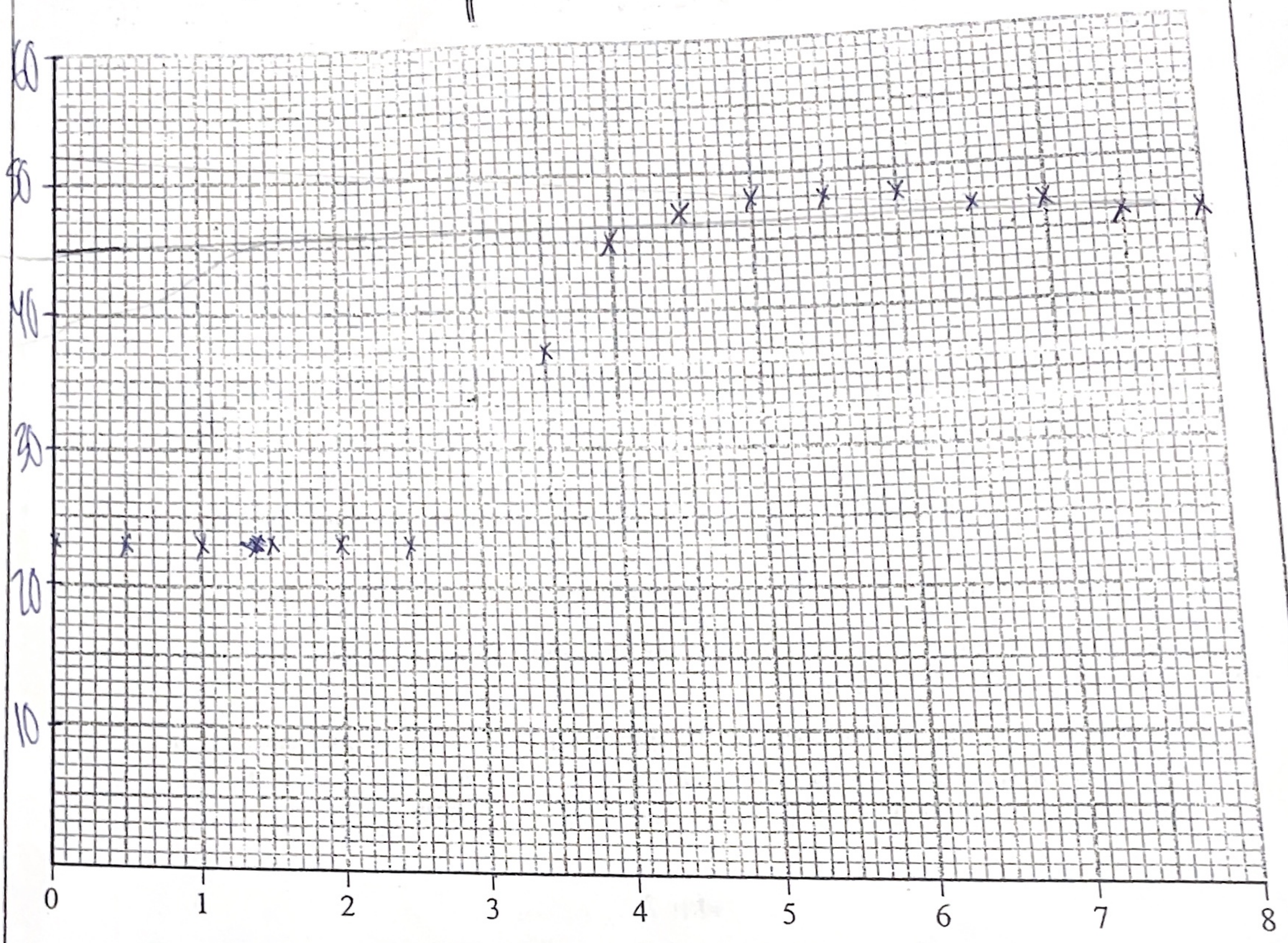
Leave blank

(b) On the grid below plot a graph of temperature against time.



(2)

(c) **Calculations**

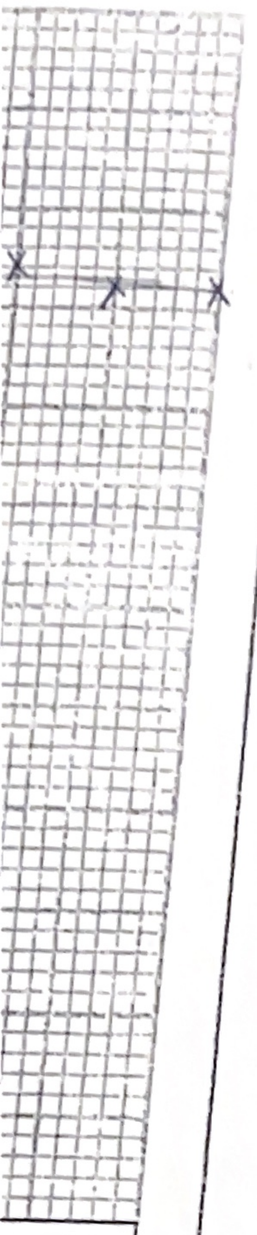
(i) From your graph find the maximum temperature change, ΔT, for the reaction. On your graph show how this was calculated. Give your value of ΔT to the nearest degree.

$\Delta T =$ 25 °C

(5)

48 - 23 = 25

Leave blank



8

(2)

. On
arest

(5)

Leave blank

(ii) Calculate the amount (moles) of copper(II) sulphate, $CuSO_4$, in 50 cm^3 of 0.50 mol dm^{-3} solution.

$n = m \times V$

$n = 0.50 \times 50 = 25$ moles

(1)

(iii) Calculate the heat evolved in the reaction. Include units with your answer.

Assume that the total mass of the solution is 50 g and that the specific heat capacity of the solution is 4.18 J g^{-1} °C^{-1}.

$Q = mc\Delta T$

$Q = 50 \times 4.18 \times 25$

$= 5225$ J

5225 → 5.225 kJ

(1)

(iv) Use your answers from (c)(ii) and (iii) to calculate the **molar** enthalpy change for the reaction. Give your answer in kJ mol^{-1} and to **two** significant figures. **Include a sign** with your answer.

$\Delta H = \frac{-Q}{n}$

$\Delta H = \frac{-5.225}{25}$

$\Delta H = -0.209$ kJ.mol^{-1}

ΔH = −0.209 kJ mol^{-1}

(3)

(d) A student suggests repeating the experiment using 100 cm^3 of the same copper(II) sulphate solution and twice the mass of zinc. What effect, if any, will this have on the temperature change? Explain your answer.

no temperature change because we've only doubled the amount of Copper Sulfate & the mass of Zinc.

(1)

Q3

(Total 15 marks)