

CHEQ 1094
Sample Final Exam 2 ANSWERS

1. a) Chemical
b) Physical
c) Chemical
2. a) Physical
b) Chemical
c) Physical
3. a) 4 c) 4
b) 3 d) 4
4. a) 8.72×10^6
b) 62.9×10^{-3}
5. a) $-129 \text{ }^\circ\text{F}$?
b) $58 \text{ }^\circ\text{C}$?
6. a) $2.59 \times 10^7 \text{ mm}$
b) $1.36 \times 10^4 \text{ kg/m}^3$
c) 340 m^3
7. 216g
8. 0.266 m^3 of magnetite
9. a) $2.26 \text{ J/g}\cdot^\circ\text{C}$ b) $5.50 \times 10^4 \text{ J}$
10. a) $^{118}_{50}\text{Sn}^{2+}$
b) $27\text{p}^+, 32\text{n}^0, 24\text{e}^-$
c)
i) Xe ii) Se^{2-}
iii) Ca^{2+} iv) 18
v) Br_2 vi) Cs
11. 121.8 amu

12. a) Cu_2CO_3 b) $\text{Fe}(\text{NO}_2)_2$ c) P_2O_5
 d) $\text{H}_2\text{S}(\text{aq})$ e) $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ f) $(\text{NH}_4)_2\text{SO}_4$

13. a) silver nitrate b) sulfuric acid c) magnesium hydroxide
 d) tin(IV) oxide e) mercury(I) chloride f) ammonia

14.

- a) $\text{P}_4 + 10 \text{Cl}_2 \rightarrow 4 \text{PCl}_5$
 b) $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + 2 \text{H}_2\text{O}$
 c) $4 \text{C}_3\text{H}_5\text{N}_3\text{O}_9 \rightarrow 6 \text{N}_2 + 12 \text{CO}_2 + 10 \text{H}_2\text{O} + \text{O}_2$
 d) $4 \text{HNCO} + 6 \text{NO} \rightarrow 5 \text{N}_2 + 2 \text{H}_2\text{O} + 4 \text{CO}_2$

15.

- a) $\text{Pb}(\text{NO}_3)_2(\text{aq}) + 2 \text{HCl}(\text{aq}) \rightarrow \text{PbCl}_2(\text{s}) + 2 \text{HNO}_3(\text{aq})$
 b) $\text{Al}(\text{OH})_3(\text{s}) + 3 \text{HNO}_3(\text{aq}) \rightarrow \text{Al}(\text{NO}_3)_3(\text{aq}) + 3 \text{H}_2\text{O}(\text{l})$
 c) $\text{Ca}(\text{s}) + 2 \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{s}) + \text{H}_2(\text{g})$
 d) $\text{CaCO}_3(\text{s}) \xrightarrow{\text{heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
 e) $3 \text{Ca}(\text{OH})_2(\text{aq}) + 2 \text{H}_3\text{PO}_4(\text{aq}) \rightarrow \text{Ca}_3(\text{PO}_4)_2(\text{s}) + 6 \text{H}_2\text{O}(\text{l})$
 f) $\text{C}_7\text{H}_6\text{O}_3(\text{s}) + 7 \text{O}_2(\text{g}) \rightarrow 7 \text{CO}_2(\text{g}) + 3 \text{H}_2\text{O}(\text{g})$
 (combustion)

16.

- a) 294.2 g/mol b) 0.0340 mol c) 1.02×10^{22} molecules
 d) 4.09×10^{22} N atoms e) 4.9×10^{-22} g aspartame

17. a) $\text{NaC}_5\text{H}_8\text{NO}_4$ b) $n = 1$, $\text{NaC}_5\text{H}_8\text{NO}_4$

18. 131.5g NH_3

19.

a) HCl is the limiting reagent.

b) 23.4 grams of chlorine will be produced.

c) 46.1 grams of MnO_2 are left unused.

20. 56.0g of NaOH is required.

21. 0.0120 moles of Cl are present.

22. 47.2 mL of a solution is required.

23. The molarity of KOH in the final solution is 0.391 mol/L.

24. The molarity of NaOH in the solution is 3.39 mol/L

25. 16.1 mL of the NaOH solution are required.

26. a) $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$

b) $\text{Zn}(\text{s}) + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{Cu}(\text{s})$

27. 2.275×10^4 kJ of heat is given off.