|  |  |
| --- | --- |
| 1. | A particular radioactive element has a half-life of 6.41 days. What percent of the original sample is left after 15.0 days? |
| A) | 80.3% |
| B) | 44.4% |
| C) | 9.9% |
| D) | 39.5% |
| E) | 19.7% |

|  |  |
| --- | --- |
| 2. | An experiment requires 25.3 g of ethyl alcohol (density = 0.790 g/mL). What volume, in liters, will be required? |
| A) | 2.00  10–2 L |
| B) | 3.12  10–5 L |
| C) | 3.20e4 L |
| D) | 3.20  10–2 L |
| E) | 20.0 L |

|  |  |
| --- | --- |
| 3. | At 20oC the density of mercury is 13.6 g/cm3. What is the mass of 16.5 mL of mercury at 20oC? |
| A) | 2.24  102 g |
| B) | 1.21 g |
| C) | 1.00 g/mL |
| D) | 0.824 g |
| E) | none of these |

|  |  |
| --- | --- |
| 4. | If a 100.-g sample of platinum metal has a volume of 4.668 mL, what is the density of platinum in g/cm3? |
| A) | 21.4 g/cm3 |
| B) | 2.14 g/cm3 |
| C) | 0.0467 g/cm3 |
| D) | 467 g/cm3 |
| E) | none of these |

|  |  |
| --- | --- |
| 5. | An example of a chemical change is |
| A) | boiling alcohol |
| B) | grinding coffee beans. |
| C) | digesting a pizza |
| D) | coffee spilled on a shirt |
| E) | an ice cube melting in a drink |

|  |  |
| --- | --- |
| 6. | How many atoms of hydrogen are in one molecule of CH3Cl? |
| A) | 6 |
| B) | 2 |
| C) | 3 |
| D) | 5 |
| E) | 4 |

|  |  |
| --- | --- |
| 7. | How many neutrons are there in one atom of  |
| A) | 22 |
| B) | 24 |
| C) | 46 |
| D) | 68 |
| E) | none of these |

|  |  |
| --- | --- |
| 8. | Which of the following elements is an alkaline earth metal? |
| A) | Ca |
| B) | Cu |
| C) | Fe |
| D) | Na |
| E) | Sc |

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| --- | --- |
| 9. | An example of a mixture is |
| A) | hydrogen fluoride |
| B) | purified water |
| C) | gold |
| D) | the air in this room |
| E) | all of these |

|  |  |
| --- | --- |
| 10. | Which of the following involves a chemical change? |
| A) | boiling water |
| B) | melting ice |
| C) | chopping wood |
| D) | cooking an egg |
| E) | none of these |

|  |  |
| --- | --- |
| 11. | Which of the following is an element? |
| A) | brass |
| B) | salt |
| C) | water |
| D) | earth |
| E) | oxygen |

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| 12. | The symbol for the element strontium is |
| A) | S |
| B) | St |
| C) | Sm |
| D) | Str |
| E) | Sr |

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| --- | --- |
| 13. | How many atoms are represented by one formula unit of aluminum dichromate, Al2(Cr2O7)3? |
| A) | 14 |
| B) | 25 |
| C) | 27 |
| D) | 29 |
| E) | none of these |

|  |  |
| --- | --- |
| 14. | How many nitrogen atoms are indicated by the formula Al(NO3)3? |
| A) | 1 |
| B) | 3 |
| C) | 9 |
| D) | 4 |
| E) | 0 |

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| 15. | List the three main subatomic particles. |

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| --- | --- |
| 16. | How many protons, electrons, and neutrons, respectively, does have? |
| A) | 8, 18, 8 |
| B) | 8, 8, 8 |
| C) | 8, 10, 8 |
| D) | 8, 14, 8 |
| E) | 8, 18, 16 |

|  |  |
| --- | --- |
| 17. | The number of neutrons in one atom of  is |
| A) | 82 |
| B) | 206 |
| C) | 124 |
| D) | 288 |
| E) | none of these |

|  |  |
| --- | --- |
| 18. | An atom with 15 protons and 16 neutrons is an atom of |
| A) | P |
| B) | Ga |
| C) | S |
| D) | Pd |
| E) | Rh |

