

Chemistry Diagnostic Questions

Answer these 40 multiple choice questions and then check your answers, located at the end of this document. If you correctly answered **less than 25 questions**, you need to enrol in a Chemistry Bridging Course.

- 1. The symbol for the element silicon is:**
 - a) S
 - b) Se
 - c) Sr
 - d) Si

- 2. When a metal atom forms a metallic ion, it usually:**
 - a) gains one or more protons
 - b) loses one or more electrons
 - c) gains one or more electrons
 - d) loses one or more protons

- 3. Atom X has 12 protons in its nucleus. The formula of its chloride would be:**
 - a) XCl
 - b) XCl₂
 - c) XCl₃
 - d) X₂Cl
 - e) X₂Cl₃

- 4. An element has the electronic configuration: 2,8,8,2. The oxide of the element would be:**
 - a) molecular
 - b) non-polar covalent
 - c) ionic
 - d) polar covalent

5. An element has the electronic configuration: 2, 7.
When this element combines with sodium, what type of compound is formed?
- molecular
 - ionic
 - non-polar covalent
 - polar covalent
6. Which ground state electronic configuration represents a noble gas?
- $1s^2 2s^1$
 - $1s^2 2s^2 2p^6$
 - $1s^2 2s^2 2p^6 3s^2$
 - $1s^1$
7. The formula for iron(III) nitrate is:
- Fe_3NO_3
 - Fe_2NO_3
 - $Fe(NO_3)_3$
 - $FeNO_3$
8. Which ground state electronic configuration represents a metal?
- $1s^2 2s^2 2p^6$
 - $1s^2 2s^2 2p^5$
 - $1s^2 2s^1$
 - $1s^2$
9. The nucleus of $^{23}_{11}\text{Na}$ contains:
- 23 protons and 11 neutrons
 - 23 protons and 11 electrons
 - protons and 12 electrons
 - 11 protons and 12 neutrons

10. Different isotopes of an element have the same number of:

- a) electrons and neutrons
- b) protons
- c) neutrons
- d) electrons and protons

11. Given the relative atomic masses of carbon hydrogen and oxygen are respectively 12.0, 1.0 and 16.0, the relative formula mass of propanoic acid ($\text{CH}_3\text{CH}_2\text{COOH}$) is:

- a) 68
- b) 74
- c) 63
- d) 59

12. The symbol for the element calcium is:

- a) C
- b) Cl
- c) Ca
- d) Cr

13. Acetone, CH_3COCH_3 , is a liquid commonly used as a solvent. According to the formula, which of the following statements is false?

- a) Acetone is a compound, not an element.
- b) Acetone has a fixed composition.
- c) Each molecule of acetone is made up of 10 atoms.
- d) One mole of acetone contains 3 moles of carbon atoms, 6 moles of hydrogen atoms and one mole of oxygen atoms.
- e) Acetone is a substance made up of 6 elements.

14. Magnesium has an atomic number of 12 and chlorine has an atomic number of 17. The correct formula for magnesium chloride is:

- a) MgCl
- b) MgCl₂
- c) Mg₂Cl
- d) Mg₂Cl₂
- e) Mg₃Cl₂

15. Ice floats in liquid water because of a lattice structure that is held together by:

- a) ionic bonds
- b) hydrogen bonds
- c) covalent bonds
- d) ionic and covalent bonds

16. Which of the following atoms would be the strongest electron acceptor?

- a) ${}_6\text{C}$
- b) ${}_9\text{F}$
- c) ${}_{19}\text{K}$
- d) ${}_7\text{N}$
- e) ${}_{32}\text{S}$

17. Which is the most common type of molecule of living organisms?

- a) H₂O
- b) CO₂
- c) O₂
- d) NH₃

18. The atomic number of an element is the:

- a) mass number
- b) number of protons in the nucleus
- c) number of neutrons in the nucleus
- d) number of electrons surrounding the nucleus

