**ATAR CHEMISTRY – UNIT 3  
TASK 7 – Secondary Cell Validation**

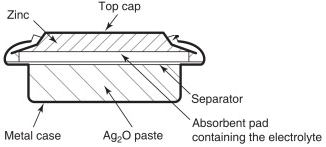
**TOTAL MARKS:**

**/14**

Clearly write your answer in the space provided. Where applicable show all working out and for calculations express your answer to appropriate significant figures.

The silver oxide-zinc battery is rechargeable and utilises sodium hydroxide, NaOH, solution as the electrolyte. The battery is used as a backup in spacecraft if the primary energy supply fails.

Each cell consists of many ‘stacks’, the diagram of one ‘stack’ is shown below:



Flow of electrons:

The overall reaction during **discharge** is:

Zn + Ag2O à ZnO + 2Ag

1. Write balanced half equations occurring at each electrode during the **recharging** process:

|  |  |
| --- | --- |
| Anode: |  |
| Cathode: |  |

(2 marks)

1. In the box provided, draw the flow of electrons during the **discharging** process.

(1 mark)

1. Use the Standard Reduction Potential table to determine the overall EMF for the discharge of a cell containing 4 stacks.

(2 marks)

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1. State the purpose of the separator and what the consequence would be if it were broken/removed from the stack.

(2 marks)

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1. The electrolyte is a sodium hydroxide (NaOH) paste with a 28.0%mass/mass ratio.   
   If 45.0 mL of the electrolyte solution has a mass of 47.6 g, calculate the concentration of the electrolyte solution in mol L-1.

(4 marks)

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1. Would sodium chloride paste be a suitable electrolyte for this cell? Explain your answer.

(3 marks)

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