Marks 3

- A strip of copper and a strip of zinc are embedded in a lemon, and are connected by wires to a voltmeter; a voltage is generated and can be read at the voltmeter. What chemical reactions are occurring that lead to the generation of current?

$Zn(s) \rightarrow Zn^{2+}(aq) + 2e^-$ at the anode

$2H^+(aq) + 2e^- \rightarrow H_2(g)$ at the cathode

Assuming there are no losses in the circuit and the conditions are similar to standard, what voltage can be read at the voltmeter?

The Zn^{2+} / Zn reduction potential is the more negative so is reversed to give E^o_{ox} = +0.76 V. The H^+ / H_2 reduction potential is E^o_{red} = 0.00 V. Overall

$$E^o = E^o_{ox} + E^o_{red} = (+0.76 + 0.00)\ V = +0.76\ V$$