An ideal gas is compressed from 6 L to 4 L at constant temperature and external pressure of 5 atm. How much work (in atm.L) is done on the gas?

A) –10

B) +10

C) –30

D) +30

$W = -P\Delta V$

$W = -5 * (4 - 6)$

$= +10$ atm.L

If the internal energy of a system increased in by 80 J and has 50 J of work done on it, the heat change of the system (in J) is:

$\Delta E = q + w$

A) –130 | B) +30

$w = +50\ J$

C) +130 | D) –30

$80 = q + 50$

$q = 80 - 50 = +30\ J$

If a 100 g of water cools from 25°C and release 1.25 kJ as a heat. What is the final temperature of the water? (specific heat of water (s) = 4.18 J/g.°C)

A) 18

B) 3

C) 22

D) 11

$q = m s \Delta t$

$-1250 = 100 * 4.18 * (T_2 - 25)$

$T_2 = 25 - 3 = 22\,°C$

Given the following reactions

$Fe_2O_3(s) + 3CO(g) \longrightarrow 2Fe(s) + 3CO_2(g) \quad \Delta H = -28.0\ kJ$

$3Fe(s) + 4CO_2(g) \longrightarrow 4CO(g) + Fe_3O_4(s) \quad \Delta H = +12.5\ kJ$

the enthalpy of the following reaction in (kJ) is:

$3Fe_2O_3\ (s) + CO\ (g) \longrightarrow CO_2\ (g) + 2Fe_3O_4\ (s)$

Hess law

A) +59

B) +109

C) – 109

D) – 59

Given the following information:

Thermochemical Reaction	ΔH^{o} (in kJ)
$Na(s) + H_2O(l) \rightarrow NaOH(s) + 1/2H_2(g)$	-146
$Na_2SO_4(s) + H_2O(l) \rightarrow 2NaOH(s) + SO_3(g)$	+418
$2Na_2O(s) + 2H_2(g) \rightarrow 4Na(s) + 2H_2O(l)$	+259

The change in enthalpy of the following reaction (**in kJ.mol^{-1}**) is: $Na_2O(s) + SO_3(g) \rightarrow Na_2SO_4(s)$

A) +531 B) –581

C) +255 D) –435

$\cancel{2Na} + \cancel{2H_2O} \rightarrow \cancel{2NaOH} + \cancel{H_2}$ $2(-146) = -292$

$Na_2O + \cancel{H_2} \rightarrow \cancel{2Na} + \cancel{H_2O}$ $259/2 = 129.5$

$\cancel{2NaOH} + SO_3 \rightarrow Na_2SO_4 + \cancel{H_2O}$ -418

The $\Delta H°$ for the following reaction at 298 K is -36.4 kJ: $1/2\ H_2(g) + 1/2\ Br_2(l) \rightarrow HBr(g)$

The internal energy change "$\Delta E°$" (in ***kJ***), is:

$\Delta E = \Delta H - RT\Delta n$

$\Delta n = 1 - \frac{1}{2} = \frac{1}{2}$

A) –37.6

B) – 35.2

C) – 36.4

D) – 38.6

Calculate ΔH^o for the following reaction (in kJ/mol) at 25°C:

	$Fe_3O_4(s)$ +	$CO(g) \rightarrow$	$3FeO(s)$ +	$CO_2(g)$
ΔH_f^o **(kJ/mol)**	-1118	-110.5	-272	-393.5

A) -50

B) + 19

$\Delta H_{rxn} = \Sigma \Delta H_P - \Sigma \Delta H_R$

C) -263

D) +109

The value of ΔE for a system that performs 23 kJ of work on its surroundings and loses 79 kJ of heat is

__________ kJ

$\Delta E = q + w$

A) – 102

B) +102

$w = -23\ kJ$

$q = -79\ kJ$

C) – 79

D) +23

Which of the following reaction has $\Delta H = \Delta E$?

A) $2C(s) + O_2\ (g) \longrightarrow 2CO\ (g)$

$\Delta E = \Delta H - RT\Delta n$

B) $H_2\ (g) + I_2\ (g) \longrightarrow 2HI\ (g)$

When $\Delta n = 0$

$\Delta H = \Delta E$

C) $N_2\ (g) + 3H_2\ (g) \longrightarrow 2NH_3\ (g)$

D) $N_2H_4\ (g) + O_2\ (g) \longrightarrow N_2\ (g) + 2H_2O\ (l)$

All of the following has a standard heat of formation ($\Delta H^o{}_f$) value of zero **except**:

A) $H(g)$ B) $Fe(s)$

C) $Hg(l)$ D) $Ne(g)$

A gas is compressed in a cylinder from a volume of 20.0 L to 2.0 L by a constant pressure of 10.0 atm. Calculate the amount of work done in "J"?

$w = -P\Delta V$

A) -1.82×10^4

B) 1.82×10^4

C) -1.01×10^4

D) 1.01×10^4

$V_1 = 20\ L$

$V_2 = 2\ L$

$1\ L{\cdot}atm = 101.3\ J$