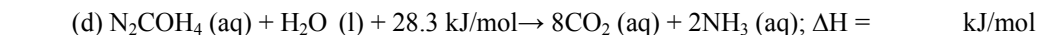
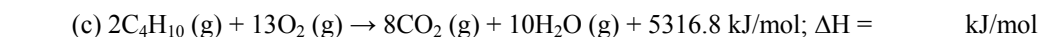
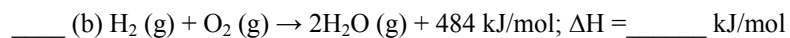
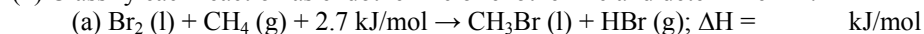


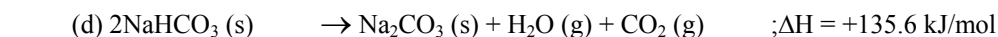
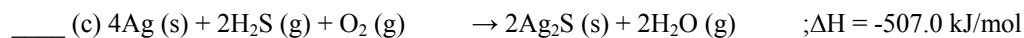
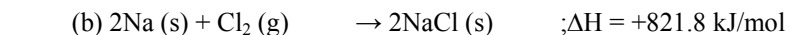
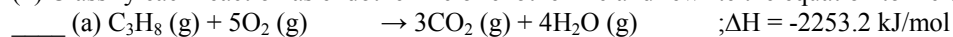
Name: \_\_\_\_\_  
Period: \_\_\_\_\_

### Heats of Reactions

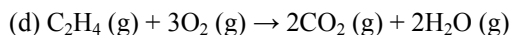
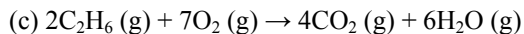
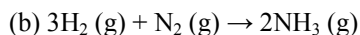
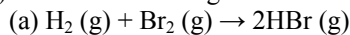
(1) Classify each reaction as endothermic or exothermic and determine  $\Delta H$ .



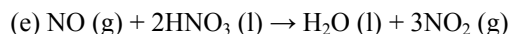
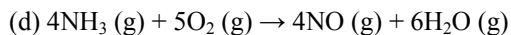
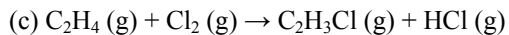
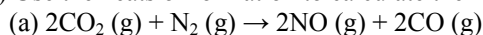
(2) Classify each reaction as endothermic or exothermic and rewrite the equation to include  $\Delta H$ .



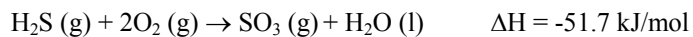
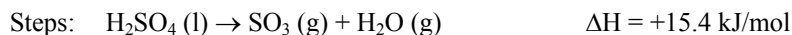
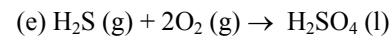
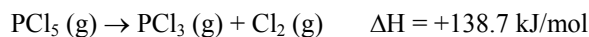
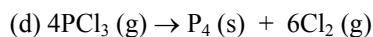
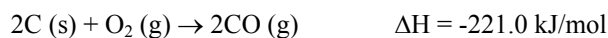
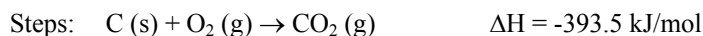
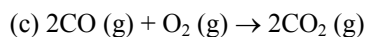
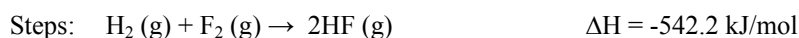
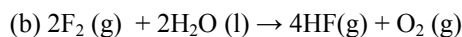
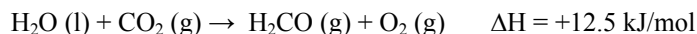
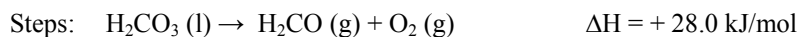
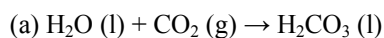
(3) Use the bond energies to calculate the heat of the reaction.



(4) Use the heats of formation to calculate the heat of the reaction.



(5) Use the steps provided to calculate the overall heat of the reaction.



Answers:

(1) (a) Endo;  $\Delta\text{H} = +2.7 \text{ kJ/mol}$

(b) Exo;  $\Delta\text{H} = -484 \text{ kJ/mol}$

(c) Exo;  $\Delta\text{H} = -5316.8 \text{ kJ/mol}$

(d) Endo;  $\Delta\text{H} = +28.3 \text{ kJ/mol}$

(2) (a) Exo;  $\text{C}_3\text{H}_8 (\text{g}) + 5\text{O}_2 (\text{g}) \rightarrow 3\text{CO}_2 (\text{g}) + 4\text{H}_2\text{O} (\text{g}) + 2253.2 \text{ kJ/mol}$

(b) Endo;  $2\text{Na} (\text{s}) + \text{Cl}_2 (\text{g}) \rightarrow 2\text{NaCl} (\text{s}) \quad 821.8 \text{ kJ/mol}$

(c) Exo;  $4\text{Ag} (\text{s}) + 2\text{H}_2\text{S} (\text{g}) + \text{O}_2 (\text{g}) \rightarrow 2\text{Ag}_2\text{S} (\text{s}) + 2\text{H}_2\text{O} (\text{g}) + 507.0 \text{ kJ/mol}$

(d) Endo;  $2\text{NaHCO}_3 (\text{s}) + 135.6 \text{ kJ/mol} \rightarrow \text{Na}_2\text{CO}_3 (\text{s}) + \text{H}_2\text{O} (\text{g}) + \text{CO}_2 (\text{g})$

(3) (a)  $\Delta\text{H} = -68 \text{ kJ/mol}$

(b)  $\Delta\text{H} = -93 \text{ kJ/mol}$

(c)  $\Delta\text{H} = -2870 \text{ kJ/mol}$

(d)  $\Delta\text{H} = -1316 \text{ kJ/mol}$

(4) (a)  $\Delta\text{H} = +746.4 \text{ kJ/mol}$

(b)  $\Delta\text{H} = -626.1 \text{ kJ/mol}$

(c)  $\Delta\text{H} = -107.5 \text{ kJ/mol}$

(d)  $\Delta\text{H} = -907.6 \text{ kJ/mol}$

(e)  $\Delta\text{H} = +71.8 \text{ kJ/mol}$

(5) (a)  $\Delta\text{H} = -15.5 \text{ kJ/mol}$

(b)  $\Delta\text{H} = -512.8 \text{ kJ/mol}$

(c)  $\Delta\text{H} = -566.0 \text{ kJ/mol}$

(d)  $\Delta\text{H} = 1355.2 \text{ kJ/mol}$

(e)  $\Delta\text{H} = -58.8 \text{ kJ/mol}$