

Name: _____
Due: Tues, April 7, 2020 (or first day back from break)

Honors Chemistry
Pride of 2022

Honors Chemistry Review Packet - Spring Break

Directions:

- For all Multiple-Choice questions, please bubble in the sheet on the front side of the page
- All questions must display work habits, or the break packet will be considered **incomplete.**
- You will receive 2 grades, along with 2 work habits grades

• Multiple Choice Score:

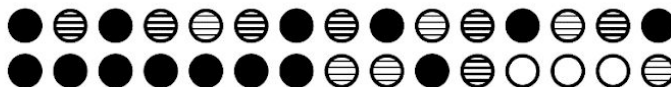
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• Work Habits Score:

- ✓ ++ (100%)
- ✓ +(95%)
- ✓ (85%)
- ✓ -(75%)
- ✓ - (65%)

- | | | | |
|---------------------------------|-----------------------------|-------------------------|-------------------------|
| 1. (A) (B) (C) (D) (E) (F) (G) | 16. (A) (B) (C) (D) (E) (X) | 31. (A) (B) (C) (D) (E) | 46. (A) (B) (C) (D) (E) |
| 2. (A) (B) (C) (D) (E) (F) (G) | 17. (A) (B) (C) (D) (E) (X) | 32. (A) (B) (C) (D) (E) | 47. (A) (B) (C) (D) (E) |
| 3. (A) (B) (C) (D) (E) (F) (G) | 18. (A) (B) (C) (D) (E) (X) | 33. (A) (B) (C) (D) (E) | 48. (A) (B) (C) (D) (E) |
| 4. (A) (B) (C) (D) (E) (F) (G) | 19. (A) (B) (C) (D) (E) (X) | 34. (A) (B) (C) (D) (E) | 49. (A) (B) (C) (D) (E) |
| 5. (A) (B) (C) (D) (E) (F) (G) | 20. (A) (B) (C) (D) (E) (X) | 35. (A) (B) (C) (D) (E) | 50. (A) (B) (C) (D) (E) |
| 6. (A) (B) (C) (D) (E) (F) (G) | 21. (A) (B) (C) (D) (E) (X) | 36. (A) (B) (C) (D) (E) | 51. (A) (B) (C) (D) (E) |
| 7. (A) (B) (C) (D) (E) (F) (G) | 22. (A) (B) (C) (D) (E) (F) | 37. (A) (B) (C) (D) (E) | 52. (A) (B) (C) (D) (E) |
| 8. (A) (B) (C) (D) (E) (F) (G) | 23. (A) (B) (C) (D) (E) (F) | 38. (A) (B) (C) (D) (E) | 53. (A) (B) (C) (D) (E) |
| 9. (A) (B) (C) (D) (E) (F) (G) | 24. (A) (B) (C) (D) (E) (F) | 39. (A) (B) (C) (D) (E) | 54. (A) (B) (C) (D) (E) |
| 10. (A) (B) (C) (D) (E) (F) (G) | 25. (A) (B) (C) (D) (E) (F) | 40. (A) (B) (C) (D) (E) | 55. (A) (B) (C) (D) (E) |
| 11. (A) (B) (C) (D) (E) (X) (X) | 26. (A) (B) (C) (D) (E) (F) | 41. (A) (B) (C) (D) (E) | 56. (A) (B) (C) (D) (E) |
| 12. (A) (B) (C) (D) (E) (X) (X) | 27. (A) (B) (C) (D) (E) (F) | 42. (A) (B) (C) (D) (E) | 57. (A) (B) (C) (D) (E) |
| 13. (A) (B) (C) (D) (E) (X) (X) | 28. (A) (B) (C) (D) (E) (X) | 43. (A) (B) (C) (D) (E) | |
| 14. (A) (B) (C) (D) (E) (X) (X) | 29. (A) (B) (C) (D) (E) (X) | 44. (A) (B) (C) (D) (E) | |
| 15. (A) (B) (C) (D) (E) (X) (X) | 30. (A) (B) (C) (D) (E) (X) | 45. (A) (B) (C) (D) (E) | |

Form Identifier — DO NOT MARK



These questions represent the type of questions you see on Recall quizzes, Mad Minutes, or vocabulary drills. Because of this, **time yourself. Answer each Skill Drill in 5 minutes or less to improve your fluency.**

SKILL DRILL 1: Preferred Charges & Ionic Bonding

Use each of the preferred charges below to answer questions 1 - 10. Note that answers may be used more than once or not at all.

