

Test bank chapter (2)

Choose the correct answer

NOTE: A periodic table is required to work many of the problems in this chapter.

1. Which of these elements is most likely to be a good conductor of electricity?
 - a) N
 - b) S
 - c) He
 - d) Fe
2. An atom of the isotope sulfur-31 consists of how many protons, neutrons, and electrons?
(p = proton, n = neutron, e = electron)
 - a) 15 p, 16 n, 15 e
 - b) 16 p, 15 n, 16 e
 - c) 16 p, 31 n, 16 e
 - d) 32 p, 31 n, 32 e
3. A magnesium ion, Mg^{2+} , has
 - a) 12 protons and 13 electrons.
 - b) 24 protons and 26 electrons.
 - c) 12 protons and 10 electrons.
 - d) 24 protons and 22 electrons.
4. Which of these pairs of elements would be most likely to form an ionic compound?
 - a) P and Br
 - b) Cu and K
 - c) C and O
 - d) O and Zn
5. The elements in a column of the periodic table are known as
 - a) metalloids.
 - b) a period.
 - c) noble gases.
 - d) a group.

6. Which is the correct formula for copper (II) phosphate?
- a) Cu_2PO_4
 - b) $\text{Cu}_3(\text{PO}_4)_2$
 - c) Cu_2PO_3
 - d) $\text{Cu}(\text{PO}_4)_2$
7. The correct name for NH_4NO_3 is
- a) ammonium nitrate.
 - b) ammonium nitrogen trioxide.
 - c) ammonia nitrogen oxide.
 - d) hydrogen nitrogen oxide.
8. What is the formula for the ionic compound formed by calcium ions and nitrate ions?
- a) Ca_3N_2
 - b) $\text{Ca}(\text{NO}_3)_2$
 - c) Ca_2NO_3
 - d) Ca_2NO_2
9. The Stock system name for Mn_2O_7 is
- a) dimanganese heptaoxide.
 - b) magnesium oxide.
 - c) manganese(VII) oxide.
 - d) manganese(II) oxide.
10. Which of these elements is chemically similar to oxygen?
- a) sulfur
 - b) calcium
 - c) iron
 - d) nickel
11. The formula of stannic oxide is SnO_2 . The valence of Sn is:
- a) +1
 - b) +2
 - c) +3
 - d) +4

Explanation: To know the charge on Sn atom, make this simple calculation remember that the charge on oxygen atom is -2, let X is the charge on Sn atom

$X + (-2 \text{ (charge on O)} \times 2 \text{ (number of O atoms)}) = 0$ (equal zero because the compound is neutral)

$X - 4 = 0 \gg \gg \gg \gg \gg x = + 4$

12. Which pair of atoms constitutes a pair of isotopes of the same element?

- | | | |
|------|------------------------|---------------------|
| (a). | ${}^1_6\text{X}$ | ${}^1_7\text{X}$ |
| (b). | ${}^{14}_6\text{X}$ | ${}^{12}_6\text{X}$ |
| (c). | ${}^{17}_9\text{X}$ | ${}^{17}_8\text{X}$ |
| (d). | ${}^{19}_{10}\text{X}$ | ${}^{19}_9\text{X}$ |

Explanation: Isotopes of an element are atoms of the same element with same number of protons but different number of neutrons. Only choice (b) has 2 atoms of X with 6 protons and 8 and 6 neutrons respectively.

13. Elements in Group 8A are known as the_____.

- a) chalcogens
- b) alkali metals
- c) noble gases**
- d) alkaline earth metals

14. _____typically forms ions with a +2 charge.

- a) Transition metals
- b) Halogens
- c) Alkaline earth metals**
- d) Alkali metals

Explanation: The alkaline earth metals are in group 2A of the periodic table and lose 2 electrons to form cations with 2 positive charges.

15. An *anion* is defined as

- a) a charged atom or group of atoms with a net negative charge.**
- b) a stable atom.
- c) a group of stable atoms.
- d) an atom or group of atoms with a net positive charge.

16. A cation is defined as

- a) a charged atom or group of atoms with a net negative charge.
- b) a stable atom.
- c) a group of stable atoms.
- d) an atom or group of atoms with a net positive charge.**

17. Atoms of the same element with different mass numbers (or number of neutrons) are called

- a) ions.
- b) neutrons.
- c) chemical families.
- d) isotopes.**

18. How many neutrons are there in an atom of lead ${}_{82}\text{Pb}$ whose mass number is 208?

- a) 82
- b) 126**
- c) 208
- d) 290

19. An atom of the isotope ${}^{16}\text{S}$ -31 consists of how many protons, neutrons, and electrons?

- a) 15 p, 16 n, 15 e
- b) 16 p, 15 n, 16 e**
- c) 16 p, 31 n, 16 e
- d) 32 p, 31 n, 32 e

20. A magnesium ion, ${}_{20}\text{Ca}^{2+}$, has

- a) 20 protons and 22 electrons.
- b) 20 protons and 20 electrons.
- c) 20 protons and 18 electrons.**
- d) 22 protons and 20 electrons.

