

## تجميعية أسئلة اختبارات سابقة حول وحدة Redox الأكسدة والاختزال



### تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الثاني عشر المتقدم ← كيمياء ← الفصل الثاني ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 2025-03-13 23:34:26

ملفات اكتب للمعلم اكتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل  
منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي للمدرس

المزيد من مادة  
كيمياء:

إعداد: Abdelbari Ahmed Mohamed

### التواصل الاجتماعي بحسب الصف الثاني عشر المتقدم



صفحة المناهج  
الإماراتية على  
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

### المزيد من الملفات بحسب الصف الثاني عشر المتقدم والمادة كيمياء في الفصل الثاني

تجميعية أسئلة اختبارات سابقة حول وحدة Electrochemistry الكيمياء الكهربائية

1

حل تجميعية أسئلة مراجعة وفق الهيكل الوزاري

2

ملزمة وفق الهيكل الوزاري باللغة العربية

3

ملزمة وفق الهيكل الوزاري باللغة الانجليزية

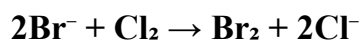
4

مراجعة مختصرة منهج انسباير الخطة 101-M

5



- 1) In the oxidation-reduction reaction below, which represents the half-reactions of oxidation and reduction?

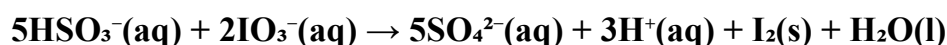


	Oxidation half-reactions	Reduction half-reactions
A	$\text{Cl}_2 \rightarrow 2\text{Cl} + 2\text{e}^-$	$2\text{Br}^- + 2\text{e}^- \rightarrow \text{Br}_2$
B	$2\text{Br}^- + 2\text{e}^- \rightarrow \text{Br}_2$	$\text{Cl}_2 \rightarrow 2\text{Cl}^- + 2\text{e}^-$
C	$\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$	$2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$
D	$2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$	$\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$

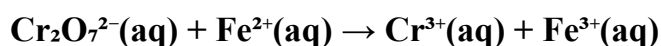
- 2) In which of the following formulas is the oxidation number of manganese the highest?

- A.  $\text{KMnO}_4$   
 B.  $\text{MnCl}_2$   
 C.  $\text{MnO}_2$   
 D.  $\text{K}_2\text{MnO}_4$

- 3) The following equation is balanced in an acidic solution. If it is balanced in a basic solution, how many water molecules are in the balanced equation?



- A. 2  
 B. 3  
 C. 4  
 D. 5
- 4) When balancing the following oxidation-reduction equation in an acidic solution, which of the following is correct?



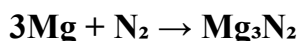
	H <sup>+</sup> ions number	Location of H <sup>+</sup> ions	H <sub>2</sub> O molecules number	Location of H <sub>2</sub> O molecules
A	14	reactant side	7	product side
B	14	product side	7	reactant side
C	7	product side	14	reactant side
D	7	reactant side	14	product side

- 5) When a solid copper wire is placed in a silver nitrate solution, a substance precipitates on the copper wire and a blue solution forms. Which of the following is correct?

	Deposited metal on the wire	Oxidation reaction	Reduction reaction	The blue solution
A	Silver	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$	$\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$	Copper(II) nitrate
B	Copper	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$	$\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$	Silver nitrate
C	Silver	$\text{Ag} \rightarrow \text{Ag}^+ + \text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$	Copper(II) nitrate
D	Copper	$\text{Ag} \rightarrow \text{Ag}^+ + \text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$	Silver nitrate



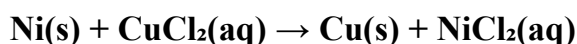
6) Regarding the oxidation-reduction reaction below, which of the following is correct?



Element Symbol	Atomic Number
Mg	12
N	7

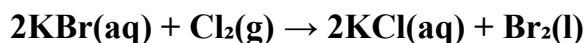
- A. Mg is the reducing agent, and its oxidation number changes from 0 to +2
- B. N<sub>2</sub> is the oxidizing agent, and its oxidation number changes from 0 to -3.
- C. Mg is the oxidizing agent, and its oxidation number changes from 0 to +2
- D. N<sub>2</sub> is the reducing agent, and its oxidation number changes from 0 to -3.

7) What is the half-reaction of oxidation for the oxidation-reduction reaction shown below?



- A.  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
- B.  $\text{Ni}^{2+} + 2\text{e}^- \rightarrow \text{Ni}$
- C.  $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$
- D.  $\text{Ni} \rightarrow \text{Ni}^{2+} + 2\text{e}^-$

8) What is the change in the oxidation number of chlorine in the following balanced equation?



- A. From 2 to 0
- B. From 1 to 0
- C. From 0 to 2
- D. From 0 to 1

9) In the characteristic step of balancing oxidation-reduction equations that occur in a basic solution, what must be added to balance the number of H<sup>+</sup> ions?

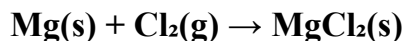
- A. A number of OH<sup>-</sup> ions
- B. A number of H<sub>2</sub>O molecules
- C. A number of electrons
- D. A number of O<sup>2-</sup> ions

10) What is the reason for the different colors of copper compounds, as shown in the figure below? (Copper is a transition metal)

- A. Difference in the number of protons
- B. Difference in the number of oxidation states
- C. Difference in the number of electrons
- D. Difference in the atomic numbers



11) Regarding the oxidation-reduction reaction below, which of the following is correct?



Element Symbol	Atomic Number
Mg	12
Cl	17

- A. The chlorine atom is oxidized
- B. The chlorine atom donates one electron to each magnesium atom
- C. The magnesium atom is reduced
- D. The magnesium atom donates one electron to each chlorine atom

Element Symbols and Atomic Numbers

12) What should the value of X be to balance the following half-reaction?



- A. 3
- B. 5
- C. 6
- D. 10

13) Which of the following has the lowest oxidation number for nitrogen?

- A.  $\text{NO}_2$
- B.  $\text{N}_2$
- C.  $\text{NH}_3$
- D.  $\text{N}_2\text{O}$

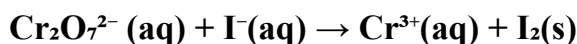
14) When balancing oxidation-reduction equations using the half-reaction method, the coefficients of the half-reactions are adjusted so that

- A. The number of electrons lost in oxidation equals the number of electrons gained in reduction.
- B. The number of electrons lost in oxidation is twice the number of electrons gained in reduction.
- C. The number of electrons lost in oxidation is greater than the number of electrons gained in reduction.
- D. The number of electrons lost in oxidation is less than the number of electrons gained in reduction.

15) Which of the following rules for determining oxidation numbers is incorrect?

- A. The oxidation number of hydrogen in metal hydrides is 1.
- B. The oxidation number of an uncombined element is zero.
- C. The sum of the oxidation numbers in a neutral compound is zero.
- D. The oxidation number of an element from Group 1 in the periodic table is +1.

16) Using the half-reaction method to balance the following oxidation-reduction equation, what is the correctly balanced equation for the reaction below? (In acidic solution)



- A.  $\text{Cr}_2\text{O}_3 + 6\text{I}^- + 14\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 7\text{H}_2\text{O}$
- B.  $\text{Cr}_2\text{O}_7^{2-} + 6\text{I}^- + 7\text{H}_2\text{O} \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 14\text{H}^+$
- C.  $2\text{Cr}_2\text{O}_3 + 2\text{I}^- + 14\text{H}^+ \rightarrow 2\text{Cr}^{3+} + \text{I}_2 + 7\text{H}_2\text{O}$
- D.  $2\text{Cr}_2\text{O}_7^{2-} + 6\text{I}^- + 28\text{H}^+ \rightarrow 4\text{Cr}^{3+} + 3\text{I}_2 + 14\text{H}_2\text{O}$

17) In which of the following is the oxidation number of hydrogen -1?

- A.  $\text{H}_2\text{O}_2$
- B.  $\text{H}_2\text{O}$
- C.  $\text{NaH}$
- D.  $\text{H}_2$

18) How many electrons must be added to the product side to balance the following half-reaction?

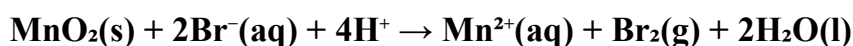


- A. 3
- B. 4
- C. 5
- D. 7

19) When is the oxidation number of oxygen positive?

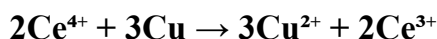
- A. In oxide compounds
- B. When bonded to itself
- C. In peroxide compounds
- D. When bonded to fluorine

20) The following chemical equation is balanced in an acidic solution. When balancing this equation in a basic solution, how many  $\text{OH}^-$  ions must be added to both sides of the equation?



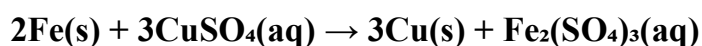
- A. 1
- B. 2
- C. 3
- D. 4

21) Which of the following is the reducing agent in the following reaction?



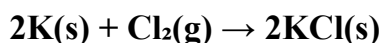
- A.  $\text{Ce}^{4+}$
- B.  $\text{Cu}^{2+}$
- C.  $\text{Cu}$
- D.  $\text{Ce}^{3+}$

22) What is the change in the oxidation number of copper (Cu) in the following balanced equation?



- A. From +2 to 0
- B. From 0 to +2
- C. From +3 to 0
- D. From 0 to +3

23) Regarding the oxidation-reduction reaction below, which of the following is incorrect?



Element Symbol	Atomic Number
K	19
Cl	17

- A. Each chlorine atom receives one electron from a potassium atom.
- B. Each potassium atom gives up two electrons to the chlorine atoms.
- C. The potassium atom is oxidized.
- D. The potassium atom becomes a  $\text{K}^+$  ion.

24) When balancing half-reactions of an oxidation-reduction equation using the half-reaction method in an acidic solution, what is used to balance?

- A. Hydrogen atoms
- B. Oxygen atoms
- C.  $\text{OH}^-$  ions
- D.  $\text{H}_2\text{O}$  molecules

25) Which of the following half-reactions is a reduction?

- A. 3, 4
- B. 2, 4
- C. 1, 2
- D. 2, 3

1	$\text{Al} \rightarrow \text{Al}^{3+} + 3\text{e}^-$
2	$\text{Cu}^{2+} + \text{e}^- \rightarrow \text{Cu}^+$
3	$2\text{F}^- \rightarrow \text{F}_2 + 2\text{e}^-$
4	$\text{Zn}^{2+} + 2\text{e}^- \rightarrow \text{Zn}$



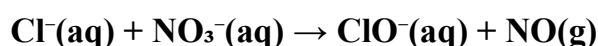
26) What explains the variety of colors in the iron rocks shown in the image below? (Iron is a transition metal)



1	Presence of different oxidation states of iron.
2	B. Presence of pure iron in the rocks without any other metals.
3	C. Presence of a similar oxidation state of iron.
4	D. Presence of other metals in the rocks.