- (A) [-3] (B) [-2] (C) [-1] (D) 0 (E) [+1] (F) [+2] (G) [+3]

- ___ is the preferred charge of halogens.
- ___ is the preferred charge of phosphorus.
- ___ is the preferred charge of calcium.
- ___ is the preferred charge of xenon.
- ___ is the charge of the unidentified atom, *X*, in the compound MgX .
- ___ is the charge of an atom that loses 2 electrons when forming an ion.
- ___ is the preferred charge of aluminum.
- ___ is the preferred charge of rubidium.
- ___ is the charge of the unidentified atom, *J*, in the ionic compound J_2O .
- ___ is the charge of the unidentified atom, *R*, in the ionic compound Na_3R .

11. When aluminum and chlorine form an ionic bond, the resulting formula is ___.

- (A) Al_3Cl (B) $AlCl$ (C) $AlCl_3$ (D) Al_3Cl_3

12. The correct name of the ionic compound SrS is ___.

- (A) strontium (I) sulfide (C) strontium sulfide
(B) strontium (II) sulfide (D) strontium sodium

13. Which of the following pairs is *unlikely* to form a compound?

- (A) potassium and iodine (C) calcium and chlorine
(B) iron and sulfur (D) neon and argon

14. The chemical formula for lithium oxide is ___.

- (A) LiO (B) Li_2O (C) LiO_2 (D) Li_2O_3

15. The Lewis dot structure shown to the right represents an atom of an unknown metallic element, *M*. When atoms of this unknown metal react with oxygen, a compound is formed. Which of the following is the *most likely* chemical formula of the resulting metal oxide?

- (A) MO (B) MO_2 (C) M_2O (D) M_2O_3



SKILL DRILL 2: Transition Metals & Polyatomic Ions

16. When aluminum and phosphate form an ionic bond, the resulting formula is ____.

- (A) $\text{Al}(\text{PO}_4)_3$ (B) AlPO_4 (C) Al_3PO_4 (D) $\text{Al}_3\text{PO}_{12}$

17. The correct name of the compound $\text{Ni}(\text{NO}_3)_2$ is ____.

- (A) nickel nitrate (C) nickel (II) nitrate
(B) nickel (II) mononitride trioxide (D) nickel (IV) nitrate

18. What is the correct name for the compound with the chemical formula NH_4NO_3 ?

- (A) ammonia nitrate (C) nitrogen tetrahydride nitrate
(B) ammonia mononitrate (D) nitro-hydrogen nitrate

19. Oxygen atoms have ____ valence electrons, beryllium atoms have ____ valence electrons, and when the two form a compound, the correct chemical formula is ____.

- (A) 2, 2, BeO (B) 6, 2, Be_2O (C) 2, 6, OBe (D) 6, 2, BeO

20. Unknown element *L* has 3 valence electrons and unknown element *Z* has 7 valence electrons. What is the likely chemical formula of the ionic compound formed between the two elements?

- (A) LZ_3 (B) L_3Z (C) L_3Z_3 (D) L_7Z_3 (E) L_7Z_7

21. Limestone is a naturally occurring form of calcium carbonate. The correct formula for limestone is

- (A) $\text{Ca}(\text{CO}_3)_2$ (B) CaCO_3 (C) Ca_2CO_3 (D) $\text{Ca}_2(\text{CO}_3)_2$

For each of the following compounds, determine the correct formula or name.

