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Fall Final Exam Practice Problems Answers
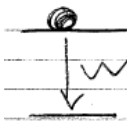
Chunk 1 Answers

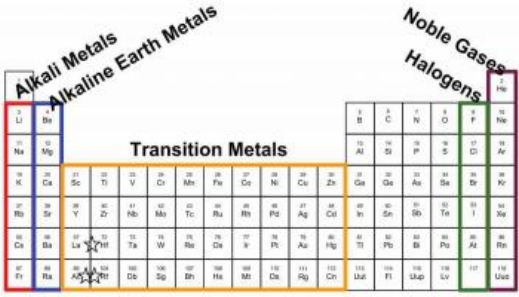| |
|---|
| 1) Democritus, Aristotle, John Dalton, JJ Thompson, Rutherford, Bohr, Schrodinger, Chadwick |
| 2) See your notebook! |
| 3) Hit gold foil with radioactive particles. They should have gone straight through because they thought the atom was uniform, but they bounced off sometimes in weird angles. This told them that there was a dense nucleus in the center, and the rest of the atom was mostly empty space |
| 4) Electrons travel randomly in orbitals – that the orbitals are areas of "probability clouds" of where you are likely to find an electron, but we don't know exactly where they are. They do not travel in circular rings/orbits like Bohr thought |
| 5) 3.45×10^{-3} |
| 6) 2.98×10^{7} |
| 7) Should be one number then the decimal, then the rest of the numbers (2.46) |
| 8) Should be one number then the decimal, then the rest of the numbers 5(.4) |
| 9) Kilo |
| 10) deci |
| 11) meter, liter, gram |
| 12) king henry died by drinking chocolate milk (or you may have a different one, this is just the one I'm used to) |
| 13) 34020000 cm |
| 14) 29400 mm |
| 15) 2700 g |
| 16) 0.000085 Dg |

17) Protons+neutrons
18) The number of protons (and electrons if it is a neutral atom)
19) 61 neutrons
20) Cl = 17, 18, 17   Ba = 56, 81, 56   C = 6, 6, 6   Ne = 10, 10, 10
21) It has the same number of protons and electrons, but a different number of neutrons. It is the same element, just a different version of the element.
22) Carbon-12 has 6 neutrons, carbon-13 has 7, and carbon-14 has 8 neutrons
23) Br-80 = 35, 45, 35   Br-83 = 35, 48, 35
24) Bromine-80 because the average atomic mass listed on the periodic table is 79.90 and this is closer to Bromine-80 than bromine-83
25) 6.02×10^{23}
26) To help us convert from grams to molecules, because atoms are very small it is hard to count them in small "chunks" so we use the mole because it is a large "chunk" we can count in – like counting eggs by the dozen
27) You use the mass from the periodic table and you add up the mass of each atom in the molecules. You do not round because you don't know which isotopes you are using, so you want to use the "average mass" so you are most closely going to match what you would find in nature
28) 107.87 g/mol
29) 74.1 g/mol
30) 174.27 g/mol
31) 68.17 g/mol

Chunk 2 Answers

1	5.63×10^5 cm
2	1.79 m/s
3	1.85×10^6 m/hr
4	1.16×10^2 mi/hr
5	0.27 mol
6	0.086 mol
7	3681.18 g
8	6.041 g
9	9.63×10^{24} molecules
10	4.15×10^7 mol
11	Area where an e- is most likely to be found, also called a probability cloud
12	
13	2
14	2, 6, 10, 14
15	
16	
17	Fill bottom to top, 2 e- per orbital, one e- in each p or
18	Ge
19	K
20	$1s^2 2s^2 2p^6 3s^2 3p^3$

21	$1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,4s^2\,3d^{10}\,4p^6\,5s^2\,4d^9$
22	absorbs energy, electron goes from ground state to excited state
23	e^- returns to ground state and releases energy
24	Ground state = lowest energy level an e- can be in Excited state = a higher energy level than normal
25	Alpha $^4_2\alpha$ ^4_2He paper beta $^0_{-1}\beta$ $^0_{-1}e$ foil gamma $^0_0\gamma$ lead
26	Gamma, beta, alpha
27	$\alpha = +2$ $\beta = -1$ $\gamma = 0$ negative positive neither
28	$^{99}_{43}Tc \longrightarrow {}^{99}_{44}Ru + {}^{0}_{-1}e$
29	$^{238}_{92}U \longrightarrow {}^{234}_{90}Th + {}^{4}_{2}He$
30	$^{150}_{62}Sm \longrightarrow {}^{0}_{-1}e + {}^{150}_{63}Eu$

Chunk 3 Answers

1	0.0394 mg
2	6.25%
3	46.87 g
4	3.61×10^{-12} g
5	+1, +2, -1, 0
6	1, 1, 2, 7, 6, 6, 4, 3
7	
8	(Answers may vary)
9	
10	Fr, Na, Ca, Fe, S, F
11	
12	Fr, Na, Ca, Fe, S, F
13	
14	F, S, Fe, Ca, Na, Fr
15	CO_3^{2-} PO_4^{3-} Fe^{3+} NO_3^{-}
16	**Ionic**: cation + anion OR metal + nonmetal Binary: cation keeps normal name, add roman numeral if transition metal, change anion to -ide Polyatomic: use ion names from common ions list

	Covalent: use prefixes, last element change end to -ide
17	Tetranitrogen decoxide Aluminum oxide Tetraphosphorus decasulfide Zinc sulfate Copper (II) chloride Ammonium nitrite Carbon tetrachloride Calcium chlorite Pentacarbon monoiodide
18	Ga_2O_3 $CaCl_2$ $(NH_3)PO_3$ CaO_2
19	P_2O S_4F_3 NH_4
20	Metal + nonmetal, nonmetal + nonmetal, metal + metal
21	Transfer, share, "sea" of free-flowing electrons
22	I, I, C, M, C, C
23	Most atoms want 8 valence e-
24	H = 2 B = 6 P = 10 S = 12
25	
29	Single: H_2, H_2O, NH_3 Double: CO_2, O_2 Triple: N_2 Lone pairs: CO_2, H_2O, NH_3, N_2, O_2
30	