



Chem!stry

| Name: (|) |
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| Class: | |
| Date: / / | |

Ionic Equations for Redox Reactions

• Balance the number of electrons between the two ionic half-equations and then combine the two ionic half-equations together to create the overall ionic equation for the reaction.

| Question 1: |
|--|
| $MnO_4^-(aq) + 8H^+(aq) + 5e^- \rightarrow Mn^{2+}(aq) + 4H_2O(l)$ |
| $SO_3^{2-}(aq) + H_2O(l) \rightarrow SO_4^{2-}(aq) + 2H^+(aq) + 2e^-$ |
| |
| What is the oxidation state of S in $SO_3^{2-}(aq)$? and in $SO_4^{2-}(aq)$? |
| What is the oxidising agent? What is the reducing agent? |
| Question 2: |
| $MnO_4^-(aq) + 8H^+(aq) + 5e^- \rightarrow Mn^{2+}(aq) + 4H_2O(l)$ |
| $Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^{-}$ |
| |
| What is the oxidation state of Mn in MnO ₄ -(aq) ? and in Mn ²⁺ (aq) ? |
| What has been oxidised? What has been reduced? |
| |
| Question 3: |
| $2IO_3^-(aq) + 12H^+(aq) + 10e^- \rightarrow I_2(aq) + 6H_2O(l)$ |
| $2I^{-}(aq) \rightarrow I_{2}(aq) + 2e^{-}$ |
| |
| What is the oxidation state of I in $IO_3^-(aq)$? and in $I_2(aq)$? |
| What is the oxidising agent? What is the reducing agent? |
| Question 4: |
| $Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6e^- \rightarrow 2Cr^{3+}(aq) + 7H_2O(l)$ |
| $SO_3^{2-}(aq) + H_2O(l) \rightarrow SO_4^{2-}(aq) + 2H^+(aq) + 2e^-$ |
| |
| What is the oxidation state of Cr in Cr ₂ O ₇ ²⁻ (aq) ? |

What has been oxidised? What has been reduced?

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 $H_2O_2(aq) + 2H^+(aq) + 2e^- \rightarrow 2H_2O(l)$

 $2I^{-}(aq) \rightarrow I_{2}(aq) + 2e^{-}$

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What is the oxidation state of O in $H_2O_2(aq)$?

What is the oxidising agent? What is the reducing agent?

Question 6:

 $MnO_4^-(aq) + 8H^+(aq) + 5e^- \rightarrow Mn^{2+}(aq) + 4H_2O(l)$

$$H_2O_2(aq) \rightarrow O_2(g) + 2H^+(aq) + 2e^-$$

.....

What is the oxidation state of Mn in Mn²⁺(aq)?

What has been oxidised? What has been reduced?

Question 7:

 $Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6e^- \rightarrow 2Cr^{3+}(aq) + 7H_2O(l)$

$$Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + e^{-}$$

.....

What is the oxidation state of Cr in Cr³⁺(aq)?

What is the oxidising agent? What is the reducing agent?

Question 8:

$$2S_2O_3^{2-}(aq) \rightarrow S_4O_6^{2-}(aq) + 2e^{-}$$

$$I_2(aq) + 2e^- \rightarrow 2I^-(aq)$$

.....

What is the oxidation state of S in $S_2O_3^{2-}(aq)$? and $S_4O_6^{2-}(aq)$?

What has been oxidised? What has been reduced?

Question 9:

$$CH_3CHO(aq) + H_2O(l) \rightarrow CH_3COOH(aq) + 2H^+(aq) + 2e^-$$

$$Ag^+(aq) + e^- \rightarrow Ag(s)$$

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What is the oxidation state of C in CH₃CHO(aq)?

What is the oxidising agent? What is the reducing agent?

| Qu | estion 10: |
|-----|---|
| a) | Write an ionic half-equation to show hydrogen peroxide acting as an oxidising agent: |
| b) | Write an ionic half-equation to show hydrogen peroxide acting as a reducing agent. |
| | |
| Qu | estion 11: |
| Dec | duce the two ionic half-equations for the following chemical reaction. Start by writing the ionic |
| equ | uation for the reaction. |
| | $Cl_2(aq) + 2KI(aq) \rightarrow 2KCl(aq) + I_2(aq)$ |
| Ion | ic equation: |
| Ion | ic half-equation #1: |
| Ion | ic half-equation #2: |
| | |
| Qu | estion 12: |
| Dec | duce the two ionic half-equations for the following chemical reaction. Start by writing the ionic |
| equ | uation for the reaction. |
| | $Cu(s) + 2AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2Ag(s)$ |
| Ion | ic equation: |
| Ion | ic half-equation #1: |
| Ion | ic half-equation #2: |
| | |
| Qu | estion 13: |
| Dec | duce the two ionic half-equations for the following chemical reaction. Start by writing the ionic |
| equ | uation for the reaction. |
| | $2FeCl_2(aq) + Cl_2(aq) \rightarrow 2FeCl_3(aq)$ |
| Ion | ic equation: |
| Ion | ic half-equation #1: |
| Ion | ic half-equation #2: |
| | |
| Qu | estion 14: |
| Dec | duce the two ionic half-equations for the following chemical reaction. Start by writing the ionic |
| equ | uation for the reaction. |
| | $H_2O_2(aq) + 2KI(aq) + 2HCl(aq) \rightarrow I_2(aq) + 2KCl(aq) + 2H_2O(l)$ |
| lon | ic equation: |
| | ic half-equation #1: |
| | ic half-equation #2: |

Question 15:

Deduce the two ionic half-equations for the following chemical reaction. Start by writing the ionic equation for the reaction.

• Scan the QR code below for the answers to this assignment.



http://www.chemist.sg/redox/ionic equations ans.pdf