18-

15 - 200 ml of NaOH solution of unknown concentration is titrated with 0.1 M H2SO4 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

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

2 × 1

n_{NaOH} $n_{H_2SO_4}$

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

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

$C_{NaOH} = 0.04\ M$

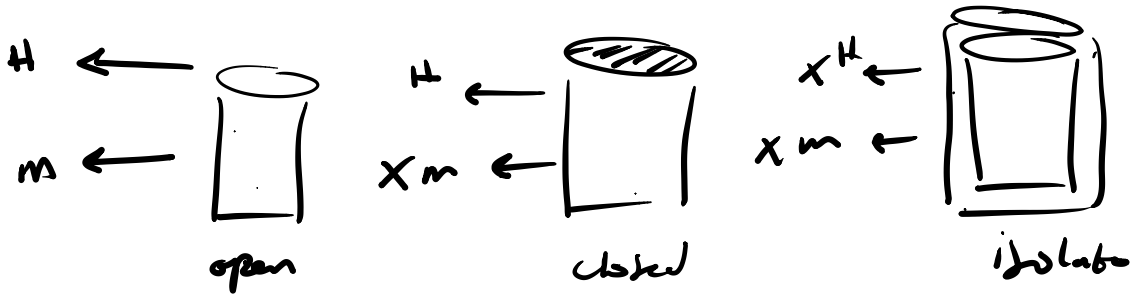
19-

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

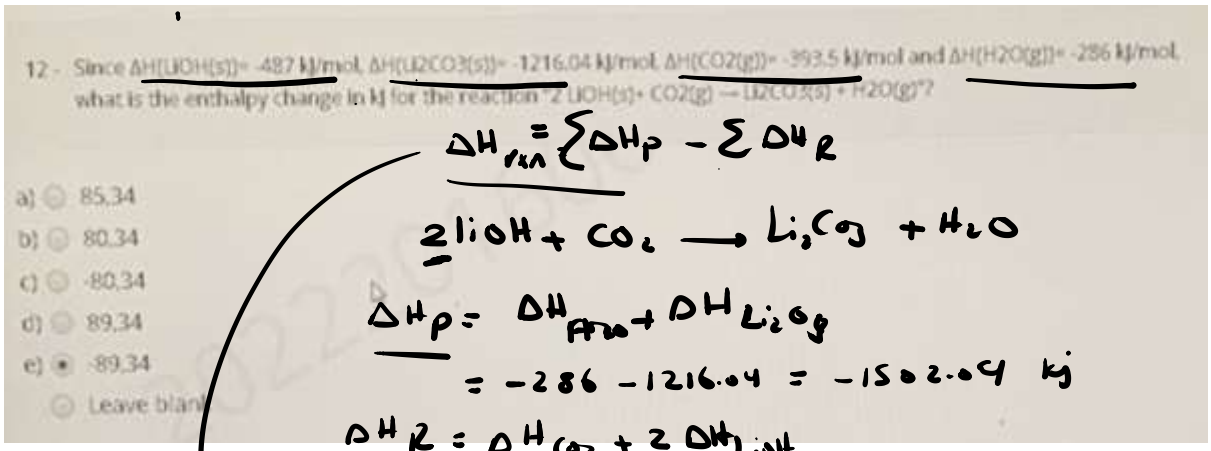
universe = system + surrounding

a) ✗ A closed system is a system that does not exchange matter with the environment, b
b) ✓ The surrounding is the part of the universe that is outside the system.
c) ✓ Internal energy is a state function.
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