- A. 1,2  
B. 2,3  
C. 1,4  
D. 4,3

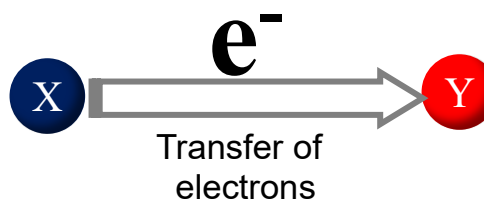
27) Using the half-reaction method to balance the following oxidation-reduction equation, what is the correctly balanced equation for the reaction below? (In acidic solution)



- A.  $2\text{NO}_3^- + 3\text{Cl}^- + 2\text{H}^+ \rightarrow 3\text{ClO}^- + 2\text{NO} + \text{H}_2\text{O}$   
B.  $2\text{NO}_3^- + 3\text{Cl}^- + \text{H}_2\text{O} \rightarrow 3\text{ClO}^- + 2\text{NO} + 2\text{H}^+$   
C.  $2\text{NO}_3^- + 3\text{Cl}^- + 3\text{H}_2\text{O} \rightarrow 3\text{ClO}^- + 2\text{NO} + 2\text{H}^+$   
D.  $2\text{NO}_3^- + \text{Cl}^- + 3\text{H}^+ \rightarrow \text{ClO}^- + \text{NO} + \text{H}_2\text{O}$

28) Which of the following is incorrect regarding the process shown below?

- A. Oxidation number of X increases.  
B. X loses an electron.  
C. X is an oxidizing agent.  
D. X is a reducing agent.

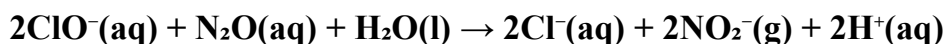


29) Which of the following has the highest oxidation number for the element written in red in the following ion formulas?

- A.  $\text{MnO}_4^{2-}$   
B.  $\text{ClO}^-$   
C.  $\text{MnO}_4^-$   
D.  $\text{ClO}_4^-$



30) The following chemical equation is balanced in an acidic solution



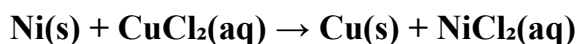
What is the number of  $\text{H}_2\text{O}$  molecules that are present in the balanced equation using the half-reaction method in a basic solution?

- A. 1
- B. 2
- C. 3
- D. 4

31) Which of the following is incorrect regarding oxidation-reduction reactions?

- A. Reduction is the gain of electrons by a reactant.
- B. Oxidation is the loss of electrons by a reactant.
- C. Oxidation and reduction are coupled processes.
- D. Oxidation occurs without reduction.

32) What are the half-reactions of oxidation and reduction for the reaction shown below?



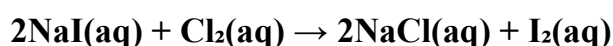
- A. 1
- B. 2
- C. 3
- D. 4

	Oxidation half	Reduction half
1	$\text{Ni} \rightarrow \text{Ni}^{2+} + 2\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
2	$\text{Ni} \rightarrow \text{Ni}^{2+} + 2\text{e}^-$	$2\text{Cl}^- + 2\text{e}^- \rightarrow \text{Cl}_2$
3	$\text{Ni} \rightarrow \text{Ni}^{2+} + 2\text{e}^-$	$\text{Cu}^+ + \text{e}^- \rightarrow \text{Cu}$
4	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$	$\text{Ni}^{2+} + 2\text{e}^- \rightarrow \text{Ni}$

33) In which of the following reactions does the oxidation number of chromium not change?

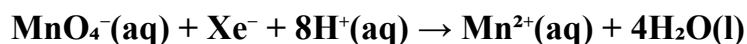
- A.  $2\text{CrO}_4^{2-} + 2\text{H}^+ \rightarrow \text{Cr}_2\text{O}_3 + \text{H}_2\text{O}$
- B.  $2\text{Cr}^{2+} + 2\text{H}^+ \rightarrow 2\text{Cr}^{3+} + \text{H}_2$
- C.  $\text{Cr}_2\text{O}_3 + 3\text{C} \rightarrow 2\text{Cr} + 3\text{CO}$
- D.  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{N}_2 + 4\text{H}_2\text{O} + \text{Cr}_2\text{O}_3$

34) Which of the following is the reducing agent in the reaction below?



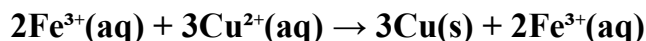
- A. NaI
- B.  $\text{Cl}_2$
- C. NaCl
- D.  $\text{I}_2$

35) What should the value of X be to balance the following half-reaction?



- A. 4
- B. 5
- C. 6
- D. 8

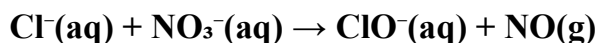
36) The following oxidation-reduction equation



Using the half-reaction method in an acidic solution, the equation is

- A. Unbalanced in terms of both atoms and charge.
- B. Balanced correctly in terms of charge but unbalanced in terms of atoms.
- C. Balanced correctly in terms of atoms but unbalanced in terms of charge.
- D. Balanced correctly in terms of both atoms and charge.

37) Using the half-reaction method to balance the following oxidation-reduction equation, what is the correctly balanced equation for the reaction below? (In acidic solution)

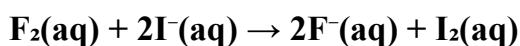


- A.  $3\text{Cl}^- + 2\text{NO}_3^- + 2\text{H}^+ \rightarrow 3\text{ClO}^- + 2\text{NO} + \text{H}_2\text{O}$
- B.  $\text{Cl}^- + 2\text{NO}_3^- + 2\text{H}^+ \rightarrow \text{ClO}^- + 2\text{NO} + \text{H}_2\text{O}$
- C.  $3\text{Cl}^- + \text{NO}_3^- + \text{H}^+ \rightarrow 3\text{ClO}^- + \text{NO} + \text{H}_2\text{O}$
- D.  $2\text{Cl}^- + 3\text{NO}_3^- + \text{H}^+ \rightarrow 2\text{ClO}^- + 3\text{NO} + \text{H}_2\text{O}$

38) In which of the following formulas is the oxidation number of oxygen different from the others?

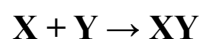
- A. NO
- B. NO<sub>2</sub>
- C. H<sub>2</sub>O<sub>2</sub>
- D. H<sub>2</sub>O

39) In the reaction represented by the equation below, which of the following is correct?



- A. Fluoride ions accept electrons from iodine and are oxidized.
- B. Iodine accepts electrons from fluoride ions and is oxidized.
- C. Fluoride ions accept electrons from iodine and are reduced.
- D. Iodine accepts electrons from fluoride ions and is reduced.

40) In the general equation below, if the reactant X is a reducing agent, which of the following correctly describes it?



- A. Gains electrons - oxidation number increases - undergoes oxidation
- B. Loses electrons - oxidation number increases - undergoes oxidation
- C. Gains electrons - oxidation number decreases - undergoes reduction
- D. Loses electrons - oxidation number decreases - undergoes reduction

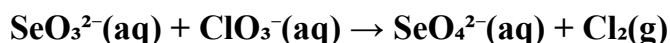
41) Given the following half-reactions of oxidation and reduction, what is the minimum number of  $Pb^{2+}$  ions and  $Fe^{3+}$  ions that can react so that no electrons remain?



	$Fe^{3+}$	$Pb^{2+}$
<b>A</b>	2	3
<b>B</b>	3	2
<b>C</b>	2	1
<b>D</b>	1	2

- A.
- B.
- C.
- D.

42) Using the half-reaction method, which of the following is the balanced equation in an acidic solution?

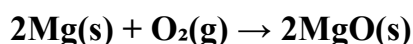


- A.  $5SeO_3^{2-}(aq) + 2ClO_3^-(aq) + 2H^+ \rightarrow 5SeO_4^{2-}(aq) + Cl_2(g) + H_2O$
- B.  $5SeO_3^{2-}(aq) + 2ClO_3^-(aq) + H_2O \rightarrow 5SeO_4^{2-}(aq) + Cl_2(g) + 2H^+$
- C.  $2SeO_3^{2-}(aq) + 5ClO_3^-(aq) + 2H^+ \rightarrow 2SeO_4^{2-}(aq) + 5Cl_2(g) + H_2O$
- D.  $2SeO_3^{2-}(aq) + 5ClO_3^-(aq) + H_2O \rightarrow 2SeO_4^{2-}(aq) + 5Cl_2(g) + 2H$

43) In which of the following formulas does nitrogen have a negative oxidation number?

- A.  $HNO_2$
- B.  $KNO_3$
- C.  $NH_3$
- D.  $NO$

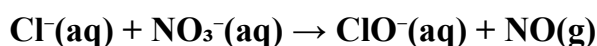
44) In the combustion reaction of magnesium in air represented by the equation below, which of the following is correct?



Element Symbol	Atomic Number
Mg	12
O	8

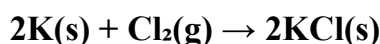
- A. Each magnesium atom gives up two electrons to each oxygen atom.
- B. Each oxygen atom gives up two electrons to each magnesium atom.
- C. A magnesium atom becomes a negative ion.
- D. An oxygen atom becomes a positive ion.

45) Using the half-reaction method, which of the following is the balanced equation below in an acidic solution?



- A.  $3\text{Cl}^-(\text{aq}) + 2\text{NO}_3^-(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow 3\text{ClO}^-(\text{aq}) + 2\text{NO(g)} + \text{H}_2\text{O(l)}$
- B.  $2\text{Cl}^-(\text{aq}) + 3\text{NO}_3^-(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow 2\text{ClO}^-(\text{aq}) + 3\text{NO(g)} + \text{H}_2\text{O(l)}$
- C.  $3\text{Cl}^-(\text{aq}) + 2\text{NO}_3^-(\text{aq}) + \text{H}_2\text{O(l)} \rightarrow 3\text{ClO}^-(\text{aq}) + 2\text{NO(g)} + 2\text{H}^+(\text{aq})$
- D.  $2\text{Cl}^-(\text{aq}) + 3\text{NO}_3^-(\text{aq}) + \text{H}_2\text{O(l)} \rightarrow 2\text{ClO}^-(\text{aq}) + 3\text{NO(g)} + 2\text{H}^+(\text{aq})$

46) In the reaction equation below, if the reactant  $\text{Cl}_2$  is an oxidizing agent, which of the following describes it correctly?



