Name _____ Period _____

Pre-AP Chemistry, Grade 10

Final Exam

I. Multiple Choice

1	4	11	1	21	2	31	1	41	2
2	3	12	1	22	4	32	2	42	1
3	1	13	3	23	3	33	2	43	2
4	4	14	1	24	4	34	4	44	1
5	1	15	4	25	4	35	4	45	4
6	2	16	4	26	3	36	3	46	1
7	2	17	2	27	3	37	2	47	2
8	4	18	2	28	3	38	3	48	D
9	1	19	3	29	1	39	3	49	4
10	2	20	2	30	3	40	4	50	3

II. Free Response

1. $273.15 + (-84.9) = 188.25\ K$

Boiling Point of HCl 188.3 K

2. NOT PART OF TEST.

3. Explanation:

NH_3	CH_4	HCl
ammonia	methane	hydrogen chloride
LDF	LDF	LDF
DD		DD
HB		HB

Ammonia has a higher boiling point than methane because it is polar and has hydrogen bonds. Though both NH_3 and HCl have the same intermolecular forces, NH_3 must make stronger hydrogen bonds than HCl or have a greater dipole moment than HCl.

4. Calculation:

$62.93(.6917) + 64.93(.3083) = 63.55\ g$

Atomic Mass of Cu 63.6 g

5. Calculation:

molar mass of Copper(I) sulfide (Cu_2S) = 159.16 g/mol

$$3.18\ g\ Cu_2S \times \frac{1\ mol\ Cu_2S}{159.16\ g\ Cu_2S} \times \frac{1\ mol\ S}{1\ mol\ Cu_2S} \times \frac{32.06\ g\ S}{1\ mol\ S} =$$

Total Mass S Consumed 0.64 g

-or-

$3.18\ g\ Cu_2S - 2.54\ g\ Cu = 0.64\ g$

6. Chemical Formula: Cu_2S

7. Explanation:

The line spectrum of an element is produced when electrons in higher-energy orbitals fall to lower-energy orbitals, releasing photons of light with energy equal to the difference in energy between the two orbitals.

8. Elements in Mixture (list):

Strontium, lithium

9. Cd: $[Kr]5s^24d^{10}$

Total Number of Valence Electrons in Cd 12

10. Explanation:

Atoms can be broken down into sub-atomic particles: electrons, protons, and neutrons.

11. Explanation:

Atoms of the same element, though having the same number of protons, may have different numbers of neutrons, giving these different isotopes of the same element different masses.

12.

Process to Separate Natural Gas Components Distillation

13. List in order of increasing strength of intermolecular forces:

Methane < Ethane < Propane < Butane

14. Circle the appropriate description

Mixture 1	(Homogeneous)	Heterogeneous
Mixture 2	Homogeneous	(Heterogeneous)

15. $\text{density} = \frac{\text{mass}}{\text{volume}} \Rightarrow \text{volume} = \frac{\text{mass}}{\text{density}}$

$$\text{volume} = \frac{15.9\ \text{g}}{7.87\ \text{g/cm}^3} = 2.02\ \text{cm}^3$$

Volume of Fe fillings 2.02 cm^3

16. Description of procedure:

Since the boiling point of water is lower than the boiling point of NaCl, we could just boil the ~~xxxxx~~ mixture to physically remove the water.

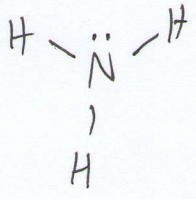
17.

Compound containing ionic and covalent bonds $NaHCO_3$ (or NH_4Cl)