|  |  |
| --- | --- |
| 19. | How many neutrons are contained in an iodine nucleus with a mass number of 131? |
| A) | 53 |
| B) | 74 |
| C) | 78 |
| D) | 127 |
| E) | 131 |

|  |  |
| --- | --- |
| 20. | An atom with 45 protons has a mass number of 99. It must contain how many neutrons? |
| A) | 144 |
| B) | 45 |
| C) | 99 |
| D) | 54 |
| E) | none of these |

|  |  |
| --- | --- |
| 21. | Which of the following elements is most similar to lithium? |
| A) | Au |
| B) | He |
| C) | Na |
| D) | Hg |
| E) | Mg |

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| 22. | When decays by producing an alpha particle, the product nuclide is \_\_\_\_\_\_\_\_\_\_\_\_\_\_. |

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| 23. | Alpha particles are |
| A) | electrons |
| B) | protons |
| C) | neutrons |
| D) | helium nuclei |
| E) | X rays |

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| 24. | The cesium-131 nuclide has a half-life of 30 years. After 90 years, about 6 g remains. The original mass of the cesium-131 sample is closest to |
| A) | 30 g |
| B) | 40 g |
| C) | 50 g |
| D) | 60 g |
| E) | 70 g |

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| 25. | Which of these is an element? |
| A) | water |
| B) | iron ore |
| C) | wood |
| D) | silver |
| E) | brass |

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| --- | --- |
| 26. | How many atoms of oxygen are in one formula unit(compound) of calcium hydrogen sulfate? |
| A) | 3 |
| B) | 4 |
| C) | 5 |
| D) | 6 |
| E) | 8 |

|  |  |
| --- | --- |
| 27. | How many protons, electrons, and neutrons, respectively, does  have? |
| A) | 13, 13, 14 |
| B) | 13, 10, 14 |
| C) | 13, 13, 27 |
| D) | 13, 10, 27 |
| E) | 13, 13, 13 |

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| --- | --- |
| 28. | Which of the following exhibits the correct orders (decreasing) for both atomic radius and ionization energy, respectively? |
| A) | S, O, F, and F, O, S |
| B) | F, S, O, and O, S, F |
| C) | S, F, O, and S, F, O |
| D) | F, O, S, and S, O, F |
| E) | none of these |

|  |  |
| --- | --- |
| 29. | The electron configuration for Cr2+ is |
| A) | 1s22s22p63s23p64s23d4 |
| B) | 1s22s22p63s23p64s13d5 |
| C) | 1s22s22p63s23p63d4 |
| D) | 1s22s22p63s23p64s23d2 |
| E) | none of these |

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| --- | --- |
| 30. | An element has the electron configuration 1s22s22p63s23p6 4s23d104p65s24d105p2. The element is a(n) |
| A) | nonmetal. |
| B) | transition element. |
| C) | metal. |
| D) | lanthanide. |
| E) | actinide. |

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| 31. | Antimony can be represented by which of the following noble gas configurations? |
| A) | 1s22s22p63s23p6 4s23d104p65s24d105p5 |
| B) | 1s22s22p63s23p6 4s23d104p65s24d105p6 |
| C) | 1s22s22p63s23p6 4s23d104p65s25d105p5 |
| D) | 1s22s22p63s23p6 4s23d104p65s25d105p6 |
| E) | 1s22s22p63s23p6 4s23d104p65s24d105p3 |

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| 32. | Which of the following best describes the "trend" for electronegativity across periods (L->R) and down groups, respectively (periods/groups)? |
| A) | Decrease / Decrease |
| B) | Increase / Decrease |
| C) | Decrease / Increase |
| D) | Increase / Increase |
| E) | neither |

|  |  |
| --- | --- |
| 33. | When an electron in the ground state absorbs energy, it goes to a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ state. |
| A) | excited |
| B) | lower |
| C) | frenetic |
| D) | ionic |
| E) | stable |

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| 34. | Which of the following has the electron configuration 1*s*22*s*22*p*63*s*23*p*64*s*23*d*5? |
| A) | Cr |
| B) | Ca |
| C) | Mn |
| D) | Br |
| E) | none of these |