- A. Gains electrons - oxidation number increases - undergoes oxidation
- B. Loses electrons - oxidation number increases - undergoes oxidation
- C. Gains electrons - oxidation number decreases - undergoes reduction
- D. Loses electrons - oxidation number decreases - undergoes reduction

47) Given the following half-reactions of oxidation and reduction, what is the minimum number of  $\text{Ce}^{4+}$  ions and  $\text{Sn}^{2+}$  ions that can react so that no electrons remain?



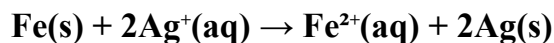
- A.
- B.
- C.
- D.

	$\text{Sn}^{2+}$	$\text{Ce}^{4+}$
<b>A</b>	3	2
<b>B</b>	1	2
<b>C</b>	2	1
<b>D</b>	2	3

48) Which of the following correctly describes oxidation?

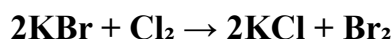
- A. The reactant loses electrons and its oxidation number decreases.
- B. The reactant loses electrons and its oxidation number increases.
- C. The reactant gains electrons and its oxidation number decreases.
- D. The reactant gains electrons and its oxidation number increases.

49) In the reaction below, if the reactant Fe is the reducing agent, which of the following describes it correctly?



- A. Gains electrons - oxidation number increases - undergoes oxidation
- B. Loses electrons - oxidation number increases - undergoes oxidation
- C. Gains electrons - oxidation number decreases - undergoes reduction
- D. Loses electrons - oxidation number decreases - undergoes reduction

50) Regarding the reaction below, which of the following is correct?

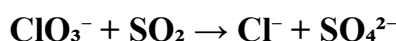


- A. The oxidation number of bromine changes from 1 to 0.
- B. The oxidation number of bromine changes from 0 to 1.
- C. The oxidation number of chlorine changes from 1 to 0.
- D. The oxidation number of chlorine changes from 2 to 0.

51) When balancing oxidation-reduction equations in a basic solution, what is done in the last step of the balancing method?

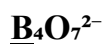
- A. Add hydroxide ions ( $\text{OH}^-$ ) and water molecules to either side of the equation.
- B. Add hydrogen ions ( $\text{H}^+$ ) and water molecules to either side of the equation.
- C. Adjust the coefficients so that the number of electrons lost in oxidation equals the number of electrons gained in reduction.
- D. Balance the number of atoms only on both sides of the equation.

52) Using the half-reaction method, which of the following is the balanced equation below in an acidic solution?



- A.  $3\text{SO}_2 + \text{ClO}_3^- + 3\text{H}_2\text{O} \rightarrow 3\text{SO}_4^{2-} + \text{Cl}^- + 6\text{H}^+$
- B.  $3\text{SO}_2 + \text{ClO}_3^- + 6\text{H}^+ \rightarrow 3\text{SO}_4^{2-} + \text{Cl}^- + 3\text{H}_2\text{O}$
- C.  $2\text{SO}_2 + 3\text{ClO}_3^- + 6\text{H}^+ \rightarrow 2\text{SO}_4^{2-} + 3\text{Cl}^- + 3\text{H}_2\text{O}$
- D.  $2\text{SO}_2 + 3\text{ClO}_3^- + 3\text{H}_2\text{O} \rightarrow 2\text{SO}_4^{2-} + 3\text{Cl}^- + 6\text{H}^+$

53) What is the oxidation number of the underlined element in the following formula?



- A. +3
- B. -3
- C. +4
- D. -4

54) In which of the following is the oxidation number of sulfur equal to (-2)?

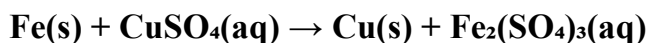
- A.  $\text{SO}_4^{2-}$
- B.  $\text{H}_2\text{S}$
- C.  $\text{SO}_3$
- D.  $\text{SO}$

55) What is the correct ascending order of the following formulas according to the oxidation number of hydrogen in each?

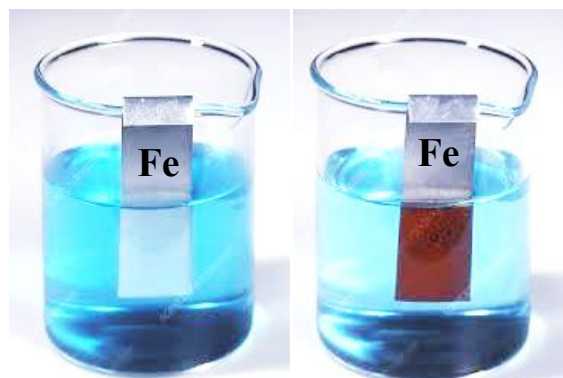


- A. (Smallest)  $\text{HCl}$  -  $\text{LiH}$  -  $\text{H}_2$  (Largest)
- B. (Smallest)  $\text{LiH}$  -  $\text{HCl}$  -  $\text{H}_2$  (Largest)
- C. (Smallest)  $\text{H}_2$  -  $\text{HCl}$  -  $\text{LiH}$  (Largest)
- D. (Smallest)  $\text{HCl}$  -  $\text{H}_2$  -  $\text{LiH}$  (Largest)

56) When an iron plate is placed in a copper(II) sulfate solution, as shown in the figure below, the color of the iron plate changes. What explains this?



- A. Reduction half-reaction  $3\text{Cu}^{2+} + 6\text{e}^- \rightarrow 3\text{Cu}$   
Oxidation half-reaction  $2\text{Fe} \rightarrow 2\text{Fe}^{3+} + 6\text{e}^-$
- B. Reduction half-reaction  $2\text{Fe} \rightarrow 2\text{Fe}^{3+} + 6\text{e}^-$   
Oxidation half-reaction  $3\text{Cu}^{2+} + 6\text{e}^- \rightarrow 3\text{Cu}$
- C. Iron ions are reduced and copper atoms are oxidized.
- D. Both iron ions and copper ions are reduced.



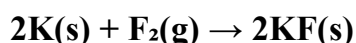
57) If the following half-reactions of oxidation and reduction are given, what is the minimum number of  $\text{Au}^{3+}$  ions and  $\text{Sn}^{2+}$  ions that can react so that no electrons remain?



- A.  
B.  
C.  
D.

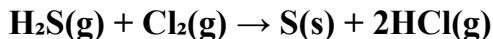
	$\text{Sn}^{2+}$	$\text{Au}^{3+}$
<b>A</b>	2	3
<b>B</b>	2	1
<b>C</b>	1	2
<b>D</b>	3	2

58) Which of the following is correct regarding the reaction below?



- A. Potassium atom K gained an electron and was reduced.  
B. Fluorine  $\text{F}_2$  lost electrons and was oxidized.  
C. Potassium atom K lost an electron and was oxidized.  
D. Fluorine  $\text{F}_2$  gained electrons and was oxidized.

59) What is the reducing agent in the following reaction?



- A.  $\text{H}_2\text{S}$   
B.  $\text{Cl}_2$   
C. S  
D. HCl

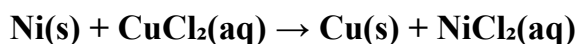
60) What is the correct ascending order of the following formulas according to the oxidation number of chlorine in each?



- A.  $\text{KClO}_4 \rightarrow \text{KClO} \rightarrow \text{Cl}_2 \rightarrow \text{NaCl}$   
B.  $\text{NaCl} \rightarrow \text{Cl}_2 \rightarrow \text{KClO} \rightarrow \text{KClO}_4$   
C.  $\text{Cl}_2 \rightarrow \text{NaCl} \rightarrow \text{KClO}_4 \rightarrow \text{KClO}$   
D.  $\text{KClO}_4 \rightarrow \text{NaCl} \rightarrow \text{Cl}_2 \rightarrow \text{KClO}$

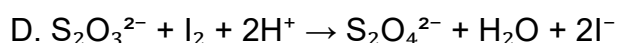
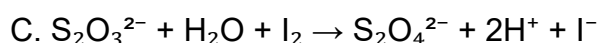
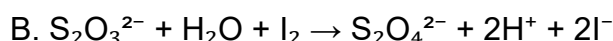
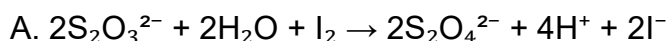
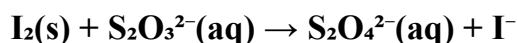


61) The reaction between nickel and copper(II) chloride is shown below. What are the half-reactions of oxidation and reduction?

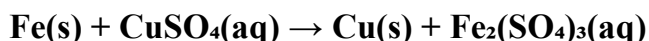


	Oxidation half-reaction	Reduction half-reaction
<b>A</b>	$\text{Ni(s)} \rightarrow \text{Ni}^{2+}(\text{aq}) + 2\text{e}^-$	$\text{Cl}_2(\text{g}) \rightarrow 2\text{Cl}^-(\text{aq}) + 2\text{e}^-$
<b>B</b>	$\text{Ni(s)} \rightarrow \text{Ni}^{2+}(\text{aq}) + \text{e}^-$	$\text{Cu}^+(\text{aq}) + \text{e}^- \rightarrow \text{Cu(s)}$
<b>C</b>	$\text{Ni(s)} \rightarrow \text{Ni}^{2+}(\text{aq}) + 2\text{e}^-$	$\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Cu(s)}$
<b>D</b>	$\text{Cu}^+(\text{aq}) + \text{e}^- \rightarrow \text{Cu(s)}$	$\text{Ni(s)} \rightarrow \text{Ni}^{2+}(\text{aq}) + 2\text{e}^-$

62) Using the half-reaction method to balance oxidation-reduction equations, what is the correct balanced equation for the following reaction in an acidic solution?



63) An iron plate was placed in a copper(II) sulfate solution, as shown in the figure below. Why did the color of the iron plate change?



A. Reduction of copper(II) ions and deposition of copper on the iron plate.

B. Reduction of iron(III) ions by gaining electrons.

C. Oxidation of copper atoms to copper(II) ions.

D. Oxidation

64) The number that specifies the degree of oxidation or reduction of an atom or ion is called

A. Oxidation Number

B. Valence Number

C. Atomic Number

D. Coefficient

65) What is the oxidation number of chromium (Cr) in the following ion formula?



A. -2

B. +2

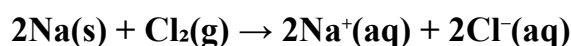
C. -6

D. +6

66) What is the reason for the different colors of copper compounds shown below?