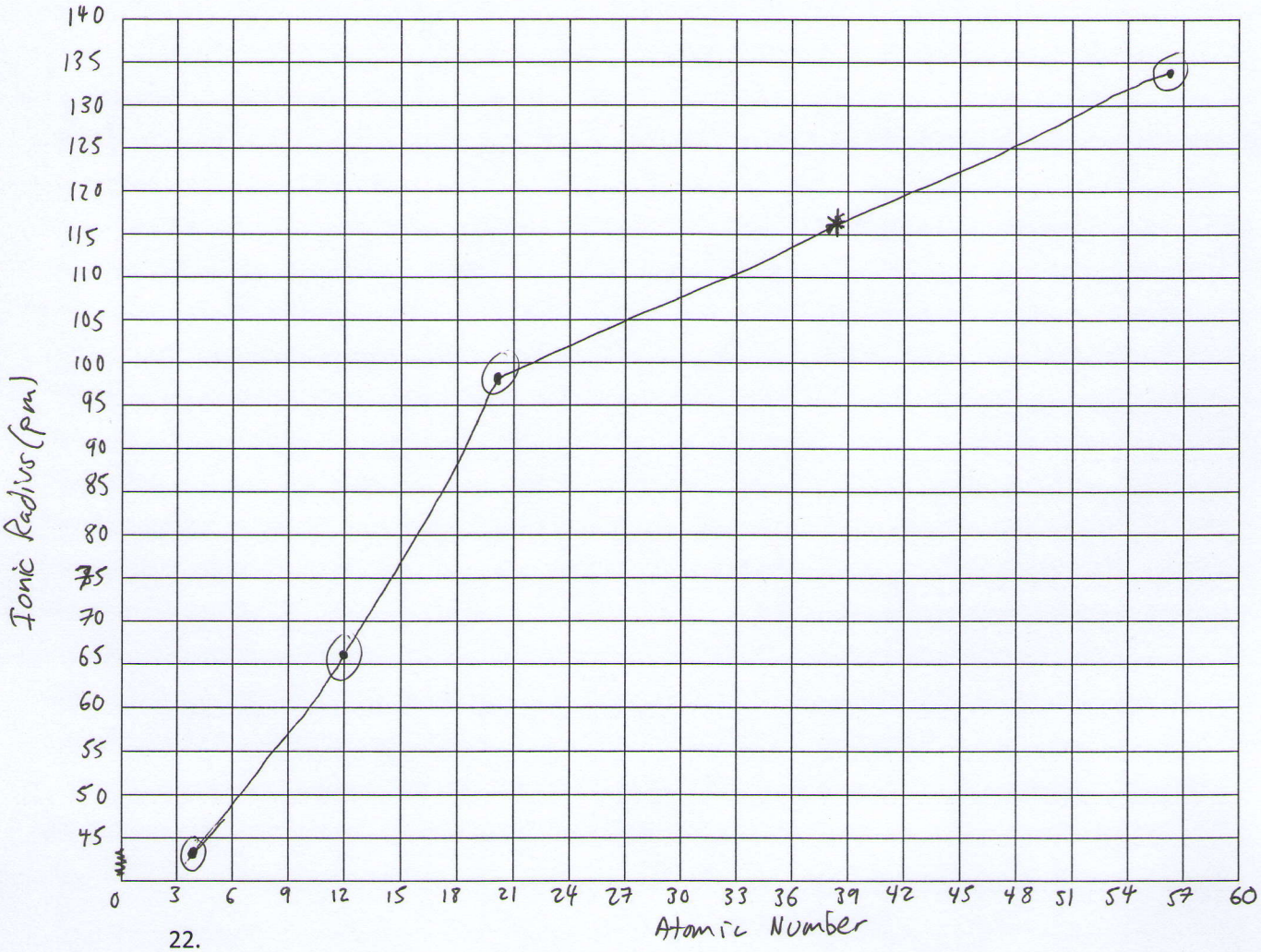
18. Explanation:

The O-H bond in water is more polar than the N-H bond in ammonia. because $\Delta EN(O\text{-}H) > \Delta EN(N\text{-}H)$. This is because $EN(H) < EN(N) < EN(O)$.

19. Lewis Structure:



Use the grid below for problems 20 – 21. Label all axes clearly.



22.

$Z(Sr) = 38$

Estimated ionic radius of strontium 116 pm

23. Trend:

The ionic radii of Group 2 elements increase in order of increasing atomic number because the principal quantum of the valence electrons grows with increasing atomic number for elements in the same group.

24. Explanation:

The ionic radius of Group 2 elements is smaller than their neutral atoms, since the removal of electrons to form X^{2+} ions causes less repulsion on the remaining electrons, allowing them to contract closer to the nucleus.