

Honors Chem Review
Sample SAT II Questions

Part A

Directions: Each set of lettered choices below refers to the numbered formulas or statements immediately following it. In each set, a choice may be used once, more than once, or not at all.

Note: For all questions involving solutions and/or chemical equations, you can assume that the system is in water unless otherwise stated.

Questions 1-5

- (a) atomic mass
- (b) atomic number
- (c) atomic radius
- (d) electronegativity
- (e) ionization energy

1. Takes into account various isotopes of an atom.
2. Determines how electron density is shared when an atom forms a bond.
3. Average distance between the nucleus and the outermost electron.
4. Number of protons in an element.
5. Energy required to remove an electron.

Questions 6-8

- (a) Na
- (b) Fe
- (c) Cl⁻
- (d) Rb
- (e) Ca⁺

6. Has a filled 4p orbital
7. All of the electrons are paired in this ion.
8. Electron configuration is:
 $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$

Questions 9-12

- (a) cation
- (b) inert gas
- (c) crystal
- (d) anion
- (e) element

9. Cannot be further broken down by chemical means.
10. Ionic species with a positive charge.
11. Has an octet of valence electrons.
12. Defined by the number of protons

27. Which atom has an ionic radius that is larger than its atomic radius?

- (a) Na
- (b) K
- (c) Mg
- (d) Ca
- (e) Cl

32. Which of the following would be different in a ground state and an excited state neon atom?

- (a) the number of neutrons
- (b) the number of electrons
- (c) the atomic weight (mass)
- (d) the electronic configuration
- (e) Everything would remain the same.

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36. Which of the following has the most polar bond?

- (a) N—O
- (b) C—H
- (c) C—C
- (d) H—F
- (e) none of the bonds are polar

39. Which of the following compounds contains both ionic and covalent bond?

- (a) C₄H₁₆
- (b) MgCl₂
- (c) (NH₄)₂SO₄
- (d) H₂O
- (e) C₂H₄

47. Electron density studies have revealed that X and Y have an equal number of electrons. Which of the following could X and Y be?

- (a) Ca⁺ and K
- (b) H⁺ and He
- (c) Cl and F
- (d) O⁻ and S⁺
- (e) none of the above

48. All halogens have similar reactivity because

- (a) they have the same number of protons
- (b) they have the same number of electrons
- (c) they have similar outer shell electron configurations
- (d) they have valence electrons with the same quantum numbers
- (e) they have the same number of neutrons

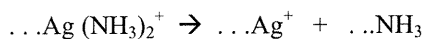
49. K⁺ and Cl⁻ have the same

- (a) atomic weight
- (b) electronic configuration
- (c) ionization potential
- (d) number of protons and neutrons
- (e) atomic radius

50. Which of the following has the largest ionic radius?

- (a) Na⁺
- (b) K⁺
- (c) Mg²⁺
- (d) Al³⁺
- (e) Cl⁻

Questions 52 & 54 refer to the following equation:



52. What is the sum of the coefficients once the equation is balanced?

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) 5

54. What is the percent composition by weight of Ag in Ag(NH₃)₂⁺?

- (a) 4.2
- (b) 19.6
- (c) 76.1
- (d) 80.3
- (e) 95.8

69. An oxide of arsenic contains 65.2% arsenic by weight. What is its simplest formula?

- (a) AsO
- (b) As₂O₃
- (c) AsO₂
- (d) As₂O₅
- (e) As₂O

Part B

Directions: Each question below consists of two statements, statement I in the left-hand column and statement II in the right-hand column. For each question, determine whether statement I is true or false and whether statement II is true or false. Then, fill in the corresponding T or F ovals on the answer sheet. Fill in oval CE only if statement II is a correct explanation of statement I.

| | I | | II |
|------|--|---------|--|
| 101. | Diamond and graphite are both substances made of carbon, but have different properties | BECAUSE | They are composed of different isotopes |
| 102. | Na and Cl form an ionic bond | BECAUSE | Cl donates an electron to Na |
| 104. | Hydrogen and deuterium are different elements | BECAUSE | They have a different number of protons. |
| 105. | On the periodic table, atomic radius increases from left to right | BECAUSE | The number of protons is increasing |
| 106. | An element with an atomic number of X and a mass number of N has $N - X$ neutrons | BECAUSE | Elements have more neutrons than protons |
| 108. | Sulfur chemically resembles oxygen | BECAUSE | They are in the same period. |