- A. Difference in oxidation number
- B. Difference in atomic number
- C. Difference in mass number
- D. Difference in particle size

67) What is the oxidation half-reaction in the net ionic equation shown below?

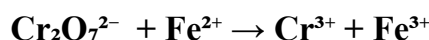


- A.  $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$
- B.  $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$
- C.  $\text{Na} \rightarrow \text{Na}^+ + \text{e}^-$
- D.  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$

68) Which of the following is not an example of a half-reaction?

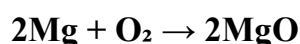
- A.  $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$
- B.  $\text{Fe} \rightarrow \text{Fe}^{3+} + 3\text{e}^-$
- C.  $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$
- D.  $2\text{Fe} + 3\text{Cl}_2 \rightarrow 2\text{FeCl}_3$

69) Which of the following is the correct balanced equation for the following oxidation-reduction reaction using the half-reaction method in an acidic solution?



- A.  $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + 6\text{Fe}^{3+} + 7\text{H}_2\text{O}$
- B.  $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
- C.  $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + 6\text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + 6\text{Fe}^{3+} + \text{H}_2\text{O}$
- D.  $\text{Cr}_2\text{O}_7^{2-} + 7\text{H}^+ + \text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + \text{Fe}^{3+} + 7\text{H}_2\text{O}$

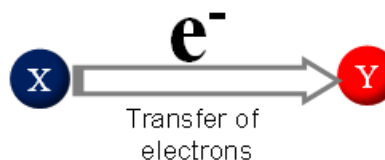
70) Which of the following statements is incorrect regarding the complete chemical equation shown below?



- A. A magnesium atom turns into a positive ion.
- B. Electrons are transferred between atoms.
- C. No electrons are transferred between atoms.
- D. The reaction is oxidation-reduction.

71) Which of the following is incorrect about (X) in the figure below?

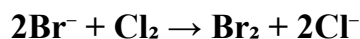
- A. X loses an electron.
- B. The oxidation number of X increases.
- C. X is an oxidizing agent and is reduced.
- D. X is a reducing agent and is oxidized.



72) To balance oxidation-reduction reaction equations, the coefficients must be adjusted so that the number of electrons lost in oxidation is \_\_\_\_\_ the number of electrons gained in reduction.

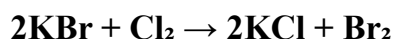
- A. Less than
- B. Equal to
- C. Greater than
- D. Twice

73) What is the substance that is oxidized in the following equation?



- A.  $\text{Br}_2$
- B.  $\text{Cl}_2$
- C.  $\text{Br}^-$
- D.  $\text{Cl}^-$

74) What is the change in the oxidation number of bromine in the following equation?

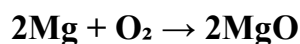


- A. No change
- B. From 0 to +1
- C. From -1 to 0
- D. From 0 to -1

75) Which of the following represents a half-reaction of oxidation?

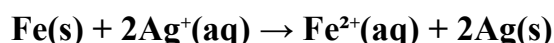
- A.  $\text{Fe}^{3+} + 3\text{e}^- \rightarrow \text{Fe}$
- B.  $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$
- C.  $\text{Na} \rightarrow \text{Na}^+ + \text{e}^-$
- D.  $\text{Zn}^{2+} + 2\text{e}^- \rightarrow \text{Zn}$

76) Which of the following statements is incorrect regarding the following reaction?



- A. Each Mg atom gives up two electrons to each oxygen atom.
- B. Electrons are transferred from magnesium to oxygen.
- C. Each Mg atom shares an electron with an oxygen atom.
- D. The reaction is oxidation-reduction.

77) What is the oxidizing agent in the following reaction?



- A.  $\text{Ag}^+$
- B. Ag
- C.  $\text{Fe}^{2+}$
- D. Fe

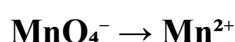
78) Which of the following must be equal when balancing an oxidation-reduction equation?

- A. Number of atoms in reactants and number of atoms in products.
- B. Sum of increase and sum of decrease in oxidation numbers.
- C. Number of electrons gained and number of electrons lost.
- D. All of the above are correct.

79) What is the oxidation number of oxygen in the compound  $\text{H}_2\text{O}_2$ ?

- A. -2
- B. -1
- C. 0
- D. +1

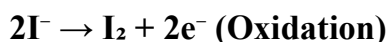
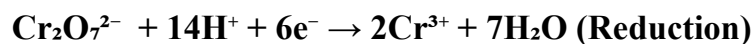
80) In the unbalanced reduction half-reaction below



What is added to the products to balance the oxygen atoms using the half-reaction method in an acidic solution?

- A.  $4\text{H}_2\text{O}$
- B.  $\text{H}_2\text{O}$
- C.  $2\text{H}_2\text{O}$
- D.  $4\text{O}_2$

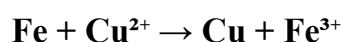
81) In the following two half-reactions



How can the coefficients be adjusted so that the number of electrons lost equals the number of electrons gained?

- A. Multiply the oxidation half-reaction by 2 and the reduction half-reaction by 3.
- B. Multiply the oxidation half-reaction by 3 and the reduction half-reaction by 1.
- C. Multiply the oxidation half-reaction by 7 and the reduction half-reaction by 2.
- D. Multiply the oxidation half-reaction by 1 and the reduction half-reaction by 3.

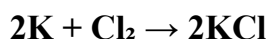
82) When balancing the following oxidation-reduction equation using the half-reaction method



What is the oxidation half-reaction after balancing?

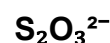
- A.  $\text{Fe} \rightarrow \text{Fe}^{3+} + 3\text{e}^-$
- B.  $\text{Fe} \rightarrow 2\text{Fe}^{3+} + 6\text{e}^-$
- C.  $2\text{Fe} \rightarrow 2\text{Fe}^{3+} + 6\text{e}^-$
- D.  $\text{Fe} \rightarrow 2\text{Fe}^{3+} + 3\text{e}^-$

83) Which of the following is correct regarding the following reaction?



- A. Potassium is reduced and its oxidation number changes from 0 to 1.
- B. Potassium is oxidized and its oxidation number changes from 0 to 1.
- C. Chlorine is reduced and its oxidation number changes from 1 to 0.
- D. Chlorine is oxidized and its oxidation number changes from 1 to 0.

84) What is the oxidation number of sulfur in the following ion?



- A. +2
- B. +3
- C. 0
- D. +4

85) Which of the following is an oxidation reaction?

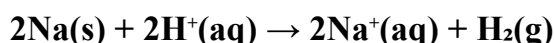
- A. 2 only
- B. 1 and 3 only
- C. 2 and 3 only
- D. 1 only

1	$\text{I}_2 + 2\text{e}^- \rightarrow 2\text{I}^-$
2	$\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$
3	$\text{Ag}^+ + 4\text{e}^- \rightarrow \text{Ag}$

86) Which of the following describes the reduction process?

- A. Loss of electrons and decrease in oxidation number.
- B. Loss of electrons and increase in oxidation number.
- C. Gain of electrons by the reactant and increase in oxidation number.
- D. Gain of electrons and decrease in oxidation number.

87) What are the oxidation and reduction half-reactions, respectively, for the following oxidation-reduction reaction?



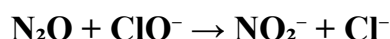
	Oxidation half-reaction	Reduction half-reaction
<b>A</b>	$2\text{Na(s)} \rightarrow 2\text{Na}^+(\text{aq}) + 2\text{e}^-$	$2\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow \text{H}_2(\text{g})$
<b>B</b>	$2\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow \text{H}_2(\text{g})$	$2\text{Na(s)} \rightarrow 2\text{Na}^+(\text{aq}) + 2\text{e}^-$
<b>C</b>	$2\text{Na(s)} + 2\text{e}^- \rightarrow 2\text{Na}^+(\text{aq})$	$2\text{H}^+(\text{aq}) \rightarrow \text{H}_2(\text{g}) + 2\text{e}^-$
<b>D</b>	$2\text{H}^+(\text{aq}) \rightarrow \text{H}_2(\text{g}) + 2\text{e}^-$	$2\text{Na(s)} + 2\text{e}^- \rightarrow 2\text{Na}^+(\text{aq})$

88) What is the correct ascending order of the following formulas according to the oxidation number of nitrogen in each?



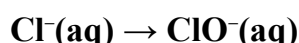
- A.  $\text{NH}_3 \rightarrow \text{N}_2 \rightarrow \text{NO}_2 \rightarrow \text{NO}_3^-$
- B.  $\text{N}_2 \rightarrow \text{NH}_3 \rightarrow \text{NO}_3^- \rightarrow \text{NO}_2$
- C.  $\text{N}_2 \rightarrow \text{NO}_3^- \rightarrow \text{NO}_2 \rightarrow \text{NH}_3$
- D.  $\text{NO}_2 \rightarrow \text{NO}_3^- \rightarrow \text{NH}_3 \rightarrow \text{N}_2$

89) When using the half-reaction method to balance the following oxidation-reduction equation in an acidic solution, what is the correctly balanced equation?



- A.  $\text{N}_2\text{O} + \text{ClO}^- + 4\text{H}^+ \rightarrow 2\text{NO}_2^- + \text{Cl}^- + 2\text{H}_2\text{O}$
- B.  $\text{N}_2\text{O} + 2\text{ClO}^- + \text{H}_2\text{O} \rightarrow 2\text{NO}_2^- + 2\text{Cl}^- + 2\text{H}^+$
- C.  $\text{N}_2\text{O} + \text{ClO}^- + 2\text{H}^+ \rightarrow 2\text{NO}_2^- + \text{Cl}^- + \text{H}_2\text{O}$
- D.  $\text{N}_2\text{O} + \text{ClO}^- + 2\text{H}_2\text{O} \rightarrow 2\text{NO}_2^- + \text{Cl}^- + 4\text{H}^+$

90) When balancing the following half-reaction of oxidation and reduction, what is the correctly balanced half-reaction?



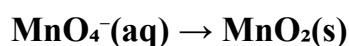
- A.  $\text{Cl}^- + 2\text{H}^+ + 2\text{e}^- \rightarrow \text{ClO}^- + \text{H}_2\text{O}$
- B.  $\text{Cl}^- + 2\text{H}_2\text{O} \rightarrow \text{ClO}^- + 4\text{H}^+ + 2\text{e}^-$
- C.  $\text{Cl}^- + 4\text{H}^+ + 4\text{e}^- \rightarrow \text{ClO}^- + 2\text{H}_2\text{O}$
- D.  $\text{Cl}^- + \text{H}_2\text{O} \rightarrow \text{ClO}^- + 2\text{H}^+ + 2\text{e}^-$

91) What is the correct ascending order of the following formulas according to the oxidation number of oxygen in each?



