work done by system → -ve
" " on " → +ve

1-

absorb → endo → +ve

7 - A system takes 250 kJ of heat and does 60 kJ of mechanical work to the surrounding. How many kJ has the internal energy of the system changed?

$q = +250$ kj

$w = -60$ kj

$\Delta U = q + w = +250 - 60 = +190$ kj

a) -250
b) 60
c) -190
d) 190
e) -310
Leave blank

2-

$H^+ + OH^- \rightarrow H_2O$

3 - Which of the following is wrong about an acid-base reaction?

a) The number and type of atoms do not change during the reaction.
b) While acid and base reactions are balanced, they react according to the number of H^+ and OH^- ions they contain.
c) The total mass remains constant before and after the reaction.
d) The moles of reactants and products during the reaction are equal.
e) When acid and base react, salt and water are formed.
Leave blank

3-

7 - Which of the following sets of quantum numbers, n, l, ml, ms, represents the 3s orbital?

a) (3, 0, 0, -1/2)
b) (3, 1, 1, 0)
c) (3, 2, 1, 0)
d) (1, 1, 1, 1/2)
e) (2, -1, 0, 1/2)
Leave blank

4-

8 - By giving 330 J of heat to the nitrogen (N2) gas, it did 190 J of work. Calculate the change in internal energy of nitrogen gas.

$q = +330\ j$

$w = -190\ j$

$\Delta U = q + w$

$= +330 - 190 = +140\ j$

a) -520 J
b) 520 J
c) -140 J
d) 140 J
e) 0
Leave blank

5-

6 - How many kJ of heat is needed to raise the temperature of 25 g of iron at 30 °C to 1000 °C? (Specific heat of iron = 0.45 J/g°C)

$q = ?$

$m = 25\ g$

$T_i = 30^\circ C$

$T_f = 1000^\circ C$

$c = 0.45$

$q = m \cdot c \cdot \Delta T$

$= 25 \times 0.45 \times (1000 - 30)$

$= 10912.5\ j = \frac{10912.5}{1000} = 10.9\ kj$

a) 8,2
b) 13,6
c) 10,9
d) 24,3
e) 0,34
Leave blank

6-

8 - 1 atm pressure corresponds to how many bar pressure?

a) 0,987
b) 2,5
c) 0,125
d) 7,3
e) 1,01325
Leave blank

1 atm = 760 mm Hg
= 760 torr
= 1.01325×10^5 Pa
= 101.325 kPa
= 1.01325 bar

7-

8 - In a cylindrical system, 1 mole of gas is compressed to 10 L at a temperature of 300 K. Calculate the work in J when the piston is compressed until the pressure is 5 atm at constant temperature.

a) 256
b) -2565
c) -256
d) 0
e) 2565
Leave blank

$n = 1$ mol
$V_1 = 10$ L
$T = 300$ K
$w = ?$ J
$P_2 = 5$ atm

* finding V_2

$P_2 V_2 = nRT$

$V_2 = \frac{nRT}{P_2} = \frac{1 \times 0.0821 \times 300}{5}$

$= 4.926$ L

P_{ext}

* $w = -P_{ext} \Delta V$

$= -5 \times (4.926 - 10) \times \frac{101}{5}$

$= +2562.37$