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| --- | --- |
| 35. | Which of the following is the atomic number of a halogen? |
| A) | 10 |
| B) | 13 |
| C) | 17 |
| D) | 136 |
| E) | 27 |

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| 36. | Which of the following statements *BEST* describes the alkali metal? |
| A) | They have two valence electrons, and they form ions with a 2- charge. |
| B) | They have two valence electrons, and they form ions with a 2+ charge. |
| C) | They have one valence electron, and they form ions with a 1+ charge. |
| D) | They have one valence electron, and they form ions with a 1- change. |
| E) | They have one valence electron, and they form ions with a 2- charge |

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| 37. | An atom that has an electron configuration of 1*s*22*s*22*p*63*s*23*p*6 is classified as  |
| A) | a noble gas element |
| B) | a transition metal |
| C) | an alkaline earth element |
| D) | an alkali metal |
| E) | a halogen |

|  |  |
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| 38. | When magnesium and oxygen form a bond 2 electrons will be |
| A) | Shared equally |
| B) | shared unequally |
| C) | Lost by magnesium gained by oxygen |
| D) | Lost by oxygen gained by magnesium |
| E) | evenly distributed |

|  |  |
| --- | --- |
| 39. | A stable element will have how many valance electrons? |
| A) | 8 |
| B) | 32 |
| C) | 6 |
| D) | 18 |
| E) | Zero |

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| 40. | What is the name of the compound whose formula is NO2 |
| A) | Nitrogen pentoxide |
| B) | Dinitrogen oxide |
| C) | Nitrogen oxide |
| D) | nitrogen dioxide |
| E) | Nitrogen (V) oxide |

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| 41. | What is the correct chemical formula for copper(II) oxide? |
| A) | Cu2O3 |
| B) | Cu3O |
| C) | CuO3 |
| D) | Cu3O2 |
| E) | CuO |

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| 42. | What is the chemical formula for Mercury (I) oxide |
| A) | Hg2O2 |
| B) | Hg2O |
| C) | Hg2O4 |
| D) | HgO2 |
| E) | HgO |

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| 43. | Calculate the molar mass of Na2SO4. |
| A) | 142 g |
| B) | 100 g  |
| C) | 132 g/mol |
| D) | 142 g/mol |
| E) | 124 g/mol |

|  |  |
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| 44. | The prefix “di” means |
| A) | 1 |
| B) | 2 |
| C) | 3 |
| D) | 4 |
| E) | 5 |

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| 45. | The chemical formula for dicarbon hexahydride is |
| A) | CH4 |
| B) | C2H6 |
| C) | CH |
| D) | CH2 |
| E) | C3H8 |

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| 46. | With which of the following would fluorine atoms MOST easily combine to form an ionic compound? |
| A) | oxygen |
| B) | chlorine |
| C) | carbon |
| D) | Sodium |
| E) | sulfur |

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| 47. | The electron configuration of carbon is 1*s*2 2*s*2 2*p*2. How many more electrons does carbon need to satisfy the octet rule? |
| A) | 1 |
| B) | 4 |
| C) | 8 |
| D) | 5 |
| E) | 2 |

Use the following to answer question 65:

 Consider the following molecules.

|  |  |
| --- | --- |
|  I. | BF3 |
| II. | CHBr3 (C is the central atom) |
|  III. | Br2 |
| IV. | XeCl2 |
| V. | CO |
|  VI. | SF4 |

Select the molecule(s) that fit the given statement.

|  |  |
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| 48. | These molecules follow the octet rule. |
| A) | I, II, IV |
| B) | I, III, IV, VI |
| C) | III, V, VI |
| D) | I, IV, VI |
| E) | II, III, V |

Use the following to answer questions 52-56:

A) Halogens

B) Alkaline Earth Metals

C) Noble Gases

D) Alkali Metals

E) Metal/Non-metal

|  |  |
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| 49. | 1s22s22p63s23p6 Represents this type of element |

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| 50. | These elements become more reactive as you decrease their atomic number. |

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| 51. | Barium is this type of element |

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| 52. | The cation of table salt is made from one of these types of elements |

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| --- | --- |
| 53. | Nitrogen, Phosphorus, Sulfur, Oxygen represent these elements |