19. The mass number of an element is 19 and the atomic number is 9. The total number electrons in the atom is:

- a) 19
- b) 9
- c) 29
- d) 10

20. The atom z has a mass number of 32. It contains in its nucleus:

- a) 32 protons
- b) 32 protons and 32 electrons outside the nucleus
- c) a total of 40 protons and neutrons
- d) 16 protons and 16 neutrons

21. A compound XCl_2 is commonly formed dichloride, of which of the following groups of elements:

- a) Mn, O, Ca, Cs
- b) Mg, B, Sr, O
- c) S, N, Al, P
- d) Ba, Sr, Mg, Be
- e) F, Al, N, O

22. The amount in moles of carbon atoms contained in 160 g silicon carbide (SiC) is:

[A = 12 for C]

[A = 28 for Si]

- a) 2
- b) 4
- c) 6
- d) 48
- e) 13

23. The rate of a chemical reaction:

- a) is the speed of the reaction
- b) has to be determined experimentally
- c) is always constant
- d) is constant at a particular temperature

24. The rate of a chemical reaction usually:

- a) is the speed of the reaction
- b) decreases with time
- c) increases with increase in temperature
- d) increases as the concentration of a reactant increases.

25. The bond between sodium and chlorine in the compound sodium chloride (NaCl) is a/an:

- a) single covalent bond
- b) non-polar covalent bond
- c) ionic bond
- d) double covalent bond

26. Which of the following equations illustrates a typical decomposition reaction?

- a) $A + B \rightarrow AB$
- b) $2A_2 + B_2 \rightarrow 2A_2B$
- c) $AB + CD \rightarrow AD + CB$
- d) $AB \rightarrow A + B$

27. Carbohydrates, lipids and proteins are formed from their basic building blocks by the

- a) addition of carbon to each molecule
- b) addition of oxygen to each molecule
- c) addition of a water molecule between the building blocks
- d) removal of water molecule between the building blocks

28. Of the following choices, the pH of the least acidic solution is:

- a) 6.0
- b) 4.5
- c) 2.3
- d) 1.0

29. Isotopes of an element differ from each other in the number of:

- a) protons
- b) neutrons
- c) electrons
- d) positrons

Use the following equation for Questions 30 and 31



30. The (g) indicates a:

- a) solid
- b) liquid
- c) gas
- d) gel

31. When the equation is balanced, the number in front of H_2SO_4 is:

- a) 1
- b) 2
- c) 3
- d) 4

32. The addition of a catalyst will speed up:

- a) the forward reaction
- b) the reverse reaction
- c) both reactions
- d) if the temperature is low

33. Gases are compressible because the molecules

- a) have elastic collisions
- b) do not attract one another
- c) are in rapid motion
- d) are far apart

34. Ions attracted toward a positively charged electrode are called

- a) electrons
- b) anions
- c) cations
- d) positrons

35. Which of the following is not a strong acid?

- a) nitric
- b) sulfuric
- c) acetic
- d) hydrochloric

36. An acid is a substance that

- a) donates electrons
- b) donates protons
- c) accepts protons
- d) accepts electrons

37. The general formula for an alcohol is:

- a) RH
- b) ROH
- c) ROR
- d) RCHO

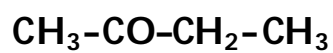
38. An example of an organic acid is:

- a) RCHO
- b) RCOOH
- c) RNH₂
- d) RCOR

39. The osmolarity of a 0.1 Na₂SO₄ solutions is

- a) 0.1
- b) 0.3
- c) 0.6
- d) 0.8

40. What is the name of the following compound?



- A) 2-butanal
- B) methyl propane ester
- C) 2-butanone
- D) methoxyketone

Multiple Choice Quiz – Answers

1	D	21	D
2	B	22	B
3	B	23	B
4	C	24	C
5	B	25	C
6	B	26	D
7	C	27	D
8	C	28	A
9	D	29	B
10	D	30	C
11	B	31	B
12	C	32	A
13	E	33	D
14	B	34	B
15	B	35	C
16	B	36	B
17	A	37	B
18	B	38	B
19	B	39	B
20	D	40	C