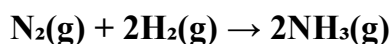
- A.  $\text{H}_2\text{O}_2 \rightarrow \text{O}_2 \rightarrow \text{SO}_2 \rightarrow \text{OF}_2$
- B.  $\text{O}_2 \rightarrow \text{SO}_2 \rightarrow \text{H}_2\text{O}_2 \rightarrow \text{OF}_2$
- C.  $\text{SO}_2 \rightarrow \text{O}_2 \rightarrow \text{H}_2\text{O}_2 \rightarrow \text{OF}_2$
- D.  $\text{SO}_2 \rightarrow \text{H}_2\text{O}_2 \rightarrow \text{O}_2 \rightarrow \text{OF}_2$

92) When balancing the following half-reaction of oxidation and reduction, what is the correctly balanced half-reaction?



- A.  $\text{MnO}_4^- + 2\text{H}^+ + 5\text{e}^- \rightarrow \text{MnO}_2 + 2\text{H}_2\text{O}$
- B.  $\text{MnO}_4^- + \text{H}_2\text{O} + 5\text{e}^- \rightarrow \text{MnO}_2 + 2\text{H}^+$
- C.  $\text{MnO}_4^- + 4\text{H}^+ + 5\text{e}^- \rightarrow \text{MnO}_2 + \text{H}_2\text{O}$
- D.  $\text{MnO}_4^- + 4\text{H}^+ + 3\text{e}^- \rightarrow \text{MnO}_2 + 2\text{H}_2\text{O}$

93) Which of the following is correct regarding the chemical reaction below?



- A. Hydrogen is the oxidizing agent.
- B. This process involves a clear transfer of electrons.
- C. Nitrogen is less electronegative than hydrogen.
- D. Nitrogen is the oxidizing agent.

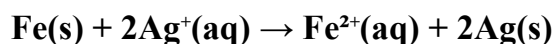
94) What is the ascending order of the following formulas according to the oxidation number of sulfur in each?



- A.  $\text{SO}_2 \rightarrow \text{H}_2\text{S} \rightarrow \text{SO}_4^{2-} \rightarrow \text{S}_8$
- B.  $\text{S}_8 \rightarrow \text{H}_2\text{S} \rightarrow \text{SO}_2 \rightarrow \text{SO}_4^{2-}$
- C.  $\text{H}_2\text{S} \rightarrow \text{S}_8 \rightarrow \text{SO}_2 \rightarrow \text{SO}_4^{2-}$
- D.  $\text{SO}_4^{2-} \rightarrow \text{H}_2\text{S} \rightarrow \text{SO}_2 \rightarrow \text{S}_8$

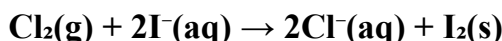


95) What are the oxidation and reduction half-reactions, respectively, for the following oxidation-reduction reaction?



	Oxidation half-reaction	Reduction half-reaction
<b>A</b>	$\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$	$2\text{Ag}^+ + 2\text{e}^- \rightarrow 2\text{Ag}$
<b>B</b>	$\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe}$	$2\text{Ag} \rightarrow 2\text{Ag}^+ + 2\text{e}^-$
<b>C</b>	$\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$	$2\text{Ag} \rightarrow 2\text{Ag}^+ + 2\text{e}^-$
<b>D</b>	$2\text{Ag}^+ + 2\text{e}^- \rightarrow 2\text{Ag}$	$\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$

96) Which of the following is correct regarding the chemical reaction below?



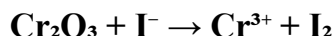
- A. Chlorine loses electrons and is oxidized.
- B. Chlorine gains electrons and its oxidation number decreases.
- C. Iodide ion loses electrons and its oxidation number decreases.
- D. Iodide ion gains electrons and is red

97) In the figure below, when copper metal (Cu) is placed in a concentrated nitric acid solution ( $\text{HNO}_3$ ), why does the solution turn blue?



- A. Oxidation of copper (Cu) to copper ions ( $\text{Cu}^{2+}$ ).
- B. Reduction of copper ions ( $\text{Cu}^{2+}$ ) to copper (Cu).
- C. Oxidation of nitrogen dioxide ( $\text{NO}_2$ ) and formation of nitrate ions ( $\text{NO}_3^-$ ).
- D. Reduction of nitrate ions ( $\text{NO}_3^-$ ) and formation of nitrogen dioxide ( $\text{NO}_2$ ).

98) When using the half-reaction method to balance the following oxidation-reduction equation in an acidic solution, what is the correctly balanced equation?



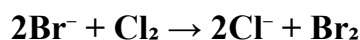
- A.  $\text{Cr}_2\text{O}_3 + 6\text{I}^- + 14\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 7\text{H}_2\text{O}$
- B.  $\text{Cr}_2\text{O}_3 + 6\text{I}^- + 7\text{H}_2\text{O} \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 14\text{H}^+$
- C.  $\text{Cr}_2\text{O}_3 + 3\text{I}^- + 4\text{H}^+ \rightarrow \text{Cr}^{3+} + \text{I}_2 + 2\text{H}_2\text{O}$
- D.  $\text{Cr}_2\text{O}_3 + 3\text{I}^- + 4\text{H}^+ \rightarrow 2\text{Cr}^{3+} + \text{I}_2 + 7\text{H}_2\text{O}$

99) Which of the following is a reduction reaction?

- A. 1 only
- B. 2 only
- C. 1 and 3 only
- D. 2 and 3 only

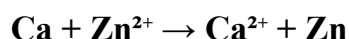
<b>1</b>	$\text{K}^+ + \text{e}^- \rightarrow \text{K}$
<b>2</b>	$\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$
<b>3</b>	$\text{O}_2 + 4\text{e}^- \rightarrow 2\text{O}^{2-}$

100) Which of the following statements is correct regarding the oxidation-reduction reaction below?



- A. Electron transfer from bromide ions to chlorine.
- B. Oxidation of chlorine molecule.
- C. Reduction of bromide ions.
- D. Electron transfer from chlorine to bromide ions.

101) Which of the following is the reducing agent in the following reaction?

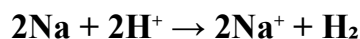


- A. Ca
- B.  $\text{Zn}^{2+}$
- C.  $\text{Ca}^{2+}$
- D. Zn

102) Which of the following has the highest oxidation number for manganese (Mn)?

- A.  $\text{MnO}_2$
- B.  $\text{K}_2\text{MnO}_4$
- C.  $\text{MnO}$
- D.  $\text{KMnO}_4$

103) Which of the following is oxidized in the following reaction?

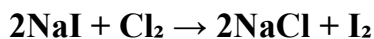


- A. Na
- B.  $\text{Na}^+$
- C.  $\text{H}^+$
- D.  $\text{H}_2$

104) To balance oxidation-reduction reactions that occur in an acidic medium, you must add

- A.  $\text{OH}^-$  &  $\text{H}_2\text{O}$
- B.  $\text{H}^+$  &  $\text{H}_2\text{O}$
- C.  $\text{OH}^-$  only
- D.  $\text{H}_2\text{O}$  only

105) Why does the oxidation number of sodium not change in the following reaction equation?

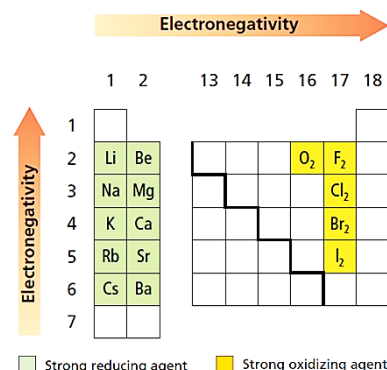


- A. Na is a spectator ion.
- B. Sodium is an uncombined element.
- C. Sodium is an active metal.
- D. Na is a monatomic ion

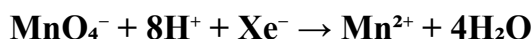
106) Using the figure below, what is the correct order of the halogens ( $\text{I}_2$ ,  $\text{Br}_2$ ,  $\text{Cl}_2$ ,  $\text{F}_2$ ) as oxidizing agents from strongest to weakest?

- A.  $\text{F}_2 \rightarrow \text{Cl}_2 \rightarrow \text{Br}_2 \rightarrow \text{I}_2$
- B.  $\text{Cl}_2 \rightarrow \text{F}_2 \rightarrow \text{Br}_2 \rightarrow \text{I}_2$
- C.  $\text{I}_2 \rightarrow \text{F}_2 \rightarrow \text{Cl}_2 \rightarrow \text{Br}_2$
- D.  $\text{Br}_2 \rightarrow \text{I}_2 \rightarrow \text{Cl}_2 \rightarrow \text{F}_2$

Not involved in  
2025 curriculum

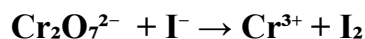


107) What should the value of X be to balance the following half-reaction?



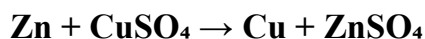
- A. 1
- B. 2
- C. 5
- D. 10

108) Which of the following is the correct balanced equation for the following oxidation-reduction reaction using the half-reaction method in an acidic solution?



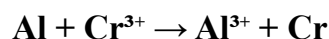
- A.  $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- \rightarrow 2\text{Cr}^{3+} + \text{I}_2$
- B.  $\text{Cr}_2\text{O}_7^{2-} + 3\text{I}^- + 7\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 7\text{H}_2\text{O}$
- C.  $\text{Cr}_2\text{O}_7^{2-} + 6\text{I}^- + 14\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{I}_2 + 7\text{H}_2\text{O}$
- D.  $\text{Cr}_2\text{O}_7^{2-} + 6\text{I}^- + 2\text{H}^+ \rightarrow \text{Cr}^{3+} + 3\text{I}_2 + \text{H}_2\text{O}$

109) Which of the following statements is correct regarding the oxidation-reduction reaction below?



- A. Oxidation of copper ions ( $\text{Cu}^{2+}$ ).
- B. Electron transfer from zinc atoms to copper ions ( $\text{Cu}^{2+}$ ).
- C. Electron transfer from copper ions ( $\text{Cu}^{2+}$ ) to zinc atoms.
- D. Reduction of zinc atoms.

110) Which of the following is the oxidizing agent in the following reaction?

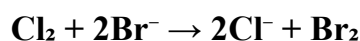


- A. Al
- B.  $\text{Al}^{3+}$
- C.  $\text{Cr}^{3+}$
- D. Cr

111) Which of the following has the highest oxidation number for oxygen (O)?

