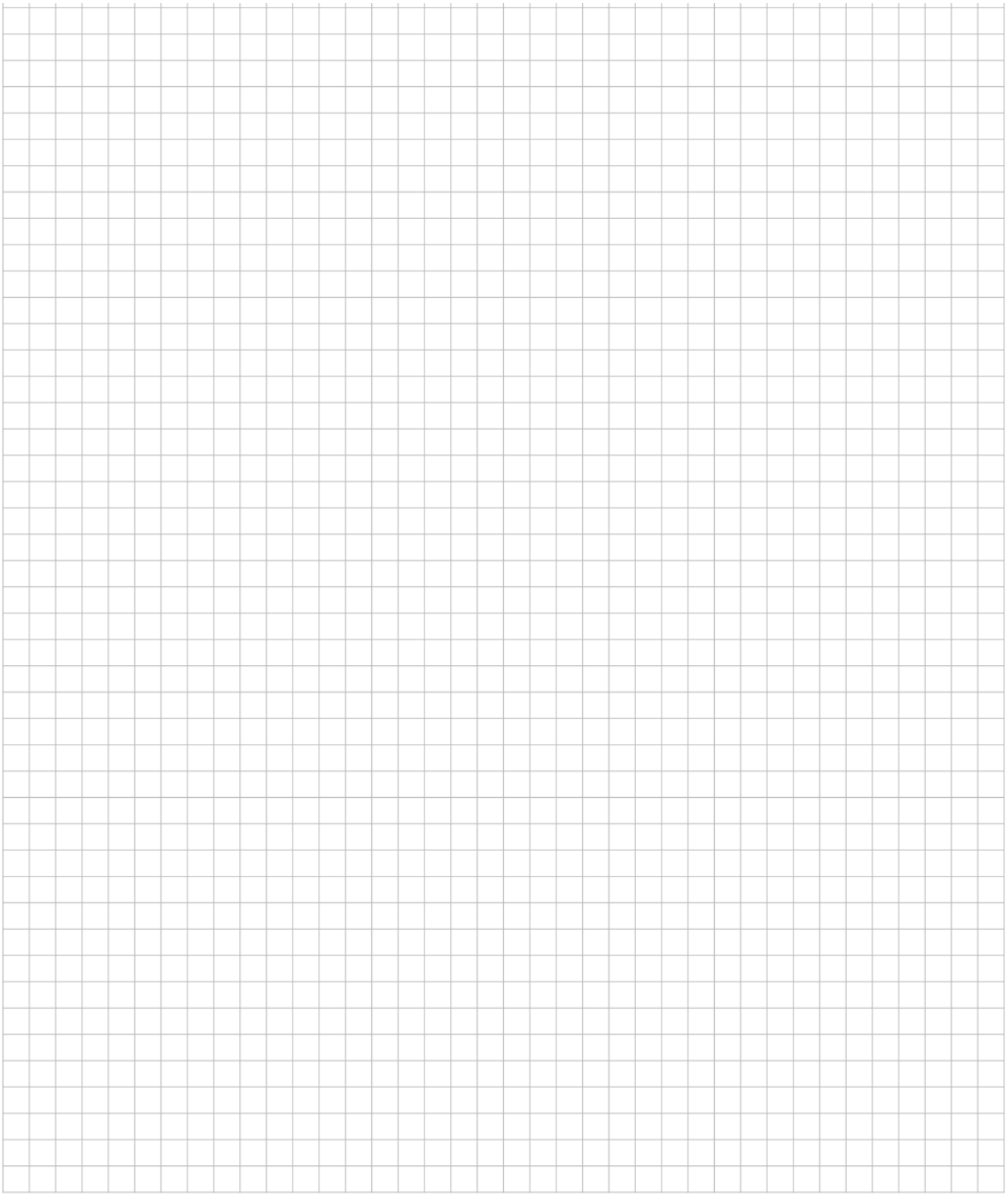
1. Calculate Percentage Change in Mass to complete the results table above **(1 mark)**
   All correct - 1 mark
2. Identify the **independent** variable in this investigation. **(2 marks)**
   1 – Glucose concentration

   1 –%
3. Identify the **dependent** variable in this investigation. **(2 marks)**
   1 – Final egg mass
   1 – g (also accept percent change in mass %)
4. Identify two **controlled** variables in this investigation. **(2 marks)**
   1 – Beakers contained same amount of glucose solution (200mL)
   1 – Beakers left for same amount of time (24 hours)
5. Write a **hypothesis** for this investigation. **(2 marks)**
   1 – Testable statement

   1 – Contains IV and DV

6. **Graph** the Percentage change in mass of potatoes. **(5 marks)**

1 – Title, 1 – Axis, 1 – Scale, 1 – Labels, 1 - Line



7. **Draw** a **labelled** diagram to show the movement of material into or out of the egg.
(4 marks)

1 – egg drawn and labelled

1 – Salt solution labelled

1 – Arrows showing movement of water out of egg

1 – Water moves out of egg by osmosis as the concentration of glucose inside the egg is less than outside of egg

8. Explain the effect of concentration on osmosis. Use data to support your statements.
(4 marks)

Increase in concentration in solution means more water has to leave the egg to dilute solution

Therefore the exchange of materials (water) (osmosis) is increased

2 - Two suitable results quoted

9. Explain one way Tim and Fatima could have improved **reliability** of their investigation.
(2 marks)

1 – Increase number of trials 1 – explained

1 – repeat experiment 1- explained

10. Explain one way Tim and Fatima could have improved **validity** of their investigation.
(2 marks)

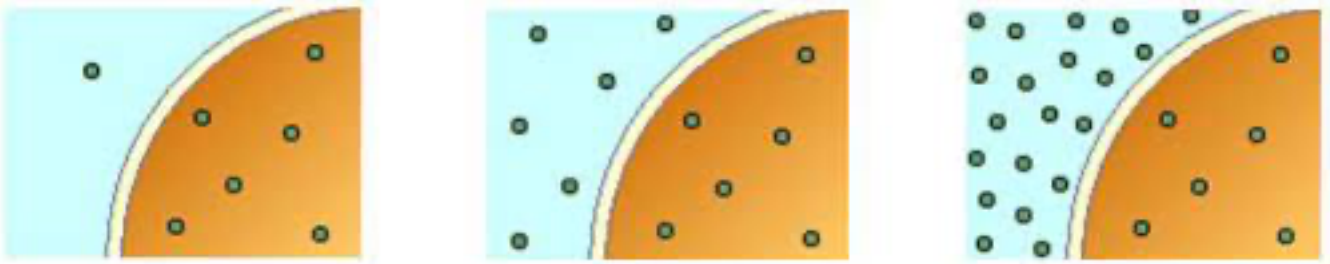
1 – name a variable that should have been controlled 1 – explained

11. **Name** and **describe** two other factors that influence the **diffusion** of materials across a cell membrane. **(4 marks)**
Temperature – particles have more KE so diffusion occurs faster

Surface area – increase SA = increase particle size, increase particle size = decrease diffusion

12. Below are 3 cells in different solutions, identify each solution is isotonic, hypotonic, or hypertonic. **(3 marks)**

a. hypotonic **b. Isotonic** **c.hypertonic**



13. Draw arrows on the diagrams above to show direction of movement of water. **(3 marks)**

14. Drinking very sweet soft drinks increases the sugar content of your blood. Explain why this would make you feel more thirsty than you were.

(3 marks)

This will increase the amount of sugar in the blood

Water will move from cells to the blood by osmosis

This will make you feel more thirsty

END OF TEST

_____/ 39 marks = _____%