

ASSIGNMENT: CELLS AND BATTERIES

A **battery** is a number of **electrochemical cells** in series.

The correct term for most batteries is 'cell'.

Answer the following 5 questions on a separate piece of paper.

1. What are the three things that all batteries require or consist of? (3 marks)
2. Cells can be divided into different categories: (4 marks)
 - (i) **wet or dry cells**. Explain the distinction between these two.
 - (ii) **primary or secondary cells**. Explain the distinction between these two.
3. List 5 different types of cells with the two electrodes and electrolyte used. (→ 15 marks ←)
4. State the advantages of each of the batteries (cells) listed above (5 marks)
5. For one of the cells, write the chemical reaction (equation) that takes place in the battery (as a formula, not words). (4 marks)

Sources: have a look at old/other physics textbooks, look at an encyclopædia, look on the internet.

MINI-LAB: ELECTROCHEMICAL CELLS

Perform a lab to answer the following questions.

- 1.—With the electrodes provided, which combination produces the most voltage?
- 2.—Does the spacing between electrodes affect the voltage produced?
- 3.—Does the depth that the electrodes are inserted in the electrolyte affect the voltage?
- 4.—~~If there is more than one electrolyte provided, which electrolyte is the best?~~
—actually just omit this. The best electrolyte depends on the electrodes used.

- ❖ Make sure that you supply your data to support your answers. ← very important!
- ❖ Choose 5 different electrodes and test all combinations of them.
- ❖ Ignore any – sign on the voltmeter. If you switch the leads it changes the sign.
- ❖ Use sandpaper to gently clean the electrodes first if they are oxidized – **except for lead (Pb)**.
- ❖ Like all good labs, only change one variable at a time.

Hand in:

- Purpose
- Procedure
- Diagram of equipment. (labelled)
- Answers to questions with data to support your answers.
(I prefer the data to be in neat tables.)

Sample data table to make your life easier – for answering question #1:

Voltages for various electrodes

(In this table, the electrodes are letters A-F. You need to write the element symbol for each.)

Depth inserted: _____ cm

Separation: _____ cm

	A	B	C	D	E	F (if time permits)
A	X					
B	X	X				
C	X	X	X			
D	X	X	X	X		
E	X	X	X	X	X	