- A.  $\text{H}_2\text{O}_2$
- B.  $\text{O}_2$
- C. NO
- D.  $\text{H}_2\text{O}$

112) Which of the following is reduced in the following reaction?



- A.  $\text{Br}_2$
- B.  $\text{Cl}_2$
- C.  $\text{Cl}^-$
- D.  $\text{Br}^-$

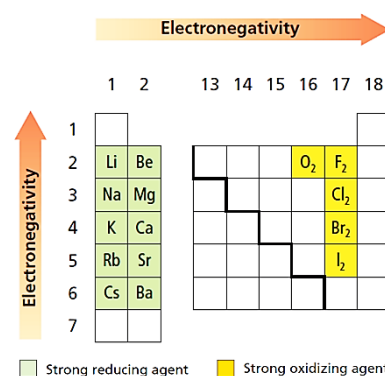
113) To balance oxidation-reduction reaction equations that occur in a basic medium, you must add

- A.  $\text{H}_2\text{O}$  only
- B.  $\text{H}^+$  &  $\text{H}_2\text{O}$
- C.  $\text{OH}^-$  &  $\text{H}_2\text{O}$
- D.  $\text{OH}^-$  only

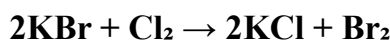
114) Using the figure below, what is the correct order of Group 1 elements (Li, Na, K, Rb, Cs) as reducing agents from strongest to weakest?

- A.  $\text{Li} \rightarrow \text{Na} \rightarrow \text{K} \rightarrow \text{Rb} \rightarrow \text{Cs}$
- B.  $\text{Li} \rightarrow \text{Rb} \rightarrow \text{K} \rightarrow \text{Na} \rightarrow \text{Cs}$
- C.  $\text{Cs} \rightarrow \text{Rb} \rightarrow \text{K} \rightarrow \text{Na} \rightarrow \text{Li}$
- D.  $\text{Na} \rightarrow \text{K} \rightarrow \text{Rb} \rightarrow \text{Cs} \rightarrow \text{Li}$

Not involved in  
2025 curriculum



115) Why does the oxidation number of the potassium ion not change in the following reaction equation?



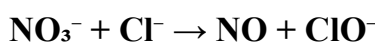
- A. Potassium is a spectator ion.
- B. Potassium is an uncombined element.
- C. Potassium is an active metal.
- D. Potassium is a monatomic ion.

116) What should the value of X be to balance the following half-reaction?



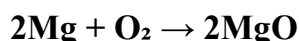
- A. 14
- B. 12
- C. 6
- D. 8

117) Which of the following is the correct balanced equation for the following oxidation-reduction reaction using the half-reaction method in an acidic solution?



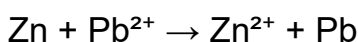
- A.  $2\text{NO}_3^- + 3\text{Cl}^- \rightarrow 2\text{NO} + 3\text{ClO}^-$
- B.  $2\text{NO}_3^- + 3\text{Cl}^- + \text{H}_2\text{O} \rightarrow 2\text{NO} + 3\text{ClO}^-$
- C.  $2\text{NO}_3^- + 3\text{Cl}^- + 2\text{H}^+ \rightarrow 2\text{NO} + 3\text{ClO}^- + \text{H}_2\text{O}$
- D.  $2\text{NO}_3^- + 3\text{Cl}^- + \text{H}^+ \rightarrow 2\text{NO} + 3\text{ClO}^- + \text{H}_2\text{O}$

118) Which of the following statements is correct regarding the reaction below?



- A. Electron transfer from oxygen molecules to magnesium atoms.
- B. Reduction of magnesium atoms.
- C. No oxidation-reduction reaction occurred.
- D. Electron transfer from magnesium atoms to oxygen molecules.

119) Which of the following is the oxidizing agent in the following reaction?

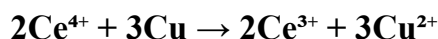


- A. Zn
- B.  $\text{Pb}^{2+}$
- C.  $\text{Zn}^{2+}$
- D. Pb

120) Which of the following has the lowest oxidation number for nitrogen (N)?

- A.  $\text{NO}_2$
- B.  $\text{NH}_3$
- C.  $\text{NO}$
- D.  $\text{N}_2$

121) Which of the following is oxidized in the following reaction?



- A.  $\text{Cu}^{2+}$
- B.  $\text{Cu}$
- C.  $\text{Ce}^{3+}$
- D.  $\text{Ce}^{4+}$

122) In the unbalanced reduction half-reaction  $\text{Al} \rightarrow \text{AlO}_2^-$

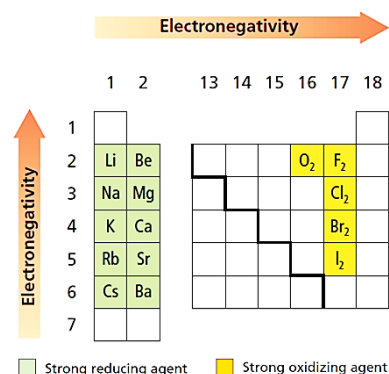
What should be added to the reactants to balance the oxygen atoms using the half-reaction method in an acidic solution?

- A.  $\text{H}_2\text{O}$
- B.  $2\text{H}_2\text{O}$
- C.  $2\text{OH}^-$
- D.  $\text{OH}^-$

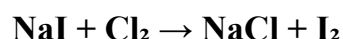
123) Using the figure below, what is the correct order of Group 2 elements (Li, Be,  $\text{O}_2$ ,  $\text{F}_2$ ) as reducing agents from strongest to weakest?

- A.  $\text{F}_2 \rightarrow \text{O}_2 \rightarrow \text{Be} \rightarrow \text{Li}$
- B.  $\text{Li} \rightarrow \text{Be} \rightarrow \text{O}_2 \rightarrow \text{F}_2$
- C.  $\text{F}_2 \rightarrow \text{O}_2 \rightarrow \text{Be} \rightarrow \text{Be}$
- D.  $\text{Li} \rightarrow \text{Be} \rightarrow \text{F}_2 \rightarrow \text{O}_2$

Not involved in  
2025 curriculum



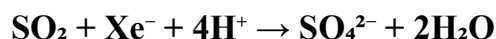
124) When balancing the following oxidation-reduction equation



Why is  $\text{Na}^+$  removed when writing the net ionic equation in its simplest form?

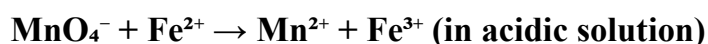
- A. Change in the oxidation number of  $\text{Na}^+$  from zero to +1.
- B. No change in the oxidation number of  $\text{Na}^+$ .
- C. Reduction of  $\text{Na}^+$ .
- D. Oxidation of  $\text{Na}^+$ .

125) What should the value of X be to balance the following half-reaction?



- A. 1
- B. 2
- C. 3
- D. 4

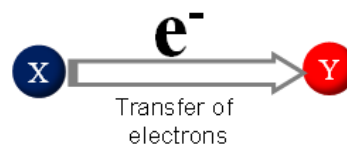
126) Which of the following is the correct balanced equation for the following oxidation-reduction reaction using the half-reaction method in an acidic solution?



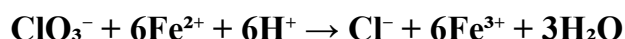
- A.  $\text{MnO}_4^- + 5\text{Fe}^{2+} \rightarrow \text{Mn}^{2+} + 5\text{Fe}^{3+}$
- B.  $\text{MnO}_4^- + 2\text{Fe}^{2+} + 2\text{H}^+ \rightarrow \text{Mn}^{2+} + \text{Fe}^{3+} + \text{H}_2\text{O}$
- C.  $\text{MnO}_4^- + 5\text{Fe}^{2+} + 8\text{H}^+ \rightarrow \text{Mn}^{2+} + 5\text{Fe}^{3+} + 4\text{H}_2\text{O}$
- D.  $\text{MnO}_4^- + 5\text{Fe}^{2+} + 16\text{H}^+ \rightarrow \text{Mn}^{2+} + 5\text{Fe}^{3+} + 8\text{H}_2\text{O}$

127) Which statement is incorrect regarding the diagram below?

- A. X is an oxidizing agent and not a reducing agent.
- B. X is a reducing agent and Y is an oxidizing agent.
- C. The oxidation number of X increases and the oxidation number of Y decreases.
- D. Y gains electrons.

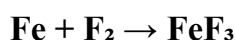


128) What is the total change in the oxidation number of chlorine in the following spontaneous oxidation-reduction reaction?



- A. 0
- B. -1
- C. -5
- D. -6

129) Which of the following shows the correctly balanced half-reaction of oxidation for the chemical reaction



- A.  $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + 1\text{e}^-$
- B.  $\text{F}_2 \rightarrow 2\text{F}^+ + 2\text{e}^-$
- C.  $\text{Fe} \rightarrow \text{Fe}^{3+} + 3\text{e}^-$
- D.  $\text{F}_2 + 2\text{e}^- \rightarrow 2\text{F}^-$

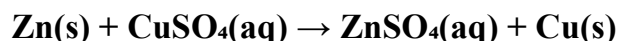


130) Which of the following changes represents oxidation?

- A. 1 only
- B. 2 only
- C. 1 and 3 only
- D. 2 and 3 only

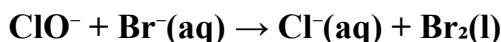
<b>1</b>	$2\text{F}^- \rightarrow \text{F}_2 + 2\text{e}^-$
<b>2</b>	$\text{IO}_3^- + 2\text{e}^- \rightarrow \text{IO}^-$
<b>3</b>	$\text{Na} \rightarrow \text{Na}^+ + \text{e}^-$

131) Regarding the following oxidation-reduction equation, which of the following statements is correct?



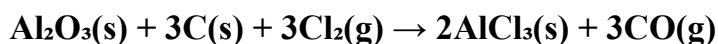
- A. Zinc is oxidized when it loses two electrons.
- B. Copper loses two electrons and is reduced.
- C. Cu is converted to  $\text{Cu}^{2+}$ .
- D.  $\text{Zn}^{2+}$  is converted to Zn.

132) In the following oxidation-reduction equation, which of the following statements is correct?



- A. The oxidation number of Cl changes from -1 to +4.
- B. The oxidation number of Br changes from -1 to zero.
- C. The oxidation number of Br changes from -1 to 2.
- D. The oxidation number of Cl changes from -1 to zero.

133) What is the oxidizing agent in the following chemical reaction?



