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VCE Chemistry ¾
Introduction to Redox [1.6]
Test

20 Marks. 16 Minutes Writing.

Results:

Test Questions	_____ /15
Extension Questions	_____ /5

Section A: Test Questions (15 Marks)

Question 1 (3 marks)

Tick whether the following statements are true or false:

Statement	True	False
a. Reduction and oxidation occur simultaneously.		
b. An oxidant's oxidation number increases.		
c. The oxidation number of N in N_2O is $+2$.		
d. A valid conjugate reductant of $CuSO_4$ is $CuCl_3$.		
e. Both the atoms and charges must balance in both half-equations and the overall equation.		
f. In a balanced half-equation in an alkaline environment, H^+ is typically present.		

Space for Personal Notes

Question 2 (4 marks)

Liquid bromine (Br_2) is often converted into bromate ions (BrO_3^-) and added to foods such as breads and pastries to improve their texture and volume.

a. Write the balanced half-equation for this process in a low pH environment. (1 mark)

_____

_____

b.

i. Explain whether this is an oxidation or reduction reaction, based on the **position of electrons** in the half equation you wrote in **part a**. (1 mark)

_____

_____

ii. Explain whether this is an oxidation or reduction reaction, based on the **change in oxidation number** of Br. (1 mark)

_____

_____

c. State the conjugate redox pair for this process. (1 mark)

_____

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Question 3 (7 marks)

For this question, you may assume everything takes place in an acidic environment, unless otherwise stated.

Given the following unbalanced equation:

$$Cl_2 + Fe_2O_3(s) \rightarrow ClO_4^- + Fe^{2+}$$

a.

i. Write the balanced half-equation for the reduction reaction. (1 mark)

_____

_____

ii. State the conjugate reducing agent. (1 mark)

_____

b.

i. Write the balanced half-equation for the oxidation reaction. (1 mark)

_____

_____

ii. State the change in oxidation number for the species being oxidised. (1 mark)

_____

c. Hence or otherwise, write the overall balanced equation. (2 marks)

_____

_____

_____

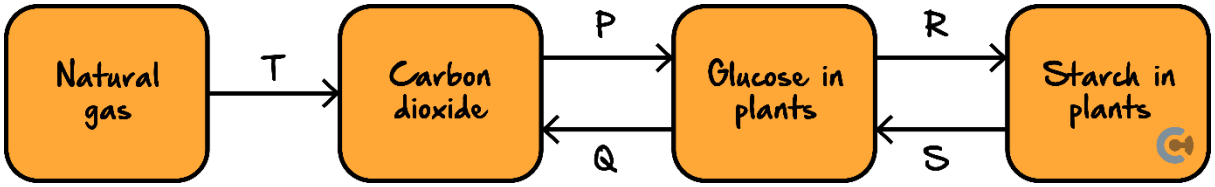
d. Had this reaction occurred in a **basic** environment, write what the overall balanced equation would have been. (1 mark)

_____

_____

Question 4 (1 mark)

A simplified section of the carbon cycle is shown below.



Carbon atoms are oxidised in reaction(s):

A. Q only.

B. S and Q only.

C. Q and T only.

D. Q, R and T only.

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Section B: Extension Questions (5 Marks)

Question 5 (5 marks)

Use the **overall** equation below to answer the following questions:

$$2H_2O_2(aq) \longrightarrow 2H_2O(l) + O_2(g)$$

a. Describe how the oxidation number of oxygen varies from the reactants to the products in the above reaction. (2 marks)

_____

_____

b. Hence or otherwise, write the:

i. Balanced half-equation for oxidation. (1 mark)

_____

ii. Balanced half-equation for reduction. (1 mark)

_____

c. Explain how your answer from **part a.** links to the **number of electrons** in your answer to **part b. ii**. (1 mark)

_____

_____

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