

Quiz 2.2 – Enthalpy

Name: _____

Ideal Gas Heat Capacities

○ Give the constant pressure heat capacities (in the low temperature limit) for perfect gases with the following geometries:

1. Monoatomic
2. Linear Diatomic
3. Non-linear Polyatomic

Definition of Enthalpy

○ What is the mathematical equation which relates enthalpy to internal energy?

○ Under what conditions is $\Delta_{rxn}U \approx \Delta_{rxn}H$

Pressure-Volume Work

○ A gas expands under isobaric conditions at 0.75 atm from 0.50 L to 2.75 L . What is the work done (from the perspective of the system)?

○ A pressurized tank with $V = 15.0 \text{ L}$ contains a gas at 140.0 atm . The tank is slowly leaking its gas into the atmosphere with a barometric pressure of 0.82 atm . The leak is slow enough that the temperature remains constant throughout. What is the total work (w_{sys}) for the gas as it leaks? (Note that although this process is isothermal, it is not reversible since $p \neq p_{ext}$)

○ A similar tank to the one above is mounted on the exterior of the international space station. This tank also experiences a leak like the one above. What is the total work (w_{sys}) for the gas as it leaks? (Unlike the example above, this process cannot be isothermal but temperature isn't important to this problem anyway)

Caged Bird

By Maya Angelou

A free bird leaps
on the back of the wind
and floats downstream
till the current ends
and dips his wing
in the orange sun rays
and dares to claim the sky.

But a bird that stalks
down his narrow cage
can seldom see through
his bars of rage
his wings are clipped and
his feet are tied
so he opens his throat to sing.

The caged bird sings
with a fearful trill
of things unknown
but longed for still
and his tune is heard
on the distant hill
for the caged bird
sings of freedom.

The free bird thinks of another breeze
and the trade winds soft through the sighing trees
and the fat worms waiting on a dawn bright lawn
and he names the sky his own

But a caged bird stands on the grave of dreams
his shadow shouts on a nightmare scream
his wings are clipped and his feet are tied
so he opens his throat to sing.
The caged bird sings
with a fearful trill
of things unknown
but longed for still
and his tune is heard
on the distant hill
for the caged bird
sings of freedom.