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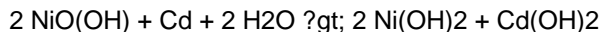
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QUESTION 1

What is the oxidation state of each nickel on the reactant side of the following reaction?



- A. -2
- B. -1
- C. +1
- D. +3

Correct Answer: D

Oxidation numbers provide a way to keep track of the movement of electrons in a reaction. Several rules govern how oxidation numbers are calculated, but in this situation, it's only important to recognize the oxidation numbers of the common components attached to nickel [Ni] on the reactant side and to remember that the sum of the internal oxidation numbers of a molecule equals that molecule's net charge. In this case, nickel oxide [NiO(OH)] is neutral, so the sum of its internal oxidation numbers must be 0. Hydroxide [OH-] always has an oxidation number of -1, and oxygen [O] almost always has an oxidation number of -2. To make these charges cancel out to equal 0, the oxidation number of nickel [Ni] must be +3: $3 - 1 - 2 = 0$.

QUESTION 2

Which cells make up the insulated wrapping on axons?

- A. Schwann cells
- B. astrocytes
- C. microglia
- D. macrocytes

Correct Answer: A

Axons are surrounded by insulating cells called Schwann cells. This insulation enables action potentials to travel rapidly throughout the nervous system.

QUESTION 3

What is the result of adding HBr and hydrogen peroxide to propene?

- A. 2-propanol
- B. 1-propanol
- C. 2-bromopropane



D. 1-bromopropane

Correct Answer: D

In the presence of an organic peroxide, the addition of HBr (and peroxide) to a propene results in an anti-Markovnikov product in which the hydrogen becomes attached to the carbon with fewer hydrogens connected to it. The product of the addition is $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$, or 1-bromopropane.

QUESTION 4

If a substance has a constant half-life of 10 weeks, how many grams of a 12 g sample would remain after 30 weeks?

A. 8 g

B. 6 g

C. 3 g

D. less than 2 g

Correct Answer: D

Thirty weeks corresponds to 3 half-lives. After the first half life (10 weeks), there will be $12 \div 2 = 6$ g remaining. After another 10 weeks, there will be 3 g remaining. And after the final 10 weeks, there will be

1.5 g remaining.

QUESTION 5

What are the critical points of $y = 4x^2 + 3x$?

A. 0

B. $-3/8$

C. 0 and $-3/8$

D. 0 and $3/8$

Correct Answer: B

A critical point of a function is a point where the derivative of the function is equal to 0 or is undefined. Evaluate the derivative with respect to x, set it equal to 0, and solve for x:

$$0 = 8x + 3 \Rightarrow x = -3/8$$

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