CALCULATION OF ISOLATED CASEIN

Type of milk used:	

1	Weight of watch glass (empty) =	
2	Weight of casein (wet) + watch glass =	
3	Weight of casein (dry) + watch glass =	
4	Amount of water removed by drying = (Box **2** - Box **3**)	
5	Weight of isolated casein = (Box **3** - Box **1**)	
6	Percentage of isolated casein in g/100 mL =	

NOTE: the initial milk sample was only 50 mL but the percentage of casein in g/100 mL is requested here.

QUALITATIVE ANALYSIS OF WHEY CONSTITUENTS

Type of milk used:	

	ASSAY	COMMENTS	POSITIVE/ NEGATIVE
1	Detection of sugars: Fehling's reaction		
2	Protein detection: Biuret reaction		
3	Chloride detection (Cl^-)		
4	Detection of phosphates (PO_4^{3-})		
5	Calcium detection (Ca^{2+})		

DETERMINATION OF THE DENSITY OF A WINE SAMPLE

Table 1

	Temperature at 1st drop
R1 (full vial)	
R2 (full vial)	
R3 (beaker, 15mL or more collected)	

Table 2

	Weight of vials A empty and with caps
A1	
A2	
A3	

Table 3

	Weight of vials A with 1 mL solution and caps	Weight of solution in vials	Density (g/mL)
A1 (1mL R1)			
A2 (1 mL R2)			
A3 (1 mL R3)			

Titration of acetic acid of unknown molarity

Volume of acetic acid to be analyzed measured with a pipette:	**mL**

Titration Table

Volume NaOH added (mL)	pH
0	
0.5	
1	
1.5	
2	
2.5	
3	
3.5	
4	
4.5	

Volume NaOH added (mL)	pH

pH of the solution at the start of titration (before adding NaOH).	
Base volume (V_{base}): Volume of added base that produces a jump in pH value. This is the volume of the equivalence point (V_{eq}).	
pH of the solution at the equivalence point.	
Calculation of the **molarity** of the acetic acid sample $M_{acid} = \frac{V_{base} \times M_{base}}{V_{acid}}$	

Determination of the acidity of a commercial vinegar

Volume of vinegar measured with the dosimeter:	**mL**

Color of the solution at start of titration (before addition of NaOH).	
Equivalence volume (V_{eq}): Volume of NaOH used to produce a change in the color of phenolphthalein.	
Color of the solution after the equivalence volume has been reached.	
Calculation of the **number of moles** of **NaOH** ($n_{NaOH} = V_{eq} \times M_{NaOH}$)	
Calculation of the **number of moles** of **HAc** ($n_{HAc} = n_{NaOH}$)	
Calculation of the **mass of acetic acid** in 5 mL $m_{HAc} = n_{HAc} \times M_{r(HAc)}$	
Calculation of the **degree of acidity** expressed as g_{HAc}/100 mL	

Buffering capacity test

Measurement of the pH of buffer solution 1 (20 mL of buffer solution)	
Measurement of the pH of buffer solution 1 after the addition of 1mL 0.1 M HCl with dosing device.	

Measurement of the pH of buffer solution 2 (20 mL of buffer solution)	
Measurement of the pH of buffer solution 2 after the addition of 1mL 0.1 M NaOH with dosing device.	

Measurement of the pH of buffer solution 3 (20 mL H_2O distilled)	
Measurement of the pH of buffer solution 3 after the addition of 1mL 0.1 M HCl with dosing device.	

Measurement of the pH of buffer solution 4 (20 mL H_2O distilled)	
Measurement of the pH of buffer solution 4 after the addition of 1mL 0.1 M NaOH with dosing device.	

