



Polytechnic Tutoring Center

Midterm II REVIEW – CM 1013 Answer Key, Fall 2021

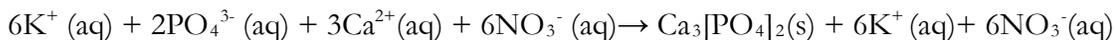
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SHORT ANSWER

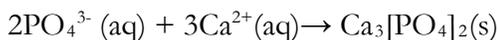
1. B, most ideal at high temperatures low pressures
2. D, sum of products - sum of reactants, atomic elements have no Hf
3. B, convert to moles, multiply by kJ per mole
4. B, Na is +1, O2 is -2, entire compound is 0. Solve for N
5. D, $q=ms\Delta t$
6. C, acid base forms salt and water
7. C, ideal gas equation
8. D, try writing an ideal gas equation for start and final states and solve for P_{final}
9. C, look for strong acids/bases and ionic compounds
10. C, find mole fractions to solve for partial pressures
11. B, $mV=mV$
12. A, molarity is moles per liter, convert to moles and divide
13. D, $E = q + w$, work and heat lost by system is negative
14. B, Net ionic Eq has spectators canceled out and ionic compounds dissociated
15. A, lightest gas
16. A, Cu starts from 0, becomes +2
17. A, temperature is a measure of kinetic energy, not speed. $KE = (\frac{1}{2})mv^2$ so highest v means lowest m
18. B, products minus reactants, don't forget to multiply by coefficient

LONG ANSWER

1. We recognize that K_3PO_4 and $Ca[NO_3]_2$ are both ionic, try to find the cation (+ ion) and the anion (-) for each one
 - a. Two ionic compounds trading partners means it is double replacement
 - b. Everything ionic breaks up



- c. Everything that is the same on both sides, cross out!



2. It didn't ask for ionic so we'll write everything out:
 - a. $H_2SO_4(aq) + 2NaOH(aq) \rightarrow 2H_2O(l) + Na_2SO_4(aq)$
 - b. Using $mV = mV$ and then dividing by 2 moles we find the acid is 1.2 M
3. Calculate the heat released using $q=ms\Delta t$, where m is the total mass of both liquids, s is the heat capacity, and delta t is the change in temperature. Find the number of moles of HBr that reacted, and divide q by this number for heat per mole. Answer is 56.01 J