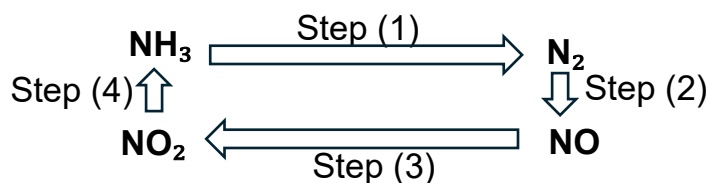
- A.  $\text{Al}_2\text{O}_3(\text{s})$
- B.  $3\text{C}(\text{s})$
- C.  $\text{AlCl}_3(\text{s})$
- D.  $\text{Cl}_2(\text{g})$

134) Which of the following formulas has the highest oxidation number for manganese?

- A.  $\text{MnO}_4^-$
- B.  $\text{MnO}_2$
- C.  $\text{MnCl}_2$
- D.  $\text{MnO}$

135) What step represents the reduction process in the diagram below?

- A. Step (1)
- B. Step (2)
- C. Step (3)
- D. Step (4)



136) What is the oxidizing agent in the following reaction?



- A. NO
- B.  $\text{Cu}^{2+}$
- C. Cu
- D.  $\text{HNO}_3$

137) Which of the following reactions represents an oxidation-reduction reaction?

- A.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- B.  $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
- C.  $\text{HCl} + \text{LiOH} \rightarrow \text{LiCl} + \text{H}_2\text{O}$
- D.  $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$

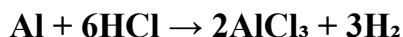
138) The oxidation number of hydrogen in the compound potassium hydride (KH) is equal to

- A. -2
- B. -1
- C. +1
- D. +2

139) Which of the following represents a peroxide compound?

- A.  $\text{H}_2\text{O}$
- B.  $\text{H}_2\text{O}_2$
- C.  $\text{Na}_2\text{O}$
- D. MgO

140) In the oxidation-reduction reaction represented by the following equation



The change in oxidation number for the element that is reduced is

- A. -3
- B. -1
- C. +1
- D. +3

141) The oxidation number of hydrogen in the compound sodium hydride (NaH) is equal to

- A. -2
- B. -1
- C. +1
- D. +2

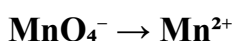
142) Which of the following reactions represents an oxidation-reduction reaction?

- A.  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- B.  $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$
- C.  $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow 2\text{HCl} + \text{S}$
- D.  $\text{Ca(OH)}_2 \rightarrow \text{CaO} + \text{H}_2\text{O}$

143) In which of the following formulas does oxygen have an oxidation number of (-2)?

- A.  $\text{Na}_2\text{O}$
- B.  $\text{H}_2\text{O}_2$
- C.  $\text{H}_2\text{O}$
- D.  $\text{OF}_2$

144) What is the change in the oxidation number of manganese in the following half-reaction?



- A. -1
- B. -5
- C. +3
- D. +7

145) Which of the following equations represents an oxidation-reduction reaction?

- A.  $\text{HCl} + \text{KOH} \rightarrow \text{KCl} + \text{H}_2\text{O}$
- B.  $\text{CuO} + \text{H}_2 \rightarrow \text{H}_2\text{O} + \text{Cu}$
- C.  $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$
- D.  $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$

146) Which of the following is NOT consistent with the process of oxidation?

- A. Increase in positive charge
- B. Increase in oxidation number
- C. Increase in negative charge
- D. Loss of electrons

147) Which of the following half-reactions requires an oxidizing agent?

- A.  $MnO_4^- \rightarrow MnO_2$
- B.  $SO_2 \rightarrow SO_3$
- C.  $NH_3 \rightarrow NH_4^+$
- D.  $NO_2^- \rightarrow NO_3^-$

148) What is the oxidation number of sulfur in  $S_2O_3^{2-}$ ?

- A. -2
- B. -3
- C. +2
- D. +4

149) Which of the following is correct regarding the reaction  $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$ ?

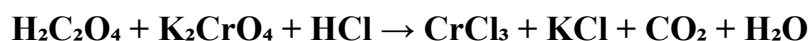
- A. Cu is a stronger oxidizing agent than Zn.
- B. Cu is a stronger reducing agent than Zn.
- C.  $Cu^{2+}$  is a stronger oxidizing agent than  $Zn^{2+}$ .
- D.  $Cu^{2+}$  is a weaker reducing agent than  $Zn^{2+}$ .

150) What happens to oxygen during the decomposition of hydrogen peroxide



- A. It is electrolyzed.
- B. It is oxidized and reduced at the same time.
- C. It is oxidized only.
- D. It is reduced only.

151) What is the oxidizing agent in the following reaction?



- A.  $H_2C_2O_4$
- B.  $K_2CrO_4$
- C. HCl
- D.  $CrCl_3$

152) Which of the following is NOT consistent with the process of oxidation?

- A. It involves the loss of electrons.
- B. It represents a half-reaction.
- C. The oxidation number decreases.
- D. There is an increase in positive charge.

153) How many electrons are gained when  $\text{MnO}_4^-$  is converted to  $\text{Mn}^{2+}$ ?

- A. 5
- B. 4
- C. 3
- D. 2

154) What happens to the oxidation number of the oxidizing agent during an oxidation-reduction process?

- A. It increases.
- B. It decreases.
- C. It remains constant.
- D. It may increase or decrease.

155) What is the sum of the oxidation numbers in a neutral compound?

- A. Greater than zero
- B. Equal to zero
- C. Less than zero
- D. Varies depending on the compound's formula.

156) Given that  $\text{F}_2$  displaces  $\text{Cl}^-$  ions from their solutions,  $\text{Cl}_2$  displaces  $\text{Br}^-$  ions, and  $\text{Br}_2$  displaces  $\text{I}^-$  ions, which of the following is the strongest oxidizing agent?

- A.  $\text{I}_2$
- B.  $\text{Br}_2$
- C.  $\text{Cl}_2$
- D.  $\text{F}_2$

157) What process occurs to the oxidizing agent in the reaction  $\text{CO} + \text{O}_2 \rightarrow \text{CO}_2$ ?

- A. Oxidation
- B. Reduction
- C. Neutralization
- D. Disproportionation

158) In the following reaction, which substance is oxidized?



- A.  $\text{Br}_2$
- B.  $\text{SO}_2$
- C.  $\text{H}_2\text{O}$
- D.  $\text{K}_2$

159) Which element is an oxidizing agent?

- A. K
- B. Ca
- C.  $F_2$
- D. Na

160) Which of the following reactions requires an oxidizing agent?

- A.  $Cl_2 + 2e^- \rightarrow 2Cl^-$
- B.  $S_2O_3^{2-} + 2H_2O \rightarrow 2SO_4^{2-} + 4H^+ + 2e^-$
- C.  $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$
- D.  $IO_3^- + 14H^+ + 10e^- \rightarrow I_2 + 5H_2O$

161) Which of the following underwent oxidation in the reaction  $F_2 + Mg \rightarrow 2F^- + Mg^{2+}$ ?

- A.  $F_2$
- B. Mg
- C.  $Mg^{2+}$
- D.  $F^-$

162) Which of the following reactions is an oxidation-reduction reaction?

- A.  $H_2SO_4 + KOH \rightarrow K_2SO_4 + 2H_2O$
- B.  $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
- C.  $2CaCO_3 \rightarrow CaO + CO_2$
- D.  $2KClO_3 \rightarrow 2KCl + 3O_2$

163) In the reaction  $2K^+ + 2Br^- \rightarrow Br_2 + 2K$ , which of the following is reduced?

- A. K
- B.  $Br^-$
- C.  $Br_2$
- D.  $K^+$

164) Which of the following reactions is an oxidation-reduction reaction?

- A.  $HNO_3 + KOH \rightarrow KNO_3 + H_2O$
- B.  $SO_2 + H_2O \rightarrow H_2SO_3$
- C.  $BaCl_2 + 2AgClO_3 \rightarrow Ba(ClO_3)_2 + 2AgCl$
- D.  $2KNO_3 \rightarrow 2KNO_2 + O_2$

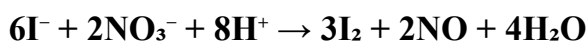
165) Which of the following reactions is NOT an oxidation-reduction reaction?

- A.  $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
- B.  $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- C.  $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$
- D.  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$

166) In the reaction  $2\text{Al} + 3\text{Cu}^{2+} \rightarrow 2\text{Al}^{3+} + 3\text{Cu}$ , which of the following is reduced?

- A.  $\text{Al}$
- B.  $\text{Cu}^{2+}$
- C.  $\text{Al}^{3+}$
- D.  $\text{Cu}$

167) What is the reducing agent in the following reaction?



- A.  $\text{NO}_3^-$
- B.  $\text{I}^-$
- C.  $\text{NO}$
- D.  $\text{I}_2$

168) Identify the reducing agent in the following reaction



- A.  $\text{Na}_2\text{SO}_4$
- B.  $\text{SO}_2$
- C.  $\text{H}_2\text{O}$
- D.  $\text{Br}_2$

169) Which of the following changes represents an oxidation process?

- A.  $\text{VO}_2^+ \rightarrow \text{VO}$
- B.  $\text{NO}_2 \rightarrow \text{N}_2$
- C.  $\text{ClO}^- \rightarrow \text{Cl}^-$
- D.  $\text{CrO}_4^{2-} \rightarrow \text{Cr}_2\text{O}_3$

170) Which of the following equations represents an oxidation-reduction reaction?

- A.  $\text{Na}_2\text{CO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
- B.  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- C.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- D.  $\text{CrCl}_3 + 3\text{KOH} \rightarrow \text{Cr}(\text{OH})_3 + 3\text{KCl}$



171) Which of the following materials is NOT produced from NO through an oxidation-reduction reaction?

- A.  $\text{HNO}_3$
- B.  $\text{NO}_2$
- C.  $\text{NO}$
- D.  $\text{N}_2$

172) Which of the following materials can be produced from  $\text{CO}_2$  through an oxidation-reduction reaction only?

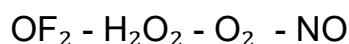
- A.  $\text{H}_2\text{CO}_3$
- B.  $\text{HCO}_3^-$
- C.  $\text{CO}$
- D.  $\text{CaCO}_3$

173) Which of the following equations does NOT represent an oxidation-reduction reaction?