Conclusions:

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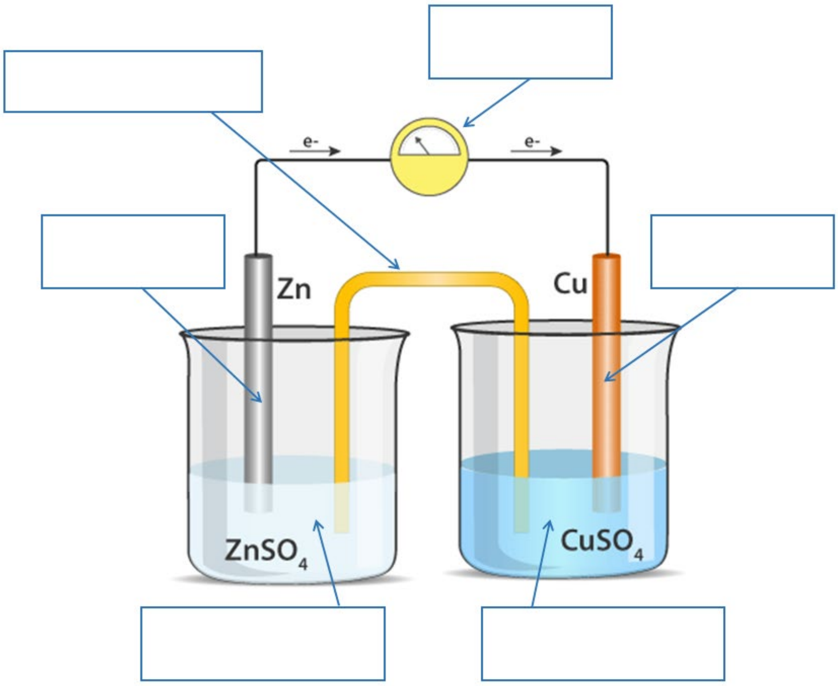
Galvanic cells. Daniell cell.

1. In the Daniell cell diagram below, write the name of each component in the correct box.



2. Indicate which electrode works as the anode and which works as the cathode. Write the reactions that take place at each electrode.

Anode	
Reaction that takes place at the anode	

Cathode	
Reaction that takes place at the cathode	

3. What is the purpose of the salt bridge?

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4. How do ions K^+ and SO_4^{2-} flow in a salt bridge? Why do the ions in the salt bridge flow in this direction?

K^+ ions migrate towards	
SO_4^{2-} ions migrate towards	

The reason for this movement is as follows:

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5. Which of the two electrodes will gain mass after the galvanic cell is connected for a while?

The electrode that will gain mass is	

6. Calculate the redox potential of the electrochemical cell and compare it with the observed potential.

Calculated redox potential	
Observed redox potential	

Qualitative assays of spontaneous redox reactions

ASSAY #1

Write down your observations on the assay (Note changes in color, the appearance of the precipitate, the generation of gases, heating or cooling of the test tube, bubbling, etc.).	
Identify the species of the reaction that is oxidized. (Identify the species that loses electrons, i.e. the one that increases its oxidation state).	
Identify the species of the reaction that is reduced. (Identify the species that gains electrons, i.e. the one that decreases its oxidation state).	
Note down the redox reaction that takes place.	
Calculate the potential of the redox reaction.	

ASSAY #2

Write down your observations on the assay (Note changes in color, the appearance of the precipitate, the generation of gases, heating or cooling of the test tube, bubbling, etc.).	
Identify the species of the reaction that is oxidized. (Identify the species that loses electrons, i.e. the one that increases its oxidation state).	
Identify the species of the reaction that is reduced (Identify the species that gains electrons, i.e. the one that decreases its oxidation state).	
Note down the redox reaction that takes place	
Calculate the potential of the redox reaction.	

SO_2 titration in a wine sample

a) Free SO_2

Volume of the wine sample	
Volume of the KI_3 solution added to reach the equivalence point (V_{eq})	
Calculation of the free SO_2 (mg/L) free SO_2 (mg/L) = $\frac{V_{eq}\times 0,01\times 64\times 1000}{50}$	

b) Total SO_2

Volume of the wine sample	
Volume of the KI_3 solution added to reach the equivalence point (V'_{eq})	
Calculation of the total SO_2 (mg/L) total SO_2 (mg/L) = $\frac{V'_{eq}\times 0,01\times 64\times 1000}{20}$	

Answer the following questions:

1. Does the wine under analysis satisfy the regulations?

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2. In what other foods are sulfites used as preservatives?

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