Accompanying Questions
Topic 06: Measurements, Prefixes, and Dimensional Analysis

Objective:

This is to provide guiding questions to help you comprehend the material we have covered in this section of the class. These questions or very similar questions have been answered within the video lecture and/or live class.

Instructions and Notes:

- Most of these questions/concepts are taken or derived from the chapters in the Chemistry: Atoms First 2e Online Textbook (OpenStax)
- Book sections covered: 1.4, 1.5, 1.6, Appendix B, Appendix C, 2.4

Submission:

Students do not submit this and it is not graded.

Helpful Tips:

- These questions or very similar questions may appear on the exams so I strongly recommend that you complete them.
- Download the lectures and rewatch the lectures.
- Pause the lectures and rewind them through concepts you don't fully understand.
- Go to tutoring in the ASTC or MESA, ask your classmates in our Discord room, watch YouTube Videos, come to office hours, etc.

In-Lecture Questions

Lecture 1 of 4

1. What do units do?
2. Define length and what is the standard unit and symbol for length? What would you use to measure this?
3. Define mass and what is the standard unit and symbol for mass? What would you use to measure this?
4. Define time and what is the standard unit and symbol for time? What would you use to measure this?
5. Define temperature and what is the standard unit and symbol for temperature? What would you use to measure this?
6. Define moles and what is the standard unit and symbol for moles? What would you use to measure this?
7. How many things is a mole?
8. Define volume and what is the standard unit and symbol for volume? What would you use to measure this?
9. What other measurement is equivalent to 1 cm^3?
10. What is the difference between 5.5 cm and 5.50 cm?

11. Define density. What would you use to measure this?
12. What is the density of silver? (include units)
13. To three decimal places, what is the volume of a cube (cm^3) with an edge length of 0.843 cm?
14. If the cube in part (a) is copper and has a mass of 5.34 g, what is the density of copper to two decimal places?
15. What would the above answer be in g/mL?

Lecture 2 of 4

16. True or False, prefixes are just words that mean numbers.
17. True or False, prefixes work with any unit.
18. What is the prefix (word) for 10^{-3}?
19. What is the factor (number) for mega?
20. How many grams (g) in a kilogram (kg)?
21. How many liters (l) in a kiloliter (kL)
22. How many moles (mol) in a kilomole (kmol)?
23. Convert 3.00×10^{-3} to a power of 10^{-5}
24. Convert 4.0×10^{-7} to a power of 10^{-6}
25. Add 5.00×10^{-5} and 3.00×10^{-3}
26. Subtract 4.0×10^{-7} from 5.0×10^{-6}
27. Multiply 4.2×10^{-8} by 2.0×10^{3}
28. Divide 3.6×10^{-5} by 6.0×10^{-4}

Lecture 3 of 4

29. What is dimensional analysis the same as?
30. What is the first step to conversions?
31. What must all conversion rates include?
32. What is the second step to conversions?
33. What is the third step to conversions?
34. What are the two important notes for the third step?
35. True or False, if you do not have a direct conversion rate, you may have to do a multi-step conversion.
36. True or False, for multi-step conversions you may need multiple conversion rates.
37. Convert 3.97 nanometers to meters
38. Convert 9.47 kilomoles (kmol) to micromoles (µmol)
39. Convert a volume of 9.345 qt to liters.
40. What is the volume in liters of 1.000 oz, given that 1 L = 1.0567 qt and 1 qt = 32 oz (exactly)?
41. A Toyota Prius Hybrid uses 59.7 L gasoline to drive from San Francisco to Seattle, a distance of 1300 km (two significant digits). (a) What (average) fuel economy, in miles per gallon, did the Prius get during this trip? (b) If gasoline costs $3.90 per gallon, what was the fuel cost for this trip?
42. How many moles in 0.26 grams of carbon?
43. How many atoms of sodium in 1.3 moles of sodium?
44. Convert 80.92 °C to K and °F.

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Lecture 4 of 4

45. Molar mass of atoms are found on the periodic table, what are the units?
46. What is the molar mass of boron (include units)?
47. What is the molar mass of water (include units)?
48. Where can you find the conversion factor for grams to moles of all elements and molecules?
49. What is the conversion factor of for moles to units?
50. Usually, what are units in this class?
51. Beryllium is a light metal used to fabricate transparent X-ray windows for medical imaging instruments. How many moles of Be are in a thin-foil window weighing 3.24 g?
52. What is the mass of 2.561 mol of gold?
53. A prospector panning for gold in a river collects 15.00 g of pure gold. How many Au atoms are in this quantity of gold?
54. How many moles of sucrose, $C_{12}H_{22}O_{11}$, are in a 25-g sample of sucrose?
55. What is the mass of 0.443 mol of hydrazine, N_2H_4?
56. How many atoms of C are there in 1 molecule of C_4H_{10}?
57. How many atoms of H are there in 1 molecule of C_4H_{10}?
58. How many total atoms are there in 1 molecule of C_4H_{10}?
59. How many C_4H_{10} molecules are contained in 9.213 g of this compound? How many hydrogen atoms?