

CM4L9 Assessment

1) The specific heat of aluminum is 0.900 J/g °C. How much heat is required to raise the temperature of a 30.0g block of aluminum from 25.0°C to 75.0°C?

- a. 0.540 J (Incorrect)
- b. 1.50 J (Incorrect)
- c. 1350 J (Correct)
- d. 1670 J (Incorrect)

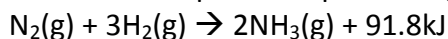
Show work regardless if student got answer correct or incorrect

$$q = mC\Delta T$$

$$q = (30.0\text{g})(0.900\text{J/g}^\circ\text{C})(50^\circ\text{C})$$

$$q = 1350 \text{ J}$$

2) Given the balanced equation representing a reaction at 101.3 kPa and 298K:



- a. It is exothermic and ΔH equals -91.8 kJ (Correct; exothermic reactions have energy as a product and a negative ΔH)
- b. It is exothermic and ΔH equals +91.8 kJ (Incorrect; exothermic reactions have a negative ΔH)
- c. It is endothermic and ΔH equals -91.8 kJ (Incorrect; endothermic reactions have a positive ΔH and have energy as a reactant)
- d. It is endothermic and ΔH equals +91.8 kJ (Incorrect; endothermic reactions have energy as a reactant)

3) The table below shows the specific heat capacity of four substances.

Substance	Specific Heat J / g °C
Water	4.18
Copper	0.39
Gold	0.13
Silver	0.24

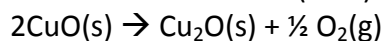
For an equal mass of each substance, which one will require the *least* amount of heat to raise its temperature from 40°C to 50°C?

- a. water (Incorrect; water would require the *most* amount of heat (energy) to raise it's temperature)
- b. copper (Incorrect; it would take 0.39 J for each degree change in copper. There is a substance that requires less heat (energy) than copper)
- c. gold (Correct; the smaller the specific heat the less heat (energy) that is needed to raise the temperature)
- d. silver (Incorrect; it would take 0.24 J for each degree change in silver. There is a substance that requires less heat (energy) than silver)

ΔH_f° kJ/mol

CuO	-156.1
Cu ₂ O	-170.7

4) What is the value of ΔH° (in kJ) for this reaction?

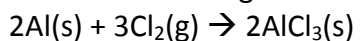


- a. 141.5 Correct
- b. 14.6 Incorrect
- c. -14.6 Incorrect
- d. -141.5 Incorrect

Show correct work regardless of answer choice.

$$\begin{aligned}\Delta H_{\text{rxn}} &= [\text{H}_{\text{Cu}_2\text{O}} + \frac{1}{2}(\text{H}_{\text{O}_2})] - 2(\text{H}_{\text{CuO}}) \\ &= [-170.7 + \frac{1}{2}(0)] - 2(-156.1) \\ &= 141.5 \text{ kJ}\end{aligned}$$

5) Consider the following reaction:



$$\Delta H = -1391 \text{ kJ}$$

When a 20.0g sample of chlorine reacts with excess aluminum, how much energy will be released as heat?

- a. 1739 kJ Incorrect
- b. 869 kJ Incorrect
- c. 580 kJ Incorrect
- d. 290 kJ Correct

Show correct work regardless of answer choice.

20g Cl_2	1 mole Cl_2	1391 kJ	289.8 g
	32 g Cl_2	3 moles Cl_2	