

Faraday's Law

1. In the Hall-Herlout process, molten aluminium oxide ($\text{Al}_2\text{O}_3(\text{l})$) is used to produce aluminium metal ($\text{Al}(\text{s})$).

A current of _____ A must run for 24.0 h to produce 4.00 kg of aluminium at the cathode

a	497
b	166
c	2.98×10^3
d	1.78×10^6

2. Mattie and Stephanie weigh the anode of a cell and find the initial mass to be 8.53 g. They then run a current of 2.50 A for 2.00 h. If the final mass of the anode is 3.32 g, then the anode is made of _____.

a	Zinc
b	Copper
c	Magnesium
d	Iron

3. Nic and Jordan weigh the anode of a cell and find the initial mass to be 20.8 g. They run a current of 4.00 A for a time of 2.50 h. When they disconnect and weigh again, the final mass of the anode is 9.90 g. Based on these observations; the boys conclude that the anode is made of _____.

a	Tin
b	Nickel
c	Zinc
d	Cobalt

4. The amount of time that it will take to plate out all the copper from 25 mL of 0.10 mol/L copper (II) nitrate will be _____ min. Assume the current used is 1.5 A.

a	5.4
b	2.7
c	11
d	3.2×10^2

5. The time to produce 5.40 g of $\text{Al}(\text{s})$ from molten bauxite ($\text{Al}_2\text{O}_3(\text{l})$) using a current of 5.00 A will be _____ h

a	1.07
b	193
c	3.22
d	9.66

6. Silver plating of ornaments or utensils is done by electrolysis of a soluble silver compound. The object to be plated is placed at the cathode. If 10.8 g of silver are to be deposited, how long will it take to plate the object using a current of 0.500 A?

a	2.68 h
b	5.37 h
c	3.22×10^2 h
d	1.93×10^4 h

7. The time required to plate out 10.0 g of chromium metal from a 0.10 mol/L solution of chromium(II) nitrate in an electrolytic cell is dependent mainly upon _____

a	Surface area of the anode in the cell
b	initial mass of the cathode in the cell
c	amount of current supplied to the cell
d	charge of the nitrate ions in the solution

8. An electrolytic cell contains 2.00 mol/L $\text{NiCl}_2(\text{aq})$ and operates at 0.500 A. To plate out 5.87 g of Ni(s) , the cell will function for _____ s

a	1.93×10^4
b	3.86×10^4
c	7.72×10^4
d	1.52×10^5

9. What mass of aluminum is deposited during the electrolysis of molten aluminum bromide if 30.0 A flows through the cell for 4.85 h?

a	146 g
b	48.8 g
c	1.46 g
d	0.0351 g

10. Ian and Crystal set up an electrochemical cell where 1.5 g of Zn(s) is removed from the anode. If the cell has run for a total of 1.0 hours, then the cell will need a minimum current of ____ A

a	1.2
b	2.4
c	0.60
d	12

11. Anne and Carly set up an electrochemical cell where 0.250 mol of $\text{Cu}^{2+}(\text{aq})$ is formed from $\text{Cu}(\text{s})$. If the cell has run for 45.0 minutes, the cell will need a minimum current of ____ A.

a	8.94
b	3.36
c	17.9
d	0.298

12. Bill and Wayne are asked to collect evidence to support the theoretical value of Faraday's constant. They collect the following data using aluminium at the anode.

Initial mass of anode	Final mass of anode	Amperage of cell	Time the cell operates
15.0 g	10.9 g	6.80 A	105 min

Based on this information, the experimental value of Faraday's constant is ____ $\frac{\text{C}}{\text{mol}}$

a	1.57×10^4
b	9.40×10^4
c	5.64×10^6
d	3.13×10^4

13. Theresa and Wendy are asked to collect evidence to support the theoretical value of Faraday's constant. They collect the following data using zinc at the anode.

Initial mass of anode	Final mass of anode	Amperage of cell	Time the cell operates
31.5	13.5 g	9.00 A	1.50 h

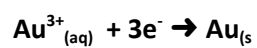
Based on this information, the experimental value of Faraday's constant is ____ $\frac{\text{C}}{\text{mol}}$

a	4.42×10^4
b	2.40×10^4
c	1.77×10^5
d	8.83×10^4

14. **Numerical response question:** Left justify your answer in the boxes provided.

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A mass of 0.175 g of gold is plated on a ring in 10.0 min according to the half reaction given below



The current required to do this is a.bc x 10^{-d} amps.

Solutions:

1. A
2. D
3. B
4. A
5. C
6. B
7. C
8. B
9. B
10. A
11. C
12. B
13. D
14. 4291