UNIT 5B: CHEMICAL REACTIONS II - REDOX REACTIONS

WASHINGTON LATIN PUBLIC CHARTER SCHOOL

CHEMISTRY 2019-20

UNIT 5B PRACTICE TEST - CHEMICAL REACTIONS II: REDOX REACTIONS

Answer all questions

Recommended time = 45 minutes

BAHATI NJEMA!

Name:	
Score	/27
Bonus (Submits quiz on time and in correct format)	/13
Total:	/40

UNIT 5B: CHEMICAL REACTIONS II - REDOX REACTIONS

Fill in all green cells

1.	Magnesium, zinc and silver are all metals. Zinc metal is obtained by heating zinc oxide (ZnO) with carbon. Magnesium metal is obtained by the electrolysis of molten magnesium chloride ($MgCl_2$) Silver metal occurs naturally but is rare.		
	(a)	Explain what you would **observe** when a piece of zinc is dropped into a beaker containing hydrochloric acid.	
		Zinc would dissolve You would see bubbles/fizzing	1 1
	(b)	Explain what you would **observe** when a piece of silver is dropped into a beaker containing hydrochloric acid.	
		Nothing would happen	1
	(c)	Write equations for any reactions occurring.	
		$Zn + 2HCl \rightarrow ZnCl_2 + H_2$	2
	(d)	State what is oxidised and reduced in any equation you have written above.	
		Zn is oxidised (0 to +2) H is reduced (+1 to 0)	1 1
	(e)	Explain why zinc and silver react differently with hydrochloric acid.	
		Zinc is above hydrogen in the reactivity series Silver is below hydrogen in the reactivity series	2
	(f)	Write a possible equation for the reaction between zinc oxide and carbon.	
		$ZnO + C \rightarrow Zn + CO$ or $2ZnO + C \rightarrow 2ZnO + CO_2$	2
	(g)	Explain why magnesium cannot be extracted by reacting magnesium oxide with carbon.	
		Magnesium is above carbon in the reactivity series so no reaction will take place	1

	(h)	Write a half-equation for the reaction taking place at the cathode during the electrolysis of molten magnesium chloride.	
		$Mg^{2+} + 2e^- \rightarrow Mg$	2
	(i)	What substance is produced at the anode during the electrolysis of molten magnesium chloride?	
		Chlorine (or Cl_2)	1
		TOTAL	15
2.	One of the first Galvanic cells invented was called a LeClanché cell. The simplified electrode half-equations for this cell are as follows: Zn electrode: $Zn \rightarrow Zn^{2+} + 2e^-$ MnO_2 electrode: $MnO_2 + 2H_2O + e^- \rightarrow Mn^{3+} + 4OH^-$ The MnO_2 electrode is actually made of graphite coated with a layer of MnO_2.		
	(a)	Identify the positive electrode, the negative electrode and the direction of electron flow between the electrodes	
		positive electrode:	MnO_2 (In galvanic cells, the cathode (reduction) electrode is positive) — 1
		negative electrode:	Zn (In galvanic cells, the anode (oxidation) electrode is negative) — 1
		direction of electron flow:	From -ve electrode/Zn/anode to +ve electrode/MnO_2/cathode — 1
	(b)	Explain why the MnO_2 electrode is not made of pure MnO_2.	
		Electrodes must be made of a metal or graphite, as these are the only substances which conduct electricity when solid	1
	(c)	Which common battery still uses a modified version of the LeClanché cell?	
		Alkali batteries	1
	(d)	State the main disadvantage of this cell.	
		Non-rechargeable	1
	TOTAL		6

3.	Brine is a saturated solution of aqueous sodium chloride. Brine is a common substance widely used in food preservation. The electrolysis of brine is an important commercial process.		
	(a)	Name the substance produced at the cathode during the electrolysis of brine.	
		hydrogen	1
	(b)	Name the substance produced at the anode during the electrolysis of brine	
		chlorine	1
	(c)	How would the products be different if sea water was electrolysed? Give a reason for your answer.	
		You would get oxygen at the anode instead of chlorine Because the concentration of Cl^- ions in sea water is much lower than in brine	1 1
	(d)	How would the products be different if molten sodium chloride was electrolysed? Give a reason for your answer.	
		You would get sodium at the cathode instead of hydrogen Because Na^+ is the only cation present	1 1
	TOTAL		6

End of Test - click here to go straight to the exit ticket