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| 54. | The name for NaHCO3 is |
| A) | sodium hydrogen carbonate (sodium bicarbonate) |
| B) | sodium carbonate |
| C) | sodium(I) hydrogen carbonate |
| D) | sodium(I) bicarbonate |
| E) | none of these |

|  |  |
| --- | --- |
| 55. | Titanium(IV) oxide has the formula |
| A) | Ti4O |
| B) | TiO4 |
| C) | Ti(IV)O |
| D) | TiO2 |
| E) | Ti4O2 |

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| 56. | According to the following Nuclear Equation, 23892U  23490Th + \_\_\_\_, which particle is produced? |
| A) |  |
| B) |  |
| C) |  |
| D) |  |
| E) |  |

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| --- | --- |
| 57. | What is the electron configuration of Al+3 |
| A) | 1s22s22p1 |
| B) | 1s22s22p6 |
| C) | 1s22s22p63s23p1 |
| D) | 1s22s22p63s23p6 |
| E) | 1s22s22p63s2 |

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| --- | --- |
| 58. | An atom with 75 neutrons, 52 protons, and 52 electrons |
| A) |  |
| B) |  |
| C) |  |
| D) |  |
| E) |  |

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| --- | --- |
| 59. | Which describes the alkali metals? |
| A) | They have two valence electron and for ions with a +1 charge |
| B) | They have one valence electron and for ions with a +1 charge |
| C) | They have one valence electron and for ions with a +2 charge |
| D) | They have two valence electron and for ions with a +2 charge |
| E) | They have one valence electron and for ions with a +3 charge |

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| --- | --- |
| 60. | What best describes the reasons for the atomic radius trends |
| A) | As you go down a group the energy level increases and as you go L🡪 R across a period the proton charge decreases |
| B) | As you go down a group the energy level decreases and as you go L🡪 R across a period the proton charge increases |
| C) | As you go down a group the energy level increases and as you go L🡪 R across a period the proton charge increases |
| D) | As you go down a group the energy level decreases and as you go L🡪 R across a period the proton charge decreases |
| E) | As you go up a group the energy level increases and as you go R🡪 L across a period the proton charge increases |

|  |  |
| --- | --- |
| 61. | The electron configuration below represents which periodic table group 1s22s22p63s23p6 |
| A) | Transition metal |
| B) | Akali metal |
| C) | Halogen |
| D) | Noble Gas |
| E) | Alkaline earth metal |

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| --- | --- |
| 62. | What is the electron configuration for Cr+3 |
| A) | 1s22s22p63s23p6 |
| B) | 1s22s22p63s23p63d2 |
| C) | 1s22s22p63s1 |
| D) | 1s22s22p63s23p64S2 |
| E) | 1s22s22p63s23p63d3 |

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| 63. | The number 0.00003044 expressed in exponential notation is |
| A) | 3.044  10–5 |
| B) | 3.0  10–5 |
| C) | 3.044  105 |
| D) | 3.044  10–4 |
| E) | 3.044 |

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| --- | --- |
| 64. | Express the number 0.00374 in scientific notation. |
| A) | 3.74  10–3 |
| B) | 3.74  103 |
| C) | 0.374  10–3 |
| D) | 374  10–5 |
| E) | none of these |

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| --- | --- |
| 65. | Convert: 42.2 cm = \_\_\_\_\_\_\_\_\_\_\_\_ m. |
| A) | 4.22  103 m |
| B) | 4.22  104 m |
| C) | 0.0422 m |
| D) | 0.422 m |
| E) | 4.22 m |

|  |  |
| --- | --- |
| 66. | Convert: 7.7 mm = \_\_\_\_\_\_\_\_\_\_\_\_\_ km. |
| A) | 7.7  10–6 km |
| B) | 7.7  10–3 km |
| C) | 7.7  103 km |
| D) | 7.7  106 km |
| E) | 7.7  102 km |

