WASHINGTON LATIN PUBLIC CHARTER SCHOOL
CHEMISTRY 2019-20

UNIT 5B QUIZ 1 - INTRODUCTION TO OXIDATION AND REDUCTION

Answer all questions
Recommended time = 30 minutes
BON COURAGE!

Name:	
Score for Q1 (open response)	/10
Score for Q2 - 6 (multiple choice)	/5
Bonus (Submits quiz on time and in correct format)	/5

SECTION A – OPEN RESPONSE

1.	Acidified potassium dichromate, a mixture of $K_2Cr_2O_7$ and H_2SO_4, is an important oxidizing agent. It reacts according to the following half-equation: $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$ One of its uses is to determine the iron levels in blood.		
	(a)	Why is acidified potassium dichromate an oxidizing agent? Define an oxidizing agent – what does it do? State whether or not the acidified dichromate is doing that in the above half-equation	2
	(b)	Deduce the oxidation numbers of the chromium (Cr) on both sides of the half-equation. Hence explain why the half-equation contains six electrons. Oxidation number of Cr in $Cr_2O_7^{2-}$ = Oxidation number of Cr in Cr^{3+} = So each Cr is gaining how many electrons during this half-equation? As are two Cr atoms, in the half-equation, how many electrons are being gained in total?	3
	(c)	What species in the half-equation shows that the potassium dichromate has been acidified? Which ion is present in all acids?	1

	(d)	There are two ions which are present in acidified potassium dichromate but which do not appear in the above half-equation. Give the formula of either one of them. Acidified potassium dichromate contains $K_2Cr_2O_7$ and H_2SO_4 $K_2Cr_2O_7$ contains K^+ and $Cr_2O_7^{2-}$; H_2SO_4 contains H^+ and SO_4^{2-} Which of these ions do not appear in the half-equation?	1
	(e)	When acidified potassium dichromate reacts with iron in blood, the iron is oxidized from Fe^{2+} to Fe^{3+}. Write a half-equation for this oxidation. $Fe^{2+} \rightarrow Fe^{3+}$ so how many electrons? On which side?	1
	(f)	Hence write an overall equation for the redox reaction between acidified potassium dichromate and the iron in blood. Take your answer to (e) Combine it with the half-equation at the top Make sure your electrons cancel out	2
		TOTAL	10

SECTION B – MULTIPLE CHOICE

Answer these questions on the separate answer sheet.

Read the questions and make a note of all five of your answers before clicking on the answer sheet.

Reaction V	**$3Cl_2 + 6NaOH \rightarrow 5NaCl + NaClO_3 + H_2O$** 0 +1,-2,+1 → +1,-1 +1,?,-5 +1,-2
Reaction W	**$H_2SO_4 + 2KCl \rightarrow K_2SO_4 + 2HCl$** +1,?,-2 +1,-1 → +1,?,-2 +1,-1
Reaction X	**$2VO_2Cl + 3Zn + 8HCl \rightarrow 2VCl_2 + 3ZnCl_2 + 4H_2O$** ?,-2,-1 0 +1,-1 → +2,-1 +2,-1 +1,-2
Reaction Y	**$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$** ?, +1, -2 0 → +4,-2 +1,-2

1.	Which of the above reactions is not a redox reaction? No changes in oxidation numbers
2.	What is the oxidation number of V in VO_2Cl (Reaction X)? Sorry, this was difficult, I've added the O and Cl above so you should be able to work it out easily now
3.	What happens to the oxidation number of C in Reaction Y? It starts as ? and it finishes as +4, so it goes up by ?
4.	What is the reducing agent in Reaction X? What is oxidized?
5.	Which reaction is a disproportionation reaction? Same atom is oxidized and reduced

Go to the answer sheet