Hess's Law Questions

Question Group 1

Question 1

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

A + 2 C ==> D + E	ΔH = -200 kJ
3 C ==> 2 D	ΔH = +350 kJ

Target:

3 A + D ==> 3 E	ΔH = ???

Question 2

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

3 A + E ==> 2 B	ΔH = -150 kJ
2 A + E ==> B + D	ΔH = +200 kJ

Target:

A + E ==> 2 D	ΔH = ???

Question 3

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 B + E ==> C + D	ΔH = +250 kJ
B + 2 E ==> 2 C	ΔH = -100 kJ

Target:

2 D ==> 3 B	ΔH = ???

Question Group 2
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Question 4
Given:

E + C ==> 2 A	ΔH = -100 kJ
2 C ==> 3 A	ΔH = -350 kJ

Target:

A ==> 2 E	ΔH = ???

Question 5
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 A + B ==> 3 E	ΔH = -350 kJ
B + D ==> 2 E	ΔH = +100 kJ

Target:

4 A ==> 3 D + B	ΔH = ???

Question 6
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 B + D ==> 3 A + 2 C	ΔH = -100 kJ
D + B ==> C + E	ΔH = -350 kJ

Target:

3 A + D ==> 2 E	ΔH = ???

Question Group 3
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Question 7
Given:

3 A + E ==> 2 B	ΔH = -200 kJ
2 A + E ==> B + D	ΔH = +300 kJ

Target:

A + E ==> 2 D	ΔH = ???

Question 8
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 B + E ==> C + D	ΔH = -200 kJ
B + 2 E ==> 2 C	ΔH = +300 kJ

Target:

2 D ==> 3 B	ΔH = ???

Question 9
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

3 C ==> A + 2 D	ΔH = -200 kJ
A + C ==> B + D	ΔH = +350 kJ

Target:

3 A ==> C + 2 B	ΔH = ???

Master Difficulty Level
Question Group 4
Question 10
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

C + D ==> 2 E	ΔH = -150 kJ
2 A ==> 2 C + D	ΔH = -100 kJ
A + E ==> D	ΔH = -200 kJ

Target:

A + 4 C ==> E	ΔH = ???

Question 11
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

A + 2 E ==> 3 D + B	ΔH = -300 kJ
C + B ==> D + A	ΔH = -200 kJ
2 B + D ==> A + 3 D	ΔH = -150 kJ

Target:

2 B + 2 E ==> 3 C	ΔH = ???

Question 12
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

A + 2 C ==> 3 B + 2 E	ΔH = -50 kJ
2 D + B ==> 2 A + C	ΔH = -150 kJ
D + 2 B ==> A + C	ΔH = -300 kJ

Target:

A + C ==> 2 E	ΔH = ???

Question Group 5

Question 13

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 A + E ==> B + 2 C	ΔH = -250 kJ
3 A + E ==> 2 B + D	ΔH = -100 kJ
2 B + C ==> A + E	ΔH = -150 kJ

Target:

2 B + D ==> 3 C	ΔH = ???

Question 14

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

B + C ==> 2 D + E	ΔH = -200 kJ
C + D ==> 2 A + B	ΔH = -100 kJ
A + B ==> 2 D	ΔH = -150 kJ

Target:

E ==> D	ΔH = ???

Question 15

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

C + D ==> 2 A + E	ΔH = -300 kJ
3 B ==> 2 A + D	ΔH = -200 kJ
B + E ==> C + D	ΔH = -250 kJ

Target:

E ==> B + C	ΔH = ???

Question Group 6

Question 16

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

3 A + E ==> 2 C	ΔH = +100 kJ
C + 2 D ==> 2 B	ΔH = -200 kJ
C + D ==> A + E	ΔH = -150 kJ

Target:

2 B + D ==> 2 E	ΔH = ???

Question 17

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

2 B ==> C + E	ΔH = +300 kJ
D + E ==> 3 A	ΔH = -250 kJ
A + B ==> E	ΔH = +100 kJ

Target:

C + D ==> A	ΔH = ???

Question 18

Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

C + 2 D ==> A + E	ΔH = +300 kJ
2 A + E ==> B + C	ΔH = +50 kJ
A + E ==> C + D	ΔH = -250 kJ

Target:

B ==> A	ΔH = ???

