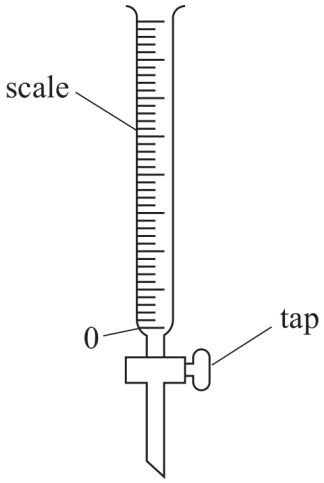
2 A student used a transparent tube to measure a volume of liquid, as shown. Opening the tap allows liquid to flow out of the tube at a controlled rate.



When the tap is open, the volume V of liquid inside the tube decreases with time t according to the relationship

$$V = V_0 \, e^{-bt}$$

where V_0 is the initial volume of liquid in the tube and b is a constant.

(a) Explain why a graph of $\ln V$ against t should be used to test this relationship.

(2)

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(b) A student investigates the relationship between V and t.

Describe how the student could obtain an accurate set of values for V and t to test this relationship.

(4)

(c) Explain a source of uncertainty in this investigation.

(2)

(Total for Question 2 = 8 marks)