- A.  $\text{NaNO}_3 \rightarrow 2\text{NaNO}_2 + \text{O}_2$
- B.  $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
- C.  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- D.  $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$

**Arrange the following formulas in ascending order according to**

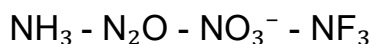
**174) the oxidation number of oxygen in each [2019 Final Exam]**



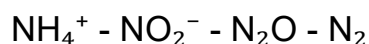
**175) the oxidation number of sulfur in each [2018 Final Exam]**



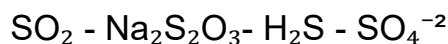
**176) the oxidation number of nitrogen [2017 Final Exam]**



**177) the oxidation number of nitrogen [2017 Training Exam]**



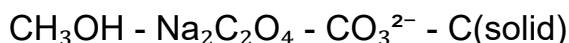
**178) the oxidation number of sulfur [2017 Exam]**



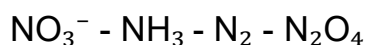
**179) the oxidation number of sulfur [2014 Final Exam]**



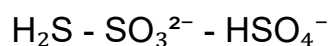
**180) the oxidation number of carbon [2014 Postponed Exam]**



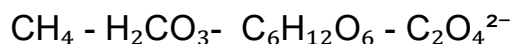
**181) the oxidation number of nitrogen [2014 Training Exam]**



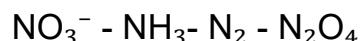
**182) the oxidation number of sulfur [2013 Final Exam]**



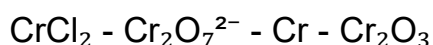
183) the oxidation number of carbon [2013 Training Exam]



184) the oxidation number of nitrogen [2012 Final Exam]

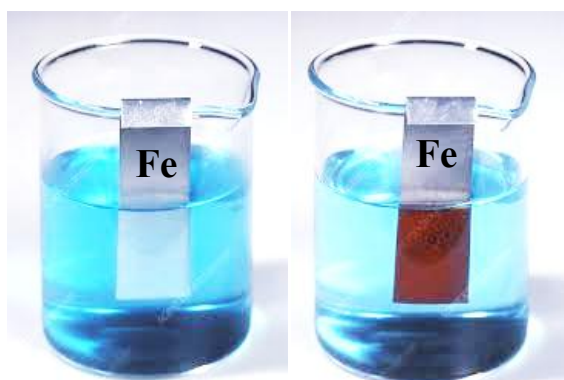


185) the oxidation number of chromium [2012 Postponed Exam]



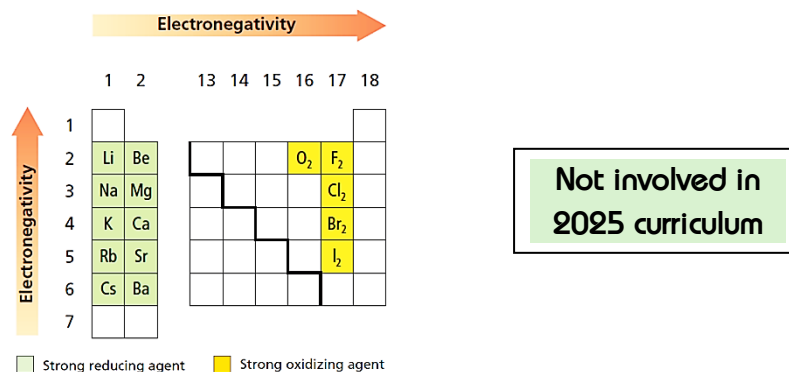
[2017-2018 First Semester Final Exam (Ministry)]

186) Study the adjacent figure, which represents the result of an oxidation-reduction reaction between iron and copper sulfate solution, then answer the following



- (1) Write the half-reaction of oxidation with balanced coefficients.
- (2) Write the half-reaction of reduction with balanced coefficients.
- (3) Write the balanced overall equation for the oxidation-reduction reaction.
- (4) What is the spectator ion in the reaction?

187) Study the adjacent figure well, then answer the following [2016-2017 Third Semester Final Exam ]



- (1) Determine the strongest reducing agent element.
- (2) Explain The oxidation number of fluorine in all its compounds is (-1)?
- (3) For the following half-reaction to occur  $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$ , does it require an oxidizing agent or a reducing agent?

---



---



---



---



---

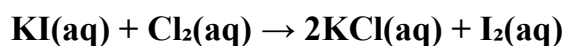


---



---

188) Study the following reaction [2016-2017 Third Semester Exam ]



Then answer the following

- (1) Identify the reducing agent.
- (2) Identify the substance that was reduced.
- (3) What is the spectator ion?
- (4) What is the change in the oxidation number of chlorine in the reaction?

---



---



---



---



---



---



---

**189)** Answer the following s [2014-2015 Final Exam (Ministry)]

(1) What is the oxidation number of sulfur in each of the following formulas  $\text{S}_2\text{O}_3^{2-}$  and  $\text{H}_2\text{SO}_3$ ?

---

---

(2) Does the reaction  $3\text{Na} + \text{Al}^{3+} \rightarrow 3\text{Na}^+ + \text{Al}$  involve the law of conservation of mass and charge?

---

---

**190)** [2010-2011 Second Semester Final Exam (Ministry)]

If you know that sulfur has the following oxidation numbers (-2, 0, +4, +6), do you expect sulfur ( $\text{S}_{16}$ ) to act as an oxidizing agent or a reducing agent? Justify your answer.

---

---

**191)** [2010-2011 Second Semester Postponed Exam (Ministry)]

If you know that nitrogen has the following oxidation numbers (-3, -2, 0, +3, +5), do you expect nitrogen ( $\text{N}_{15}$ ) to act as an oxidizing agent or a reducing agent? Justify your answer.

---

---

**192)** [2010-2011 Second Semester Training Exam (Ministry)]

If you know that sulfur has the following oxidation numbers (-2, 0, +4, +6), do you expect sulfur ( $\text{S}_2$ ) to act as an oxidizing agent or a reducing agent? Justify your answer.

---

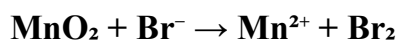
---

**193)** [2012-2013 Second Semester Training Exam (Ministry)]

Which of the following equations represent oxidation-reduction reactions, and which do not?

- a.  $4\text{Fe(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Fe}_2\text{O}_3\text{(s)}$
- b.  $\text{NaOH(aq)} + \text{HCl(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O(l)}$
- c.  $\text{Cl}_2\text{(aq)} + \text{H}_2\text{O(l)} \rightarrow \text{HCl(aq)} + \text{HClO(aq)}$

194) Balance the following equation in an acidic solution [2019 Final Exam]



---

---

---

---

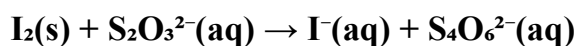
---

---

---

---

195) Balance the following equation in an acidic solution [2018 Final Exam]



---

---

---

---

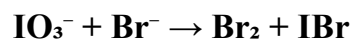
---

---

---

---

196) Balance the following equation in an acidic solution [2017 Ministry Exam]



---

---

---

---

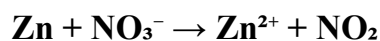
---

---

---

---

197) Balance the following equation in an acidic solution [2017 Exam]



---

---

---

---

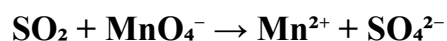
---

---

---

---

198) Balance the following equation in an acidic solution[2017 Training Exam]



---

---

---

---

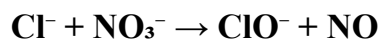
---

---

---

---

199) Balance the following equation in an acidic solution [2017 Exam]



---

---

---

---

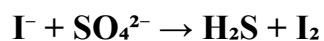
---

---

---

---

200) Balance the following equation in an acidic solution [2016 Final Exam]



---

---

---

---

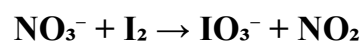
---

---

---

---

201) Balance the following equation in an acidic solution [2015 Training Exam]



---

---

---

---

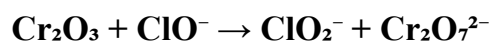
---

---

---

---

202) Balance the following equation in an acidic solution [2014 Final Exam]



---

---

---

---

---

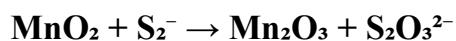
---

---

---



203) Balance the following equation in a basic solution [2014 Training Exam]



---

---

---

---

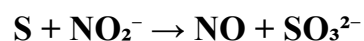
---

---

---

---

204) Balance the following equation in a basic solution [2013 Final Exam]



---

---

---

---

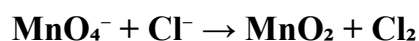
---

---

---

---

205) Balance the following equation in an acidic solution. [2013 Training Exam]



---

---

---

---

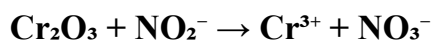
---

---

---

---

206) Balance the following equation in an acidic solution. [2012 Final Exam]



---

---

---

---

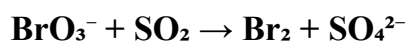
---

---

---

---

207) Balance the following equation in an acidic solution. [2012 Training Exam]



---

---

---

---

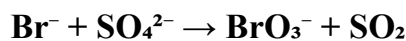
---

---

---

---

208) Balance the following equation in an acidic solution. [2012 Postponed Exam]



---

---

---

---

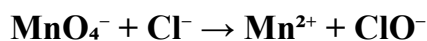
---

---

---

---

209) Balance the following equation in an acidic solution. [2011 Final Exam]



---

---

---

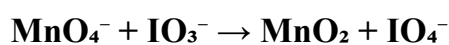
---

---

---

---

210) Balance the following equation in a basic solution. [2011 Postponed Exam]



---

---

---

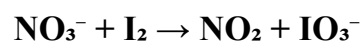
---

---

---

---

211) Balance the following equation in an acidic solution. [2010 Final Exam]



---

---

---

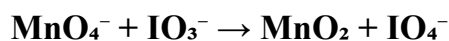
---

---

---

---

212) Balance the following equation in a basic solution. [2009 Training Exam]



---

---

---

---

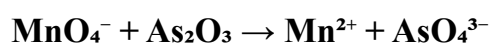
---

---

---

---

213) Balance the following equation in an acidic solution. [2009 Training Exam]



---

---

---

---

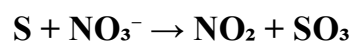
---

---

---

---

214) Balance the following equation in an acidic solution. [2008 Final Exam]



---

---

---

---

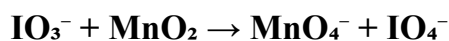
---

---

---

---

215) Balance the following equation in a basic solution. [2008 Exam]




---

---

---

---

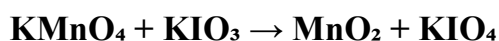
---

---

---

---

216) Balance the following equation in a basic solution. [2008 Training Exam]




---

---

---

---

---

---

---

---

مع خالص الشكر والامتنان للأستاذ محمد محسن

من بذل جهدا فوق العادة في تجميع الأسئلة باللغة العربية



Web page



YouTube channel



Telegram Channel

