

Quiz #1

1. 2.7 g/cm^3
2. Rb_2S , ionic compound, substance
- 3.a. yes, no, yes
b. no, yes, no

Quiz #2 (says "Quiz #3" at the top, but is actually Quiz #2)

1. -127.9 kJ
2. $48.1 \text{ }^\circ\text{C}$

Exam #1

- 1.a. 0.125 g
b. 194.2 g/mol
c. $6.43 \times 10^{-4} \text{ mol}$
d. 3.89×10^{20} molecules
2. CO_2 : C, CB, M
 N_2 : E, CB, M
 CaCl_2 : C, IC, IB
 $\text{Mg}(\text{NO}_3)_2$: C, IC, IB, CB
3. Check your answers against the definitions in the text. If you'd like me to check your answers, send them to me in an email.
- 4.a. BrF_3
b. BrF_3 , Br_2F_6 , Br_3F_9 , etc
- 5.a. 2.41 g
b. 41.2 mL
- 6.a. $2\text{NH}_3 + 5\text{F}_2 \rightarrow \text{N}_2\text{F}_4 + 6\text{HF}$
b. F_2 is limiting
c. $140. \text{ g HF}$
d. 117 g HF
- 7.a. HBr is the acid
b. This problem was unintentionally tricky -- S in $\text{S}_4\text{O}_6^{2-}$ has an oxidation number of 2.5. If you got the other oxidation numbers correct, you would be fine. I_2 is the oxidizing agent.
c. Fe_2O_3 is the oxidizing agent.
d. $\text{Mg}^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{MgCO}_3(\text{s})$
8. T, F, F, T

Exam #2

- 1.a. 31.3 kJ heat released (or $q = -31.3 \text{ kJ}$)
b. 34.7°C
2. -825.5 kJ for $\text{Fe}_2\text{O}_3(\text{s})$
3. -103.8 kJ
4. Lowest E: (a) < (b) < (c) highest E
- 5.a. $1.06 \times 10^{-19} \text{ J}$
b. $1.88 \times 10^{-6} \text{ m}$
- 6.a. exothermic
b. endothermic

- c. exothermic
- 7.a. $l = 2$ (3d) or $l = 1$ (3p)
 - b. $n = 1$ or 2 or 3 or ...; $m_l = 0$; $m_s = 1/2$ or $-1/2$; 1s or 2s or 3s or ...
 - c. $m_l = 2, 1, 0, -1, \text{ or } -2$; 3d
 - d. $l = 4$ or 3 ; 5g or 5f
- 8.a. 15
 - b. 18
 - c. 5
 - d. 8
 - e. Cl
- 9.a. $[\text{He}] 2s^2 2p^4$
 - b. $[\text{Kr}] 5s^2$
 - c. $[\text{Xe}] 6s^2 4f^{14} 5d^{10} 6p^4$
- 10.a. Te
 - b. Br^-
 - c. K

If you'd like me to check your explanations, send them to me in an email.

Final exam

- 1.a. 0.021 mol Mg
 - b. 0.0238 mol HCl
 - c. HCl is limiting
- 2.a. HNO_3
 - b. $\text{Pb}^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{PbCO}_3(\text{s})$
 - c. I
- 4.a. 40, 40, 51
 - b. $[\text{Kr}] 5s^2 4d^2$
 - c. (2, 2, 0, +1/2) and (2, -1, 0, +1/2) are not allowed
- 5. 180.5 kJ
- 6. Use bond enthalpy values in Table 9.2.
 - a. -2440. kJ
 - b. 12.2 kJ
 - c. 31°C
- 7.a. $\text{N}_2(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{N}_2\text{O}_4(\text{g})$
 - b. $\text{Na}(\text{g}) \rightarrow \text{Na}^+(\text{g}) + e^-$
 - c. $\text{NaCl}(\text{s}) \rightarrow \text{Na}^+(\text{g}) + \text{Cl}^-(\text{g})$
- 8. TeCl_2 : bent, $\sim 109.5^\circ$, sp^3 , polar
 CO_3^{2-} : trigonal planar, 120° , sp^2
 ClF_3 : t-shaped, $\sim 90^\circ$, sp^3d , polar
 For this problem and the next, I can check your answers.
- 9. sp^2
 3 sigma and 1 pi bond
- 10.a. metallic bonding (describe)
 - b. ionic bonding (describe)
- 11. P, CO, CaS, SCl, Cl^-
- 12. Cl

13. Be