

Solutions for Practice Exam 4

- Of the elements N, P, As, Sb, and Bi, which one has the most metallic character?
 - Bi
- Oxides of the alkaline earth family form
 - basic solutions.
- Oxides of nitrogen are known which have the following positive oxidation numbers of nitrogen.
 - +1, +2, +3, +4, +5
- All of the following are acid-base conjugate pairs **EXCEPT**
 - H_3O^+ , OH^-
- Which of the following species is the best reducing agent?
 - Na
- All of the following would be expected to function as reducing agents **EXCEPT**
 - Al^{3+} .
- | Half Reaction | E° (volts) |
|---|-------------------|
| $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$ | 1.09 |
| $\text{Hg}_2^{2+} + 2\text{e}^- \rightarrow 2\text{Hg}$ | 0.80 |
| $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ | 0.34 |
| $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$ | 0.00 |
| $\text{Sn}^{2+} + 2\text{e}^- \rightarrow \text{Sn}$ | -0.14 |
| $\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe}$ | -0.41 |
| $\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$ | -1.67 |

The strongest reducing agent of this series is

 - Al
- An example of a neutral bidentate ligand is
 - ethylenediamine.
- The name of the coordination compound with the formula $\text{Na}[\text{FeCl}_4]$ is
 - sodium tetrachloroferrate(III).

10. The formula for the hydroxopentaaquairon(III) ion is
- b. $[\text{Fe}(\text{OH})(\text{H}_2\text{O})_5]^{2+}$.
11. Which of the following can form optical isomers?
- d. $\text{BrCH}(\text{CH}_3)\text{CO}_2\text{H}$
12. Which of the elements indicated below would be classed as transition elements?
- c. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$
13. How many unpaired electrons are there in the strong field complex, $[\text{Co}(\text{NH}_3)_6]^{3+}$?
- a. 0
14. Which of the following Lewis bases would be expected to form chelates with transition metal ions?
1. $^-\text{OOC}^-\text{COO}^-$
2. $(\text{CH}_3)_2\text{NH}$
3. EDTA
- d. 1 and 3 only
15. If a nucleus decays by successive α , β , β emissions, how would the atomic number and mass number change?
- e. The atomic number stays the same; the mass number decreases by four units.
16. The isotope $^{59}_{24}\text{Cr}$ is produced by the β decay of:
- d. $^{53}_{23}\text{V}$
17. Complete the following nuclear reaction:



- d. $^{244}_{98}\text{Cf}$

18. What particles are produced in the following reaction?

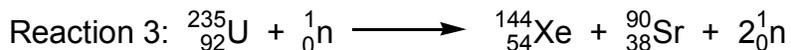
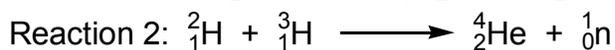
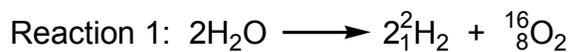


b. 4 neutrons

19. What do scientists call the sequence of rapidly occurring reactions that results when a nuclear fission reaction produces enough neutrons to produce more fission reactions?

a. chain reaction

20. Which of the following equations represent(s) a fusion reaction?



b. Reaction 2