Chemical Changes
Multiple Choice Questions
Set 4 (HT Only)

Tick **one** box.

1. What is oxidation?

   A. the gain of electrons or gain of oxygen ☐
   B. the gain of electrons or loss of oxygen ☐
   C. the loss of electrons or gain of oxygen ☐
   D. the loss of electrons or loss of oxygen ☐

2. What is the correct ionic equation for the reaction between magnesium and copper sulfate solution?

   A. $Mg + Cu^{+} \longrightarrow Mg^{+} + Cu$ ☐
   B. $Mg + Cu^{2+} \longrightarrow Mg^{2+} + Cu$ ☐
   C. $Mg^{+} + Cu \longrightarrow Mg + Cu^{+}$ ☐
   D. $Mg^{2+} + Cu \longrightarrow Mg + Cu^{2+}$ ☐

3. Which of the following is the correctly balanced half equation for the reduction of aluminium in its extraction from Al_2O_3?

   A. $Al \longrightarrow Al^{+} + e^{-}$ ☐
   B. $Al \longrightarrow Al^{3+} + 3e^{-}$ ☐
   C. $Al^{+} + e^{-} \longrightarrow Al$ ☐
   D. $Al^{3+} + 3e^{-} \longrightarrow Al$ ☐

4. Which of the following is **not** an example of a strong acid?

   A. citric acid ☐
   B. hydrochloric acid ☐
   C. nitric acid ☐
   D. sulfuric acid ☐

5. Which of the following describes a weak acid?

   A. it has a pH value greater than 7 ☐
   B. it has a high concentration of H^{+} ions ☐
   C. it is completely ionised in aqueous solutions ☐
   D. it is only partially ionised in aqueous solutions ☐

6. What happens to the pH of a solution if the hydrogen ion concentration increases by a factor of 1000?

   A. the pH decreases by 2 ☐
   B. the pH decreases by 3 ☐
   C. the pH increases by 1 ☐
   D. the pH increases by 3 ☐

7. A solution of 0.5mol/dm^3 sulfuric acid has a pH of 0.3.
   What will the pH of the solution be if it is diluted to 0.05mol/dm^3?

   A. 0 ☐
   B. 1.3 ☐
   C. 2.3 ☐
   D. 3 ☐

8. What happens at the anode during electrolysis?

   A. positively charged ions gain electrons ☐
   B. positively charged ions lose electrons ☐
   C. negatively charged ions gain electrons ☐
   D. negatively charged ions lose electrons ☐

9. The half equations for the reactions that take place in the electrolysis of molten copper chloride are

   $Cu^{2+} + 2e^- \longrightarrow Cu$ and $2Cl^- \longrightarrow Cl_2 + 2e^-$.

   Which of the following statements is correct?

   A. chloride ions gain electrons and are reduced ☐
   B. chloride ions lose electrons and are oxidised ☐
   C. copper ions gain electrons and are oxidised ☐
   D. copper ions lose electrons and are reduced ☐

10. Which of the following half equations represents the reaction that takes place at the cathode in the electrolysis of aqueous sodium chloride?

   A. $2H^+ + 2e^- \longrightarrow H_2$ ☐
   B. $Na^+ + e^- \longrightarrow Na$ ☐
   C. $4OH^- \longrightarrow O_2 + 2H_2O + 4e^-$ ☐
   D. $2Cl^- \longrightarrow Cl_2 + 2e^-$ ☐