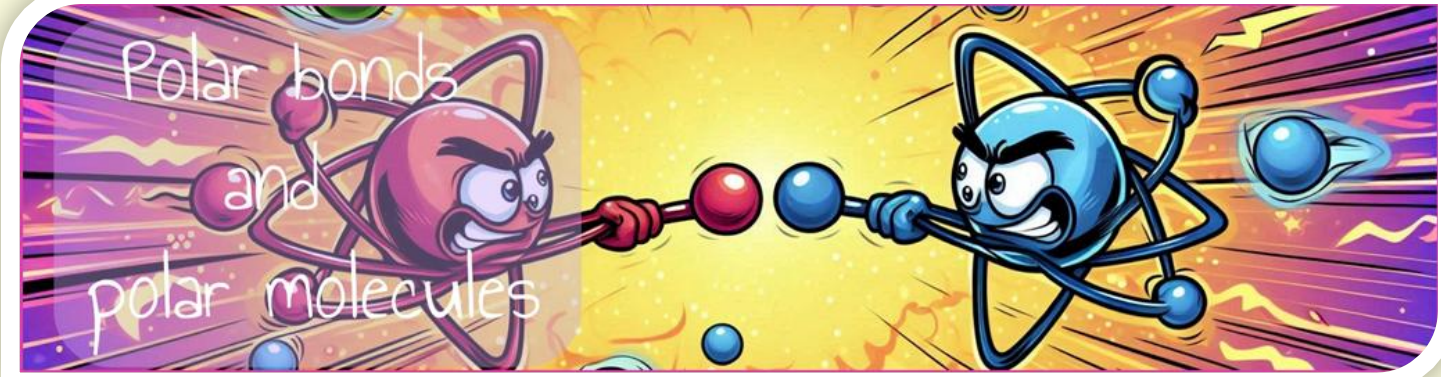

Answer the multiple-choice questions below then check your answers.

1. Which of the following bonds is purely ionic?

a) HCl b) $NaCl$ c) O_2 d) NH_3

2. In a covalent bond, electrons are:

a) Transferred from one atom to another b) Shared between two atoms

c) Free to move between many atoms d) Lost by both atoms

3. Which molecule is expected to have a polar covalent bond?

a) H_2 b) Cl_2 c) HCl d) $NaCl$

4. Which of the following molecules is non-polar despite containing polar bonds?

a) H_2O b) NH_3 c) CO_2 d) CH_3Cl

5. The concept of electronegativity is important in determining:

a) The atomic mass of an element b) The strength of an ionic bond

c) The type of bond formed between two atoms

d) The number of neutrons in an atom

6. A bond is likely to be ionic if the difference in electronegativity between the two atoms is:

a) Less than 0.4 b) Between 0.4 and 1.7

c) Greater than 1.7 d) Exactly 0

7. Which statement best describes a polar molecule?

a) It contains a mixture of ionic and covalent bonds.

b) It has an uneven distribution of electron density.

c) It has equal sharing of electrons.

d) It lacks any permanent dipoles.

8. Which molecule has a net dipole moment?

a) CH_4 b) CO_2 c) BF_3 d) H_2O

9. What is the key feature of a molecule that determines whether it will be polar?

a) The number of atoms in the molecule

b) The type of atoms involved

c) The molecular geometry and distribution of charge

d) The molecular mass

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

a) F_2 b) H-F c) H-Cl d) H-Br

11. In which of the following molecules does hydrogen bonding occur due to molecular polarity?

a) CH_4 b) H_2O c) CO_2 d) Cl_2

12. Which of the following molecules is polar?

a) CCl_4 b) N_2 c) HF d) BCl_3

13. A dipole is defined as:

a) A bond with equal sharing of electrons

b) A molecule with an equal number of protons and electrons

c) A separation of charges within a bond or molecule

d) A bond between two atoms with the same electronegativity

14. Which of the following molecules has a tetrahedral shape and is non-polar?

a) CH_4 b) NH_3 c) H_2O d) SO_2

15. In which scenario would a molecule with polar bonds be non-polar overall?

a) The molecule is linear with identical atoms at both ends.

b) The molecule is bent with different atoms.

c) The molecule has an asymmetric shape.

d) The molecule has a net dipole moment.

16. Which of the following statements about bond dipoles is true?

a) Bond dipoles can only occur in non-polar bonds.

b) Bond dipoles always cancel out in non-polar molecules.

c) A bond dipole occurs when there is no difference in electronegativity between the two atoms.

d) Bond dipoles are stronger in non-polar covalent bonds.

17. Which of the following molecules is likely to be polar based on its shape?

a) CO_2 (linear) b) $BeCl_2$ (linear) c) SO_2 (bent)

d) BF_3 (trigonal planar)

18. Which type of bond is characterised by equal sharing of electrons?

a) Ionic bond b) Polar covalent bond

c) covalent bond d) Metallic bond

19. What is the most significant factor that determines whether a bond is polar or non-polar?

a) Bond length b) Atomic mass

c) Difference in electronegativity d) Number of bonds

20. Which of the following statements about molecular polarity is incorrect?

a) A molecule can have polar bonds and still be non-polar.

b) The shape of a molecule can cause dipoles to cancel out.

c) All molecules with polar bonds are polar.

d) Molecular geometry is crucial in determining polarity.

Answers

1. Answer: b) NaCl
2. Answer: b) Shared between two atoms
3. Answer: c) HCl
4. Answer: c) CO_2
5. Answer: c) The type of bond formed between two atoms
6. Answer: c) Greater than 1.7
7. Answer: b) It has an uneven distribution of electron density.
8. Answer: d) H_2O
9. Answer: c) The molecular geometry and distribution of charge
10. Answer: b) H-F
11. Answer: b) H_2O
12. Answer: c) HF
13. Answer: c) A separation of charges within a bond or molecule
14. Answer: a) CH_4
15. Answer: a) The molecule is linear with identical atoms at both ends.
16. Answer: b) Bond dipoles always cancel out in non-polar molecules.
17. Answer: c) SO_2 (bent)

18. Answer: c) covalent bond

19 Answer: c) Difference in electronegativity

20. Answer: c) All molecules with polar bonds are polar.