



# Polytechnic Tutoring Center

## Midterm I REVIEW ANSWER KEY– CM 1003, Fall 2021

*Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the Academic Department.*

Use this key to resolve problems you missed

1. A, dividing is limited by 1.2, 2 sig figs. Units divide into gs/L
2. D, definition of ionic bond is two molecules of opposite charges
3. 45%, divide mass of iron over total molecular mass (385g/850g)
4. B, assume 100g, multiply each percent by atomic mass and take the sum
5. E, phase change is a physical property
6.  $2.81 \times 10^{23}$  atoms, divide given mass by weight of molecule, convert to moles of K and multiply by weight of K to find moles
7. D, use density and volume to find mass, divide by number of molecules and multiply avogadro's number
8. B, balance carbon, then hydrogen, then oxygen
9. A, alkali group 1, halogen group 7, transition in the F block
10. C, cobalt III bonds with 3 chlorines
11. A, atomic number = 20, 2+ removes 2e-
12. D, opposite charges switch subscripts
13. B, find change in volume, divide grams by volume
14.  $\text{Pb}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{PbSO}_4(\text{s})$   
Break apart soluble compounds, switch ions, check for solubility of new molecules
15. D, solubility rules chart
16. C, definition of reaction types
17. D 4 moles of aluminium/ 3 moles of oxygen multiplied by moles of Al
18. 135 g, convert grams of copper to moles of copper, to moles of copper II nitrate, to mass of copper II nitrate

19. B, SO<sub>4</sub> is -2 charge

20. B, definition of allotropes

21. B, check the number of moles product each react can produce

22. E, definition of metal displacement, the more reactive Na kicks out H

23. a)  $\text{Ba(OH)}_2 + 2\text{HClO}_3 \rightarrow \text{Ba(ClO}_3)_2 + 2\text{H}_2\text{O}$

b)  $\text{Ba(OH)}_2$ , compare number of moles of product formed by fully reacted  $\text{Ba(OH)}_2$  vs  $\text{HClO}_3$

c) 7.21g, using limiting reagent

d)  $\text{HClO}_3$  8.45g. Non limiting reagent is in excess. Calculate number of moles of  $\text{HClO}_3$  uses and subtract from initial