22. Iron (II) chloride

- (A) FeCl (B) FeCl_2 (C) Fe_2Cl (D) FeCl_3 (E) Fe_2Cl_2 (F) Fe_3Cl_2

23. PdO

- (A) palladium oxide (C) palladium (IV) oxide (E) palladium (II) oxide
(B) platinum oxide (D) platinum (II) oxide (F) palladium (VI) oxide

24. Technetium (IV) carbonate

- (A) $\text{Tc}_2(\text{CO}_3)_4$ (B) TcCO_3 (C) $\text{Tc}_2(\text{CO}_3)_2$ (D) $\text{Tc}(\text{CO}_3)_2$ (E) $\text{Tc}_4(\text{CO}_3)_2$ (F) TcCO_{12}

25. $(\text{NH}_4)_2\text{S}$

- (A) ammonium (I) sulfide (C) ammonium (II) sulfide (E) nitrogen tetrahydride sulfide
(B) ammonium sulfide (D) dinitrogen tetrahydride (F) nitrogen sulfide

26. $\text{Co}_3(\text{PO}_4)_2$

- (A) cobalt (I) phosphate (C) cobalt (II) phosphate (E) cobalt (III) phosphate
(B) cobalt (II) phosphide (D) cobalt phosphite (F) cobalt phosphorus tetrahydride

27. titanium (IV) sulfate

- (A) Ti_2SO_4 (B) $\text{Ti}_2(\text{SO}_4)_4$ (C) TiSO_4 (D) Ti_4SO_4 (E) $\text{Ti}(\text{SO}_4)_2$ (F) TiSO_{16}

28. How many different elements are in the compound sodium carbonate?

- (A) 1 (B) 2 (C) 3 (D) 6 (E) 7
-

29. What is true about the melting points of ionic and covalent compounds?

- (A) The melting points of ionic and covalent compounds are usually similar.
(B) The melting points of ionic compounds are lower than the melting points of covalent compounds.
(C) The melting points of ionic and covalent compounds increase with the number of atoms present in the compound.
(D) The melting points of ionic compounds are higher than the melting points of covalent compounds.
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Comparison of Two Bond Types

Bond Type X	Bond Type Y
makes compounds	makes molecules
transfers, gives/takes electrons resulting in a noble configuration	shares electrons resulting in a noble configuration
made with metals and nonmetals	made of nonmetals
examples: NaCl, CaCl ₂	examples: H ₂ O, CO ₂ , NH ₃ , CH ₄

30. Which of these correctly identifies the bond types?

- (A) X is ionic; Y is covalent. (C) Both bonds are ionic.
(B) X is covalent; Y is ionic. (D) Both bonds are covalent.

31. Unidentified element *M* is in group 3A and unidentified element *G* has 6 valence electrons. If these two atoms bond, what will occur?

- (A) Three electrons will be transferred from element *M* to element *G*, forming an ionic bond.
(B) Six total electrons will be transferred from 2 atoms of element *M* to 3 atoms of element *G*, forming an ionic bond.
(C) Elements *M* and *G* will share four total electrons, resulting in a covalent bond.
(D) Six total electrons will be transferred from 3 atoms of element *G* to 2 atoms of element *M*, forming an ionic bond.

32. The label to the right contains information about an unknown metal. Note that "salts" refers to ionic compounds. Based on this information, the unknown metal, *M*, likely has _____ valence electrons.

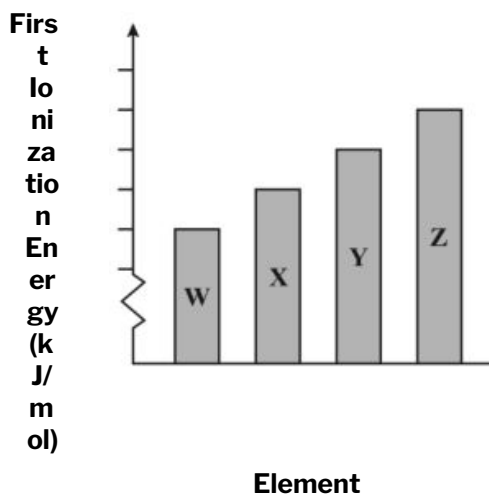
- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