21. A sulfide ion, ${}_{16}\text{S}^{2-}$, has:

- a) 16 protons and 16 electrons
- b) 32 protons and 16 electrons
- c) 16 protons and 14 electrons
- d) 16 protons and 18 electrons**

22. Which of these pairs of elements would be most likely to form a molecular compound?

- a) Na and Br
- b) Ca and O
- c) C and O**
- d) Zn and O

23. What is the formula for the ionic compound formed by calcium ions and nitrate ions?

- a) Ca_3N_2
- b) $\text{Ca}(\text{NO}_3)_2$**
- c) Ca_2NO_3
- d) Ca_2NO_2

24. Which is the correct formula for copper(II) phosphate?

- a) Cu_2PO_4
- b) $\text{Cu}_3(\text{PO}_4)_2$**
- c) Cu PO_4
- d) $\text{Cu}(\text{PO}_4)_2$

25. The correct name for NH_4NO_3 is

- a) ammonium nitrate.**
- b) ammonium nitrogen trioxide.
- c) ammonia nitrogen oxide.
- d) hydrogen nitrogen oxide.

26. The correct name for PCl_5 is

- a) monophosphate pentachloride
- b) phosphorus chloride
- c) monophosphate tetrachloride
- d) Phosphorus pentachloride**

27. Which of the following expressions represents two molecules of water?

- a) H_2O
- b) H_2O_2
- c) $2 \text{H}_2\text{O}$**
- d) 2HO_2

28. The empirical formula of a compound with molecules containing 12 carbon atoms, 14 hydrogen atoms, and 6 oxygen atoms is _____.

- a) $\text{C}_{12}\text{H}_{14}\text{O}_6$
- b) $\text{C}_2\text{H}_4\text{O}$
- c) CH_2O
- d) $\text{C}_6\text{H}_7\text{O}_3$**

Explanation: The empirical formula is always the simplest possible whole number ratio between the atoms of the molecules.

29. The charge on the manganese in the salt MnF_3 is _____.

- a) +1
- a) -1
- c) +3**
- d) -2

Explanation: Since every F has one negative charge, the Mn can have only 3 positive charges.

30. Magnesium reacts with a certain element to form a compound with the general formula MgX . What would the most likely formula be for the compound formed between potassium and element X?

- a) KX
- b) K_2X_2
- c) K_2X_3
- d) **None of the above**

Explanation: In the compound MgX , X must have 2 negative charges since Mg will always have 2 positive charges. The element K will always form an ion with 1 positive charge and hence the only combination of K and X could be K_2X , which is not one of the options.

31. Barium forms an ion with a charge of_____.

- a) +1
- b) -2
- c) +3
- d) **None of the above.**

Explanation: Barium is in group 2A of the periodic table and forms ions with only 2 positive charges.

31. Aluminum forms an ion with a charge of_____.

- a) +2
- b) -3
- c) **+3**
- d) +1

32. Iodine forms an ion with a charge of_____.

- a) -7
- b) +1
- c) **-1**
- d) +2

33. The chemical symbol for the ion with 11 protons and 10 electrons.

- a) Na
- b) F^-
- c) Ne
- d) **Na^+**

34. Which of these compounds is a binary compound?

- a) **NaCl**
- b) MgSO₄
- c) NaOH
- d) HCN

35. Atoms with the same number of electrons and number of protons are called...

- a) ions
- b) isotopes
- c) **neutral atoms**
- d) different atoms

36. Atoms which have different number of electrons are called...

- a) **ions**
- b) isotopes
- c) neutral atoms
- d) different atoms

37. Use the following table and choose which of the species are positively charged?

Atom or ion element	I	II	III	IV	V	VI
Atom or ion electrons (e)	6	10	18	10	28	7
Atom or ion protons (p)	6	8	17	11	30	7
Atom or ion neutrons (n)	6	8	18	11	36	6

- A. III and V
- B. **IV and V**

- C. II and III
- D. I and VI

38. Which isotope has 45 neutrons?

- (a). ⁸⁰₃₆Kr
- (b). ⁷⁸₃₄Se
- (c). ⁸⁰₃₅**Br**
- (d). ³⁴₁₇Cl

39. In the periodic table, the elements are arranged in_____.

- a) alphabetical order
- b) **order of increasing atomic number**
- c) order of increasing metallic properties
- d) order of increasing neutron content

40. An element in the upper right corner of the periodic table is _____.
- either a metal or metalloid
 - a metal
 - a non-metal**
 - either a metalloid or a non-metal
41. An element that appears in the lower left corner of a periodic table is _____.
- either a metal or metalloid
 - a metal**
 - either a metalloid or a non-metal
 - a non-metal
42. A molecular formula always indicates _____.
- how many of each atom are in a molecule**
 - the simplest whole-number ratio of different atoms in a compound
 - which atoms are attached to which in a molecule
 - the isotope of each element in a compound
 -
43. An empirical formula always indicates _____.
- which atoms are attached to which in a molecule
 - how many of each atom are in a molecule
 - the simplest whole-number ratio of different atoms in a compound**
 - the geometry of a molecule
44. There are _____ protons, _____ neutrons, and _____ electrons in $^{131}\text{I}^-$.
- 131, 53, and 54
 - 131, 53 and 52
 - 53, 78, and 54**
 - 53, 131, and 52
45. Which species has 48 electrons?
- $^{118}_{50}\text{Sn}^{+2}$
 - $^{116}_{50}\text{Sn}^{+4}$
 - $^{112}_{48}\text{Cd}^{+2}$
 - $^{68}_{31}\text{Ga}$