**Answers to the General Chem Midterm Reviews 2024**

The 2021-22 midterm answers are first, followed by the 2023-24 answers. Each table shows the answer for each question, followed by an explanation (if needed) and a description of what the question generally implies you should know.

Answers to “Gen Midterm Review (based on 2021-22 midterm)

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| Question  number | Answer | Explanation | What it implies you should know |
| 1 | a | Electrons are equal to the atomic number. | You should be familiar with how to find the number of protons, neutrons, electrons, atomic mass, and atomic number of isotopes |
| 2 | c | 58 + 44 = 102 | protons + neutrons = electrons |
| 3 | d |  | What an isotope is, and how it differs from other isotopes of the same element. |
| 4 | d | By matching line spectra of unknown elements to the line spectra of elements you have identified, you can match them to identify the unknowns. | You should generally know how spectroscopy works. |
| 5 | d |  | You should understand how each model of the atom describes what it believes the properties of an atom are and why. |
| 6 | a | Electrons are 3-D waves, also known as force fields. | You should understand how electrons are viewed differently in each model of the atom, and generally how the models differ from each other. |
| 7 | b |  | How to do electron configurations |
| 8 | NA | We never discussed this, so don’t worry about it | We never discussed this, so don’t worry about it |
| 9 | no correct answer | 8.7 kg = 8700 grams  8700 grams = 870000 cg  That’s what it should have been, anyway | You should be able to identify the prefixes of metric units and convert between them. This is generally true of any type of unit |
| 10 | b |  | Understand what the definitions of precision and accuracy are and how they differ. |
| 11 | c |  | Understand the difference between precision and accuracy, and how this is reflected by the number of significant figures in a measurement |
| 12 | c | There’s no reason a best fit line can’t go through the origin | Know the parts of a graph and how to use them. |
| 13 | d | There’s no such thing as an intensive or extensive change. Because heating a material changes its state but not what the material is made of, this is a physical change | Understand the definitions and differences between intensive/extensive and chemical/physical changes and properties |
| 14 | c | The plum pudding model saw the positive charge as encompassing the entire atom | Understand the models of the atom and how they differ from each other |
| 15 | b |  | You should understand the experiments or ideas that led to the development of each model of the atom |
| 16 | c |  | Understand the definitions of electronegativity, ionization energy, and atomic radius |
| 17 | d | Atoms increase in size as you move down a group and decrease in size as you move across a period | Understand how the periodic trends change for elements in different parts of the periodic table. |
| 18 | c | Ionization energy increases as you move across a period and decreases as you move down a group. | Same as #17 |
| 19 | c |  | Know the names and locations of each group in the periodic table |
| 20 | a |  | Understand how ionic compounds are formed by the transfer of electrons that want to lose electrons to those that want to gain electrons. |
| 21 | b |  | Know the general properties of each group in the periodic table, as well as the general properties of metals, nonmetals, and metalloids |
| 22 | d | Carbon doesn’t form ionic compounds because it can either gain four electrons to be like the nearest noble gas or lose four electrons. As a result, it does neither and does not form ionic compounds. | Understand how ionic compounds are formed by the transfer of electrons from one element that wants to lose electrons to be like the nearest noble gas to another that wants to gain electrons to be like the nearest noble gas. |
| 23 | d |  | Understand how each of the periodic trends (atomic radius, electronegativity, ionization energy) work |
| 24 | b | Electricity is caused by the movement of charged particles, and ions can only move if their compounds are either melted or dissolved. | Know how electricity is conducted from the movement of charged particles. This is caused by the movement of electrons in metals and the movement of ions in ionic compounds |
| 25 | a | Sr is strontium, and N is nitrogen so we call it “nitride” | Know how to name ionic compounds and write their formulas. |

Answers to “General Chemistry Midterm Review, Based on the 2023-24 exam”

