Revision –electroplating.

1. A student was asked to experimentally determine Faraday's constant (F) using the electrolytic cell shown in diagram 1. The following items was on the list of material asked for.
   - ammeter
   - one copper and one nickel strips of metal.
   - 0.1 M $Ni(NO_3)_2$.
   - 1 X 200 mL beaker
   - 12 V power pack
   - stopwatch

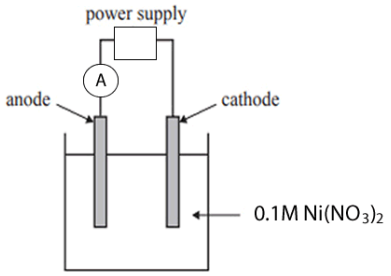

Diagram 1

   a. Complete the labelling of diagram 1 by clearly indicating the:
      i. polarity of each electrode
      ii. substance that each electrode is made of
      iii. direction of electron flow
      iv. direction of cation flow
      v. write the half equations for the reactions taking place at the
         anode _____
         cathode _____

   b. Offer a valid method, in dot point form, that the student could follow to achieve the aim of the experiment.

      A valid method is one that enables the accurate collection of appropriate data that will enable the student to calculate the value of Faraday's constant.
      In other words the method must outline what information needs to be collected to calculate the Charge and how this information will be collected and in what units.

      It should also clearly outline how the mass of the nickel metal deposited will be calculated. Consideration also needs to be given on how the nickel coated cathode will be washed and cleaned of impurities so that the gain in mass is totally due to the nickel metal deposited.

      Consideration must also be given to potential errors. Example may be not to deposit too low a mass of nickel as this increases the percentage of error due to the weighing of low mass with scales that have an inherent error of -/+ 0.05 g.

   c. A current of 1.10 A was applied for 6.00 minutes in order to deposit 0.121 grams of nickel. Using this data calculate Faraday's constant. Give the answer to the right number of significant figures and show all working out.

      Click here to see the video of the solutions

   d. Calculate the charge in, Coulombs, of one electron using the information

      derived from this experiment.
      Click here to see the video of the solutions