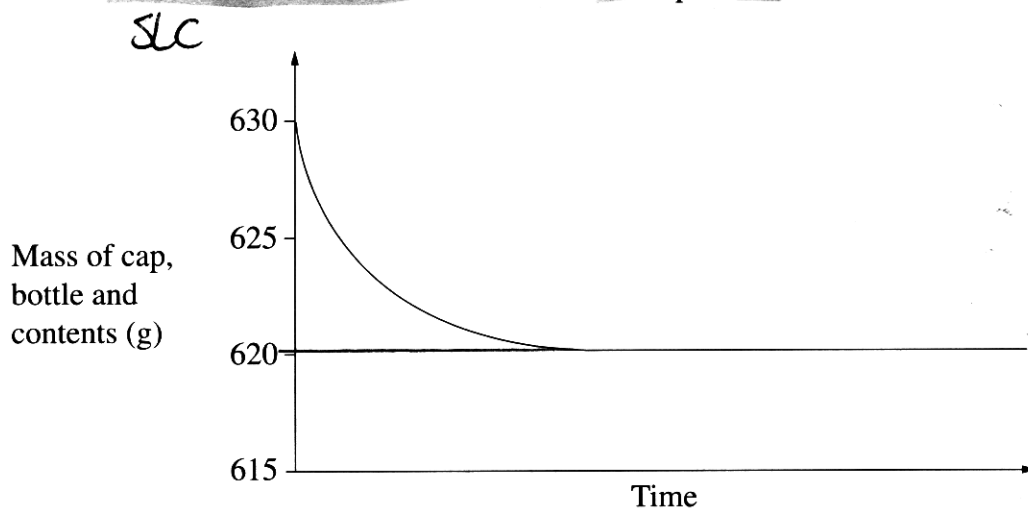


Question 23 (4 marks)

A bottle of soft drink was placed on an electronic balance and weighed. The cap was removed and placed next to the bottle on the balance. The mass of the cap, bottle and its contents was monitored. The results are shown in the graph. The experiment was conducted at 25°C and 101.3 kPa. Assume that no evaporation has occurred.



(a) Identify the gas released.

1

Carbon dioxide (CO₂)

(b) Calculate the volume of the gas released.

3

At 25°C and 101.3 kPa Volume of 1 mole = 24.47 L

$$n = \frac{m}{M}$$

$$n_{CO_2} = \frac{10 \text{ g}}{12.01 + (2 \times 16.00)} \quad \text{Volume}_{CO_2} = \text{Volume of 1 mole at SLC} \times n_{CO_2}$$

$$= \frac{10 \text{ g}}{44.01} = 24.47 \times 0.227221086$$

$$= 0.227221086 \text{ moles.} \quad V_{CO_2} = 5.10557802 \text{ L} = 5.12 \text{ to 2 D.p.}$$