**Name : Block :**

1. Elements in Group 17 have similar chemical properties. Explain why they have such similarities, using actual electron configurations to support your answer.

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1. Identify the following elements, families or parts of the periodic table. Use symbols for specific elements; where applicable, use the correct name for families and parts of the periodic table.
   1. 2nd period halogen \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Highest ionization energy in group 15 \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Element with 6 outer s and p electrons in 4th period \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Smallest atom in 5th period \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Weakest attraction for electrons in 3rd period \_\_\_\_\_\_\_\_\_\_\_\_\_
   6. Family whose atoms have two weakly held electrons \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. Part of the periodic table where d-orbitals are filled \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. Element X is in the 4th period. It combines with F to form XF3. X is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why do atomic radii increase going down a group in the periodic table?

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1. Why do atomic radii decrease from left to right across a period in the periodic table?

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1. Using C and Si to illustrate your answer, show your understanding of the terms *nuclear charge* and *shielding*:
2. State the nuclear charge of C and Si \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. State the # of shielding electrons for C and for Si \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What observation does the ***shielding effect*** explain?

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1. Which of the following pairs has the greatest attraction for its outer electrons? Briefly explain your choice..
2. K or Cs \_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Bror Kr \_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Na or Ne \_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Mg+2 or Mg \_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. A potassium atom readily loses an electron to form a positive ion. How does the size of the ion compare with the neutral atom? Explain why the size changes as it does.
7. An oxygen atom will gain two electrons and form an O-2 ion.
8. Give the electron configuration for an oxygen atom: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Why does O gain two electrons?
10. How does the size of the O-2 ion compare with the neutral atom? Why?
11. Consider the neutral atoms of I, Xe, Cs, and Ba. Which element has:
12. The largest ionization energy? \_\_\_\_\_\_\_\_\_\_
13. The largest atomic radius? \_\_\_\_\_\_\_\_\_\_
14. The ions Ca2+ and S2– have the same number of electrons: Which one is larger? Explain.
15. a) State the two directions within the periodic table in which the ionization energies are increasing:

Circle the correct number: 1) → and ↓ 2) → and ↑ 3) ← and ↓ 4) ← and ↑

b) What explains this trend?

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1. Define ***electronegativity***: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Which of P and Ne has the greater electronegativity? Explain why.

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1. What is an open shell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. a) What are ***valence electrons***? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) How many valence electrons does phosphorus have? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a) What is the ***valence*** of an atom? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What is the valence of phosphorus? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the charge on a…
   1. strontium ion? \_\_\_ b) strontium nucleus? \_\_\_ c) strontium atom? \_\_\_
2. Write the formulae of the ions which make up sodium selenide. \_\_\_\_\_\_ and \_\_\_\_\_\_
3. Define ionic, covalent and polar covalent bonds. Include an explanation of what determines

the nature of a given bond.

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1. What is the difference between a single, double and triple bond? Which is stronger? Explain.

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1. What is the predicted formula and classification (*ionic* or *covalent*) for each of the following pairings?

***Formula Classification***

* 1. Magnesium and phosphorus \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Carbon and iodine \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Ca2+ and PO43– \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. Arsenic and oxygen \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Of MgCl2 and SrI2, which would you predict should have the higher melting point? Why?

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1. Of NaCl and MgS, which would you predict should have the higher melting point? Why?

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1. Draw the Lewis structure for the chlorate anion. Describe the structural pair geometry and the molecular shape.
2. Draw the Lewis structures for each of the following compounds (***show your e – counts***):
   1. BaCl2 b) CH2Cl2 e) BF33–

c) CH4O d) C2Cl2

1. What are the two requirements necessary for a molecule to be polar?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Given SbH2–, **i)** draw the Lewis structure,

**ii)** label the bonding pairs (***bps***) and non-bonding pairs (***nbps***),

**iii)** state the structural pair geometry,

**iv)** state the molecular shape

**v)** identify as ***polar*** or ***non-polar***.

1. What type of forces are dipole-dipole and London forces? Explain the difference between them.

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1. Predict the expected formula for the compound formed when each type of the given atoms combine based on valence. Classify the bonds as covalent, polar covalent, or ionic.

a) **Ca** and **F** b) **C** and **I** c) **Fr** and **Se** d) **N** and **F**

**Formula:** \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_

**Bond Type:** \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_