Total marks	11
Time allowed	Approximately 25 minutes
Instructions	Answer ALL questions. Write answers in the spaces provided.

Question 1

Pondweed (Elodea) was placed in sodium hydrogen carbonate solution. A lamp was placed at different distances and the number of oxygen bubbles per minute was counted.

Distance from lamp (cm)	Bubbles per minute — Trial 1	Trial 2	Trial 3	Mean
5	52	55	53	53.3
10	38	41	37	38.7
15	26	28	24	26.0
20	18	16	19	17.7
25	10	12	11	11.0
30	7	6	8	7.0

A student investigates the effect of light intensity on the rate of photosynthesis using pondweed. The table shows the results.

[0 marks]

Question 2

Describe the trend shown in the results.

[2 marks]

Question 3

Explain why the student added sodium hydrogen carbonate solution to the water in this experiment.

[2 marks]

Question 4

At a distance of 5 cm, the student increases the lamp power. The rate of bubbles does not increase. Suggest ONE reason why.

[2 marks]

Question 5

Counting oxygen bubbles is not the most accurate method for measuring the rate of photosynthesis. Suggest a more accurate method and explain why it is better.

[2 marks]

★ **Higher Tier**

Question 6

Calculate the relative light intensity at distances of 10 cm and 20 cm from the lamp. Use the formula: relative light intensity = 1 / distance².

[3 marks]

END OF QUESTIONS — Total: 11 marks