

## Chemistry Level 2: Midterm I, Chapters 1-5

1. Name the three basic particles in an atom; indicate its electric charge and what charge does it have:

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2. In its nucleus, an element has 126 protons, how many electrons does it have?

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3. What is the atomic mass (in amu) of an atom that has 35 protons and 42 neutrons in its nucleus?

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4. In your own words explain the significance of the *Periodic Table of Elements*:

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5. List the atomic numbers of the noble gases:

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List the atomic numbers of the alkali metals:

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List the atomic numbers of the halogens:

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6. How many moles of atoms are in 12.01 grams of carbon? \_\_\_\_\_

7. How many grams would 5 moles of carbon weigh?

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8. Describe what an orbital is:

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9. Name and draw the three 2p orbitals:

10. What are the names of the two rules for filling electron orbitals?

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11. Explain what is special about the orbitals for the noble gases, and how are the orbitals for the alkali metals and halogens different from the noble gases?

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12. What is the difference between core and valence electrons?

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13. The element Carbon had an electron configuration of  $1s^2 2s^2 2p^2$ , identify the core electrons and valence electrons.

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14. Explain what an ion is.

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15. How many electrons does lithium lose and fluorine gain to form the ionic compound, LiF?

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16. Explain how a covalent bond can form.

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17. Name the molecular bonding orbital for molecular hydrogen.

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18. What kind of molecular orbital is formed by two side-by-side  $p$  orbitals?

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19. List the three types of hybrid orbitals:

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20. Discuss what the basis for a chemical reaction is:

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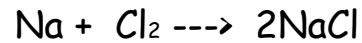
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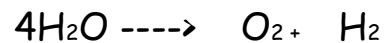
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21. Balance the following equations:

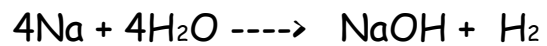
a. Combination reaction



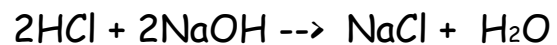
b. Decomposition reaction



c. Displacement reaction



d. Exchange reaction



22. Give the meaning of monoprotic and name one common monoprotic acid:

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23. Define an Arrhenius acid and base.

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24. Calculate molarity:

a. 2 moles of HCl in 5 liters.

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b. 4 moles of NaOH in 2 liters.

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c. 0.5 moles of HCl in 1 liter.

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d. 72 grams of HCl in 1 liter.