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| --- | --- |
| 67. | Convert 9.16 kg to pounds (1 lb = 453.6 g). |
| A) | 20.2 lb |
| B) | 2.02  10–2 lb |
| C) | 4.15  103 lb |
| D) | 4.15 lb |
| E) | 4.15  106 lb |

|  |  |
| --- | --- |
| 68. | Convert 418.2 mi to kilometers (1 m = 1.094 yd; 1 mi = 1760. yd). |
| A) | 2.599  10–4 km |
| B) | 6.728  105 km |
| C) | 457.5 km |
| D) | 2.376  10–1 km |
| E) | 6.728  102 km |

|  |  |
| --- | --- |
| 69. | Perform the following conversion: 5.77 m/s = \_\_\_\_\_\_\_\_\_\_ km/h |
| A) | 20.8 km/h |
| B) | 0.346 km/h |
| C) | 1.60 km/h |
| D) | 624. km/h |
| E) | 173. km/h |

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| --- | --- |
| 70. | Perform the following conversion: 5.67 m/s = \_\_\_\_\_\_\_\_\_\_ mi/h |
| A) | 0.395 mi/h |
| B) | 12.7 mi/h |
| C) | 284. mi/h |
| D) | 211. mi/h |
| E) | 11.3 mi/h |

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| --- | --- |
| 71. | Draw the Lewis structures for the following compounds to assist you in answering this question.CBr2H2 BH3 XeCl4 SF4 HClHow many of the compounds are nonpolar? |
| A) | 1 |
| B) | 2 |
| C) | 3 |
| D) | 4 |
| E) | 5 |

|  |  |
| --- | --- |
| 72. | Which of the following compounds contains one or more covalent bonds? |
| A) | NaCl |
| B) | CaO |
| C) | CO2 |
| D) | Cs2O |
| E) | BaBr2 |

|  |  |
| --- | --- |
| 73. | Which of the following compounds contains an ionic bond? |
| A) | HCl*(g)* |
| B) | NaCl |
| C) | CCl4 |
| D) | SO2 |
| E) | O2 |

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| --- | --- |
| 74. | Which of the following elements has the lowest electronegativity? |
| A) | Na |
| B) | Rb |
| C) | Ca |
| D) | S |
| E) | Cl |

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| --- | --- |
| 75. | Which of the following has nonpolar bonds? |
| A) | H2S |
| B) | HCl |
| C) | Br2 |
| D) | OF2 |
| E) | All are nonpolar. |

|  |  |
| --- | --- |
| 76. | Which of the following bonds does **not**have a dipole moment? |
| A) | N-H |
| B) | O-H |
| C) | F-H |
| D) | H-H |
| E) | S-H |

|  |  |
| --- | --- |
| 77. | How many lone pairs of electrons are in the Lewis structure for ammonia, NH3? |
| A) | 0 |
| B) | 1 |
| C) | 2 |
| D) | 3 |
| E) | 4 |

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| 78. | Draw the Lewis electron structure for the HI molecule. |

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| 79. | Draw the Lewis electron structure for the H2Te molecule. |

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| 80. | Draw the Lewis structure for CO. |

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| 81. | Which of the following molecules are polar? (Check all that apply.) |
| A) | CH3OH |
| B) | CH4 |
| C) | H2O |
| D) | C2H6 |

|  |  |
| --- | --- |
| 82. | Which of the following has a double bond? |
| A) | H2O |
| B) | NH3 |
| C) | O2 |
| D) | CO |
| E) | H2S |

|  |  |
| --- | --- |
| 83. | Which of the following should have the lowest boiling point? |
| A) | CH4 |
| B) | C2H6 |
| C) | C3H8 |
| D) | C4H10 |
| E) | C5H12 |

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| --- | --- |
| 84. | Which of the following species exhibit hydrogen bonding? (Check all that apply.) |
| A) | HBr |
| B) | NO3– |
| C) | H2O |
| D) | SF4 |
| E) | KrCl4 |
| F) | I3– |

Use the following to answer questions 23-25:

Identify the major attractive force in each of the following molecules.

|  |  |
| --- | --- |
| 85. | CH4 |
| A) | dipole-dipole |
| B) | London dispersion |
| C) | ionic |
| D) | hydrogen bonding |
| E) | none of these |