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| Question | Answer | Explanation of answer | The general idea it implies you should learn |
| 1 | depends | The actual answer is a, burette. However, we never talked about it in class, so if you thought it was d, graduated cylinder, you’re in good shape. If you think it’s one of the others, you’re wrong. | Understand what the lab equipment is called and what it’s used for. |
| 2 | b |  | Know the steps of the scientific method |
| 3 | b |  | Know who came up with the models of the atom |
| 4 | c | The nucleus was seen to have all the mass from the gold foil experiment. | Understand how the different models of the atom were developed by their inventors’ understanding of what they saw in experiments. |
| 5 | a | The atomic number of sodium is 11 | Understand how to calculate the number of protons, neutrons, electrons, atomic mass, and atomic number of elements. |
| 6 | b |  | Know where each of the different groups in the periodic table are located. |
| 7 | c | Three oxygen atoms have a total charge of -6 (each of them has a charge of -2), so the two iron atoms must each have a charge of +3 to cancel out this -6 charge. | Know how to name compounds and write their formulas. |
| 8 | d | Orbitals increase in energy as you move away from tbe nucleus in the Bohr model | Understand the characteristics of the different models of the atom |
| 9 | a |  | Know how the periodic trends change as you move across a period or down a group. |
| 10 | b |  | Know where each group in the periodic table can be found. |
| 11 | a | If copper has a +2 charge and sulfate has a -2 charge, the formula must contain one of both, making it CuSO4. | Understand how to name ionic compounds and write their formulas. |
| 12 | c | Electrons are not shared in ionic compounds. Rather, they are transferred from an element that wants to lose electrons to be like the nearest noble gas to an element that wants to gain electrons to be like the nearest noble gas. | Understand how ionic bonding works in terms of the transfer of electrons. |
| 13 | c | Also called a crystal | Understand the properties of ionic compounds and the reason for each. |
| 14 | c |  | Understand how ionic bonds form. |
| 17 | a | Electrons = atomic number | Understand how to determine the number of protons, neutrons, electrons, atomic mass, and atomic number of the isotopes of elements. |
| 18 | c | Protons + neutrons = atomic mass, so if 94 + X = 245, then X must be 151 | See #17 |
| 19 | d | a and b are true. c is not | Understand what the differences are between isotopes of an element. |
| 20 | b |  | Know the difference between a line spectrum and a continuous spectrum. Also understand how a line spectrum is formed. |
| 21 | d | It’s another way of saying that it’s where the electrons live. | Know the parts of an atom |
| 22 | b |  | Understand how an atom gives off light when energy is added to it. Particularly, this should focus on what the electrons do during this process. |
| 23 | d | Remember the flame test lab? | Know how spectroscopy works and what it’s used for. |
| 24 | d |  | Be familiar with the characteristics of all models of the atom. |
| 25 | a | 3-D waves called force fields, to be precise | Understand the parts of the quantum model and how they differ from the Bohr model |
| 26 | b |  | You should know what precision and accuracy are and how they are determined |
| 27 | d | The 1 and the two zeros to the right are significant because you see the decimal point. The zeros on the left are never significant, whether or not there is a decimal point. | You should be familiar with determining the number of significant figures in a value |
| 28 and 29 | NA | We didn’t talk about these. Sorry about that. |  |
| 30 | b |  | Be familiar with the experiments that led to the development of each of the models of the atom. |
| 31 | c | They have the formula X2 | Know the properties and locations of each of the families/sections in the periodic table. |
| 32 | b |  | Know some of the common uses of elements in different groups of the periodic table. |
| 33 | c | a) is atomic radius; b) is ionic radius, which we never even discussed; d) isn’t a thing | Be familiar with what the periodic trends are and what each of them measures. |
| 34 | d | Atomic radius is highest on the left side and bottom of the periodic table. | Know how the periodic trends change as you move across the periodic table. You should also know the reason for each. |
| 35 | c | Ionization energy is lowest on the left and bottom of the periodic table. | same as #34 |
| 36 | b | Oxygen is six elements from the noble gas before it. | Understand that valence electrons are always equal to the number of s- and p- elements a particular element is from the last noble gas. |
| 37 | d | Since electrons have – charge, gaining an electron gives the atom – charge | Know how protons, neutrons, and electrons affect the charges of different isotopes |
| 38 | c | Cations and anions are really really attracted to one another, particularly in large crystals | You should know how the attraction of ions causes the formation of ionic compounds. |
| 39 | d | Periods are rows, families or groups are columns. | Know the basics of the different parts of the periodic table |
| 40 | c | a and b both imagine a world where lithium grabs electrons (it doesn’t), and c imagines a world where the noble gases either lose or gain electrons. | Know how ions are formed by gaining or losing electrons to be like the nearest noble gas |
| 41 | d | She shielding effect also affects the electronegativities of elements for the same reason. | Understand what causes each property of element in the periodic table to change the way it does as you move down a group or across a period. |
| 42 | NA | We didn’t discuss this |  |
| 43 | b | The Roman numeral is the charge of the cation | Understand how to determine the charges of both anions and cations |
| 44 | a | Sr is strontium, N is nitrogen (which we call “nitride” because it’s an ion) | Know how to name elements and write their formulas |
| 45 | b |  | Understand how spectroscopy works. What do the electrons do? How does comparing spectra make it possible to identify elements? |
| 46 | c | Electronegativity is highest to the top right of the periodic table. He is excepted from this as it’s a noble gas | Know how the periodic trends of the elements differs as you move around the periodic table |
| 47 | d | Metals generally conduct, iron is a metal, and metalloids conduct only under high voltage or temp | Understand the properties of all of the groups in the periodic table – this includes the halogens/actinides/etc. |
| 48 | b | A little vague, but relates periodic trends to the formation of ionic compounds | Understand how ionic compounds are formed. |
| 49 | c | Because atomic radius decreases as you move across the periodic table, c is correct. | You should be familiar with the properties of elements in different parts of the periodic table. |
| 50 | NA | Never discussed this, sorry about that |  |

Other information:

* I feel like I may have understated the importance of knowing the properties of different parts of the periodic table. You might want to look into that.
* I don’t know that I mentioned safety here. Be familiar with some of the very basic safety rules
* There are no trick questions on the exam. The questions you saw in the multiple choice practice problems that contained information we never covered were accidentally left in the review sheet because I overlooked them when making the review.

And the answer to the big question: “What’s on the midterm?”

EVERYTHING. Anything that I’ve talked about in class is fair game. I’ve done my best to represent the material from the midterm on the review sheets, but it’s possible I’ve forgotten something big. Some general things to know about the midterm good rule of thumb is that:

* Things we learned second quarter are more likely to be on the midterm than the stuff we learned first quarter.
* Things we spent a lot of time on will be represented more on the midterm.
* I’m not going to ask any trick questions, so relax.