Wizard Difficulty Level
Question Group 7
Question 19
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given

$2\ WO_{2(s)} + O_{2(g)} \Longrightarrow 2\ WO_{3(s)}$ $\Delta H = -506$ kJ

$2\ W_{(s)} + 3\ O_{2(g)} \Longrightarrow 2\ WO_{3(s)}$ $\Delta H = -1686$ kJ

Target:

$2\ W_{(s)} + 2\ O_{2(g)} \Longrightarrow 2\ WO_{2(s)}$

Question 20
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

$N_{2(g)} + O_{2(g)} \longrightarrow 2\ NO_{(g)}$ $\Delta H = +180.5$ kJ

$NO_{(g)} + \frac{1}{2}\ O_{2(g)} \longrightarrow NO_{2(g)}$ $\Delta H = -57.06$ kJ

Target

$N_{2(g)} + 2\ O_{2(g)} \longrightarrow 2\ NO_{2(g)}$

Question 21
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

$N_2H_{4(l)} + O_{2(g)} \Longrightarrow N_{2(g)} + 2\ H_2O_{(g)}$ $\Delta H = -534.2$ kJ

$2\ H_{2(g)} + O_{2(g)} \Longrightarrow 2\ H_2O_{(g)}$ $\Delta H = -483.6$ kJ

Target:

$N_{2(g)} + 2\ H_{2(g)} \Longrightarrow N_2H_{4(l)}$

Question Group 8
Question 22
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given

$H_{2(g)} + F_{2(g)} \Longrightarrow 2\ HF_{(g)}$	ΔH = -537kJ
$C_{(s)} + 2\ F_{2(g)} \Longrightarrow CF_{4(g)}$	ΔH = -680kJ
$2\ C_{(s)} + 2\ H_{2(g)} \Longrightarrow C_2H_{4(g)}$	ΔH = 52.3kJ

Target:
$C_2H_{4(g)} + 6\ F_{2(g)} \Longrightarrow 2\ CF_{4(g)} + 4\ HF_{(g)}$

Question 23
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

$C_2H_{2(g)} + 5/2\ O_{2(g)} \Longrightarrow 2\ CO_{2(g)} + H_2O_{(l)}$	ΔH = -1229.5 kJ
$C_{(s)} + O_{2(g)} \Longrightarrow CO_{2(g)}$	ΔH = -393.5 kJ
$H_{2(g)} + ½\ O_{2(g)} \Longrightarrow H_2O_{(l)}$	ΔH = -285.8 kJ

Target:
$2\ C_{(s)} + H_{2(g)} \Longrightarrow C_2H_{2(g)}$

Question 24
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given

$H_{2(g)} + ½\ O_{2(g)} \rightarrow H_2O_{(g)}$	ΔH = –286 kJ
$C_2H_{4(g)} + 3\ O_{2(g)} \rightarrow 2\ CO_{2(g)} + 2\ H_2O_{(g)}$	ΔH = –1411 kJ
$C_2H_{6(g)} + 3/2\ O_{2(g)} \rightarrow 2\ CO_{2(g)} + 3\ H_2O_{(g)}$	ΔH = –1560 kJ

Target
$C_2H_{4(g)} + H_{2(g)} \rightarrow C_2H_{6(g)}$

Question Group 9
Question 25
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given

$2\ H_{2(g)} + O_{2(g)} \rightarrow 2\ H_2O_{(l)}$	ΔH = -571.6 kJ
$N_2O_{5(g)} + H_2O_{(l)} \rightarrow 2\ HNO_{3(l)}$	ΔH = -73.7 kJ
$½\ N_{2(g)} + 3/2\ O_{2(g)} + ½\ H_{2(g)} \rightarrow HNO_{3(l)}$	ΔH = -174.1 kJ

Target:
$N_{2(g)} + 5/2\ O_{2(g)} \rightarrow N_2O_{5(g)}$

Question 26
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given

$2\ Mg_{(s)} + O_{2(g)} \rightarrow 2MgO_{(s)}$	ΔH = -1203.6 kJ
$Mg(OH)_{2(s)} \rightarrow MgO_{(s)} + H_2O_{(l)}$	ΔH = +37.1 kJ
$2\ H_{2(g)} + O_{2(g)} \rightarrow 2\ H_2O_{(l)}$	ΔH = -571.7 kJ

Target:
$Mg_{(s)} + O_{2(g)} + H_{2(g)} \rightarrow Mg(OH)_{2(s)}$

Question 27
Step 1: Manipulate (reverse, multiply by a factor) and add the given equations to produce the target equation.
Step 2: Now use given ΔH values and the manipulations you have made to determine the ΔH for the target reaction.

Given:

$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$	ΔH = -393.5 kJ/mol
$H_{2(g)} + 1/2\ O_{2(g)} \rightarrow H_2O_{(l)}$	ΔH = -285.8 kJ/mol
$4\ C_{(s)} + 5\ H_{2(g)} \rightarrow C_4H_{10(g)}$	ΔH = -125.7 kJ/mol

Target:
$C_4H_{10(g)} + 13/2\ O_{2(g)} \rightarrow 4\ CO_{2(g)} + 5\ H_2O_{(l)}$