$\Delta U = q + w$



20-



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

$2LiOH + CO_2 \rightarrow Li_2CO_3 + H_2O$

$\Delta H_P = \Delta H_{H_2O} + \Delta H_{Li_2CO_3}$

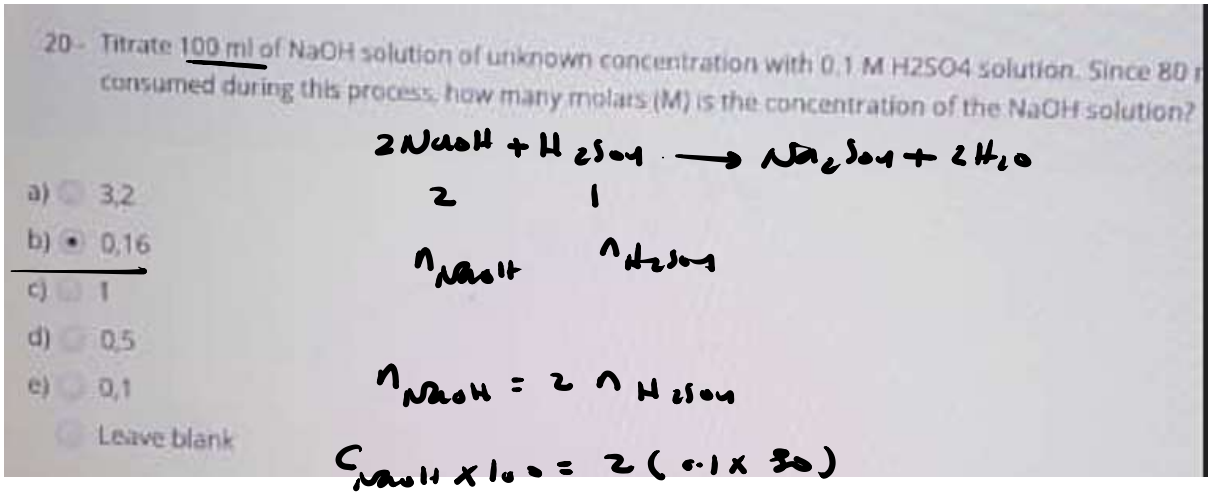
$= -286 - 1216.04 = -1502.04$ kj

$\Delta H_R = \Delta H_{CO_2} + 2\Delta H_{LiOH}$

$= -393.5 - (487 \times 2) = -1367.5$

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

21-



$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

2 1

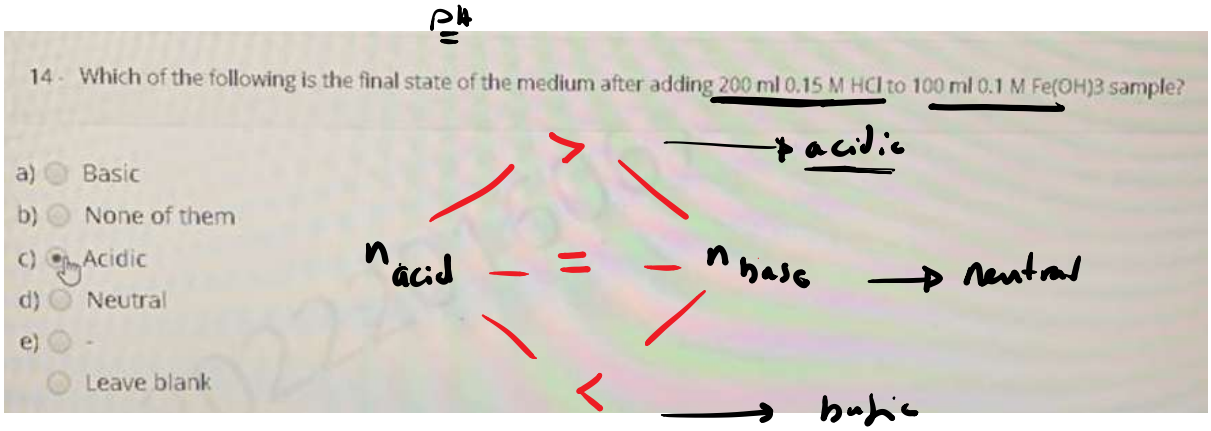
n_{NaOH} $n_{H_2SO_4}$

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

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

$C_{NaOH} = 0.16$ M

22-



$n_{acid} > n_{base}$ → acidic

$n_{acid} = n_{base}$ → neutral

$n_{acid} < n_{base}$ → basic

pH

HCl

$V = 200$ ml $= 0.2$ L

$C = 0.15$ M

$n = 0.2 \times 0.15 = 0.03$

$Fe(OH)_3$

$V = 100$ ml $= 0.1$ L

$C = 0.1$ M

$n = 0.1 \times 0.1 = 0.01$

$0.03 > 0.01$ → acidic

23-

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

K

$m = 4.8$ g

$V = 5.6$ L

$T = 27^\circ C + 273 = 546$ K

$P = ?$

$M_r = 16$

$R = 0.0821$

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

$P = \frac{m RT}{V M_r}$

$= \frac{4.8 \times 0.0821 \times 546}{5.6 \times 16}$

$= 2.4$ atm

24-

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

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

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

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) NH4NO2 (k) → N2(g) + 2 H2O (g)

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

$+273 = 1092$ K

1 1

$n_{NH_4NO_2} = \frac{m}{M_r} = \frac{128}{64} = 2$

$n_{N_2} = 2$

$n_{H_2O} = 2 \times 2 = 4$

$\} n_{total} = 6$

$PV = n_{total} RT$

$V = \frac{nRT}{P} = \frac{6 \times 0.0821 \times 1092}{1}$

$= 537.9$ L