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| --- | --- |
| 86. | CO |
| A) | dipole-dipole |
| B) | London dispersion |
| C) | ionic |
| D) | hydrogen bonding |
| E) | none of these |

|  |  |
| --- | --- |
| 87. | K2O |
| A) | dipole-dipole |
| B) | London dispersion |
| C) | ionic |
| D) | hydrogen bonding |
| E) | none of these |

|  |  |
| --- | --- |
| 88. | Consider the following compounds:CO NH3 CO2 CH4 H2How many of the compounds above exhibit London dispersion forces? |
| A) | 1 |
| B) | 2 |
| C) | 3 |
| D) | 4 |
| E) | 5 |

|  |  |
| --- | --- |
| 89. | Consider the following compounds:CO NH3 CO2 CH4 H2Which compound has the **highest** boiling point? |
| A) | CO |
| B) | NH3 |
| C) | CO2 |
| D) | CH4 |
| E) | At least two of the above compounds have equally high boiling points. |

|  |  |
| --- | --- |
| 90. | Rank the following compounds from **lowest to highest** boiling point.CH3OH CH4 H2O C2H6 |
| A) | H2O < CH3OH < C2H6 < CH4 |
| B) | C2H6 < CH4 < CH3OH < H2O |
| C) | CH4 < C2H6 < CH3OH < H2O |
| D) | CH4 < C2H6 < H2O < CH3OH |
| E) | CH4 < CH3OH < C2H6 < H2O |

|  |  |
| --- | --- |
| 91. | Which of the following has the highest melting temperature? |
| A) | H2O |
| B) | CO2 |
| C) | S8 |
| D) | MgF2 |
| E) | P4 |

Check your answers. Highlight the ones you got wrong. On page 128 list the question numbers you missed, next to them list the TOPIC that the question was about, and then show your correction next to it. The topics you missed are the topics you should study the most before the final!

 **Answer Key**

|  |  |
| --- | --- |
| 1. | E |
| 2. | D |
| 3. | A |
| 4. | A |
| 5. | C |
| 6. | C |
| 7. | B |
| 8. | A |
| 9. | D |
| 10. | D |
| 11. | E |
| 12. | E |
| 13. | D |
| 14. | B |
| 15. | electron, proton, neutron |
| 16. | B |
| 17. | C |
| 18. | A |
| 19. | C |
| 20. | D |
| 21. | C |
| 22. |  |
| 23. | D |
| 24. | C |
| 25. | D |
| 26. | E |
| 27. | B |
| 28. | A |
| 29. | C |
| 30. | C |
| 31. | E |
| 32. | B |
| 33. | A |
| 34. | C |
| 35. | C |
| 36. | C |
| 37. | A |
| 38. | C |
| 39. | A |
| 40. | D |
| 41. | E |
| 42. | B |
| 43. | D |
| 44. | B |
| 45. | B |
| 46. | D**Pick the TOP five questions you would like Mrs. Farmer to try and do in class under the document camera.**1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Go to the following link and submit these questions to the online form so Mrs. Farmer knows which ones you would like her to do!****1st Period:** https://www.surveymonkey.com/r/FPTM9M2**2nd Period:** https://www.surveymonkey.com/r/F6N3CL6**3rd Period:** https://www.surveymonkey.com/r/FZ7ZJQP**4th Period:** https://www.surveymonkey.com/r/FZR9GNN**5th Period:** https://www.surveymonkey.com/r/FZ6T2PT**6th Period:** https://www.surveymonkey.com/r/F57LFDN |
| 47. | B |
| 48. | E |
| 49. | C |
| 50. | A |
| 51. | B |
| 52. | D |
| 53. | E |
| 54. | A |
| 55. | D |
| 56. | B |
| 57. | B |
| 58. | E |
| 59. | B |
| 60. | C |
| 61. | D |
| 62. | E |
| 63. | A |
| 64. | A |
| 65. | D |
| 66. | A |
| 67. | A |
| 68. | E |
| 69. | A |
| 70. | B |
| 71. | B |
| 72. | C |
| 73. | B |
| 74. | B |
| 75. | C |
| 76. | D |
| 77. | B |
| 78. |  |
| 79. |  |
| 80. |  |
| 81. | A, C |
| 82. | C |
| 83. | A |
| 84. | C |
| 85. | B |
| 86. | A |
| 87. | C |
| 88. | E |
| 89. | B |
| 90. | C |
| 91. | D |