UNKNOWN METAL, <i>M</i> Most common salts MPO ₄ M ₂ O ₃ MCl ₃

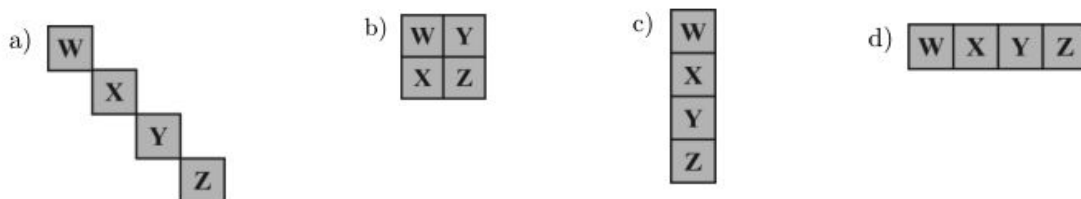
33. Which of the following salts releases the greatest amount of lattice energy?

- (A) BaCl₂ (B) CaCl₂ (C) BeCl₂ (D) RaCl₂ (E) MgCl₂

The bar graph below represents four elements and their relative ionization energies. Use this information to answer questions 34 – 35.



34. What would be the *most likely* positioning of these unknown elements in the periodic table?



35. The reasoning that best supports the positioning you chose in Q57 is ____.

- (A) Down a family, the effective nuclear charge of elements increases.
- (B) Down a family, the effective nuclear charge of elements decreases.
- (C) Across a period, the effective nuclear charge of elements increases.
- (D) Across a period, the effective nuclear charge of elements decreases.

36. A ninth grader is designing an experiment to rank the melting points of three different salts, shown below. Use your knowledge of lattice energy to make a prediction by ranking the salts from lowest to highest melting point.

- i. calcium sulfide chloride
- ii. lithium chloride
- iii. lithium bromide
- iv. calcium chloride

- (A) i, ii, iii, iv
- (B) iii, ii, iv, i
- (C) i, iv, ii, iii
- (D) iii, ii, i, iv
- (E) ii, iii, iv, i

37. The distance between two charges is increased by a factor of 2. What will happen to the resulting coulombic force if the magnitude of charges remains constant? The force will be ____ its original value.

- (A) $\frac{1}{16}$
- (B) $\frac{1}{4}$
- (C) $\frac{1}{2}$
- (D) 2x
- (E) 4x

38. The distance between two charges is decreased by a factor of 2 and the magnitude of one charge is doubled. What will happen to the resulting coulombic force? The force will be ____ its original value.

- (A) the same as (B) $\frac{1}{12}$ (C) $\frac{1}{4}$ (D) 4x (E) 12x

Use the full electron configurations below to answer the questions that follow. Note that you may use these answer choices more than once or not at all.

- (A) $1s^2 2s^2 2p^6 3s^2$ (C) $1s^2 2s^2 2p^6 3s^2 3p^1$
 (B) $1s^2 2s^2 2p^6 3s^2 3p^6$ (D) $1s^2 2s^2 2p^5$

39. The ground state configuration for an ion of a halogen with its preferred charge is ____.

40. The ground state configuration for an ion of an alkaline earth metal with its preferred charge is ____.

41. The ground state configuration for a neutral atom of an alkaline earth metal is ____.

42. The ground state configuration for a neutral atom of a halogen is ____.

Use the data below to answer question 43

	I	II	III	IV	IV	IV	IV
Ionization Energies of Element Z (kJ/mol)	999	2252	3357	4556	7004	8495	27107

43. If the element has 3 energy levels, the identity is likely ____.

- (A) sodium (B) sulfur (C) aluminum (D) silicon

44. Which of the following compounds will have the highest melting point?

- (A) SrS (B) BaS (C) BeS (D) MgS

45. Which of the following compounds will release the greatest lattice energy upon formation?

- (A) Na_2P (B) NaCl (C) $GaCl_3$ (D) Mg_3N_2

Bubble in (A) for ionic or (B) for covalent beside each of the following compounds to indicate the type of bonding involved.

46. _____ SO_2

47. _____ BrF_5

48. _____ $SeCl_2$

49. _____ NaI

50. _____ N_2O

51. _____ Mg_3P_2

52. _____ K_2O

53. _____ H_2O

54. _____ $COCl_2$

55. _____ $CoCl_2$

56. _____ NiO

57. _____ $SrCl_2$