18-

15 - 200 ml of NaOH solution of unknown concentration is titrated with 0.1 M H_2SO_4 solution. Since 40 ml H
consumed during this process, what is the concentration of NaOH solution (M)?

a) 0,5
b) 1
c) 0,08
d) 0,1
e) • 1,6
Leave blank

$n_{NaOH} = 2 n_{H_2SO_4}$

$\frac{C \times V}{NaOH} = 2\left(\frac{C \times V}{H_2SO_4}\right)$

$C_{NaOH} \times 200 = 2(0.1 \times 40)$

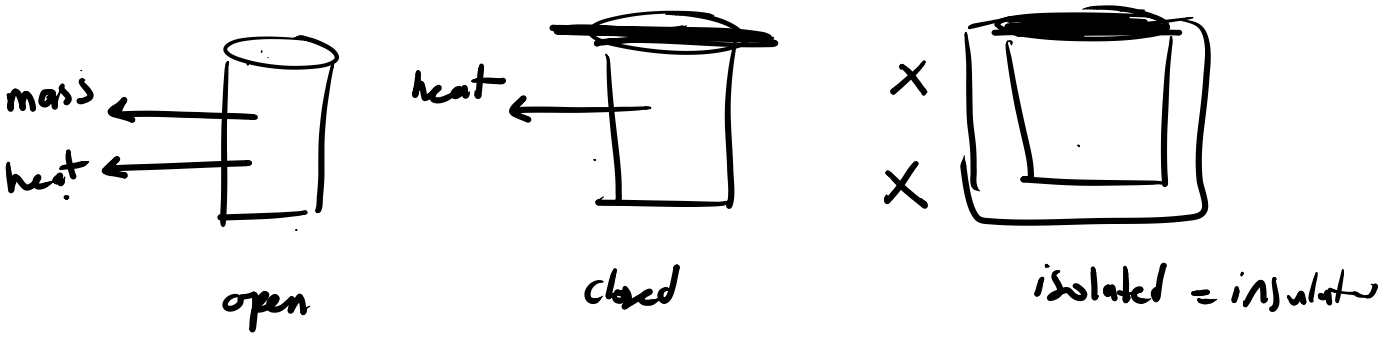
$C_{NaOH} = \frac{2(0.1 \times 40)}{200} = 0.04\ M$

19-

10 - Which of the following statements about thermochemistry is false?

a) A closed system is a system that does not exchange matter with the environment, but
b) The surrounding is the part of the universe that is outside the system.
c) Internal energy is a state function. $\Delta U = q + W$
d) The system is the studied part of the universe in terms of the thermodynamic process.
e) An open system is one that exchanges matter with the environment, but not energy.
Leave blank

universe = system + surrounding



20-

12 - Since ΔH(LiOH(s))= -487 kJ/mol, ΔH(Li2CO3(s))= -1216.04 kJ/mol, ΔH(CO2(g))= -393.5 kJ/mol and ΔH(H2O(g))= -286 kJ/mol, what is the enthalpy change in kJ for the reaction "2 LiOH(s)+ CO2(g) → Li2CO3(s) + H2O(g)"?

a) 85.34
b) 80.34
c) -80.34
d) 89.34
e) -89.34
Leave blank

$\Delta H_{rxn} = \sum \Delta H_p - \sum \Delta H_R$

$2LiOH + CO_2 \rightarrow Li_2CO_3 + H_2O$

$\Delta H_p = -1216.04 + (-286) = -1502.04$ kj

$\Delta H_R = 2 \times -487 + (-393.5) = -1367.5$ kj

$\Delta H_{rxn} = -1502.04 - (-1367.5) = -134.5$ kj

21-

20 - Titrate 100 ml of NaOH solution of unknown concentration with 0.1 M H2SO4 solution. Since 80 ml is consumed during this process, how many molars (M) is the concentration of the NaOH solution?

a) 3.2
b) 0,16
c) 1
d) 0,5
e) 0,1
Leave blank

$n_{NaOH} = 2 n_{H_2SO_4}$

$C \times V = 2(C \times V)$

$C_{NaOH} = \frac{2(0.1 \times 80)}{100} = 0.16$ M

22-

14 - Which of the following is the final state of the medium after adding 200 ml 0.15 M HCl to 100 ml 0.1 M Fe(OH)3 sample?

a) Basic
b) None of them
c) Acidic
d) Neutral
e) -
Leave blank

HCl
V = 200 ml
C = 0.15 M
$n = C \times V = 0.15 \times \frac{200}{1000} = 0.03$ mol

$Fe(OH)_3$
V = 100 ml
C = 0.1 M
$n = C \times V = 0.1 \times \frac{100}{1000} = 0.01$

$n_{acid} > n_{base}$ → acid
$n_{acid} = n_{base}$ → neutral
$n_{acid} < n_{base}$ → basic

23- O_2

1- There is 4.8 g of O2 gas in a 5.6 L container at 273°C. How many atm is the pressure applied to the vessel? (O: 16 g/mol)

a) 2
b) 1
c) 1,5
d) 0,5
e) 1,2
Leave blank

$m = 4.8\ g$

$V = 5.6\ L$

$T = 273^\circ C + 273^\circ = 546\ K$

$R = 0.0821$

$P = ?\ atm$

$M_r = 16 \times 2 = 32$

$PV = nRT$

$PV = \frac{m}{M_r} RT$

$P = \frac{mRT}{M_r V} = \frac{4.8 \times 0.0821 \times 546}{32 \times 5.6} \times 2$

$= 1.2\ atm$

24-

1- Which of the following is wrong about the neutralization reaction of Cu(OH)2 and HNO

a) The reaction is an acid-base reaction.
b) 2 moles of water are released when balanced with the smallest integers
c) 2 moles of acid is required for 1 mole of base to react.
d) The salt formed is CuNO3.
e) The base in the reaction is HNO3.
Leave blank

reaction between acid + base

$Cu(OH)_2 + 2HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O$

25-

3- If 128 g of NH4NO2 decomposes according to the following reaction at 819°C and 1 atm, what is the total volu the products formed? (NH4NO2: 64 g/mol) $NH_4NO_2(k) \rightarrow N_2(g) + 2H_2O(g)$

a) 421,56
b) 672,21
c) 253,45
d) 537,26
e) 342,32
Leave blank

1 2 ? ?

$T = 819 + 273 = 1092\ K$

$n = \frac{m}{M_r} = \frac{128}{64} = 2$

$n_{N_2} = 2$

$n_{H_2O} = 4$

$n_t = 2 + 4 = 6$

$PV_{total} = n_{total} RT$

$V_{total} = \frac{n_{total} RT}{P} = \frac{6 \times 0.0821 \times 1092}{1}$

$= 537.4\ L$