



Answer all the questions below then check your answer

1. What is the octet rule?

- a) Atoms tend to gain, lose, or share electrons to achieve a stable configuration of eight electrons in their outer shell.
- b) Atoms always have eight electrons in their outer shell.
- c) Atoms must gain eight electrons to become stable.
- d) Only noble gases follow the octet rule.

2. Which of the following elements typically follow the octet rule?

- a) Hydrogen and helium b) Carbon, nitrogen, oxygen
- c) Transition metals d) All elements

3. Exceptions to the Octet Rule: Electron Deficient Molecules

Which of the following molecules is electron deficient, meaning it has less than eight electrons around the central atom?

- a) CH_4 b) NH_3 c) BF_3 d) H_2O

4. Aluminium chloride (AlCl_3) is an example of a molecule that:

- a) Follows the octet rule
- b) Is electron deficient
- c) Has more than eight electrons around the central atom
- d) Contains ionic bonds

5. Exceptions to the Octet Rule: Expanded Octet

Which of the following molecules has an expanded octet, meaning the central atom has more than eight electrons around it?

- a) CO_2
- b) SF_6
- c) H_2S
- d) NaCl

6. Phosphorus pentachloride (PCl_5) is an example of a molecule that:

- a) Follows the octet rule
- b) Is electron deficient
- c) Has an expanded octet
- d) Contains ionic bonds

7. Transition Metals and Octet Rule Exceptions

Transition metals typically:

- a) Strictly follow the octet rule
- b) Can have electron configurations that deviate from the octet rule
- c) Always form ions with a full outer shell
- d) Do not form compounds

8. Copper(I) ion (Cu^+) is an example of a species that:

- a) Follows the octet rule
- b) Has a complete outer electron shell due to the inclusion of d orbitals
- c) Has an incomplete outer electron shell
- d) Does not exist

9. Which of the following molecules has an odd number of electrons, making it an exception to the octet rule?

- a) NO
- b) CO_2
- c) CH_4
- d) H_2O

10. The stability of molecules with expanded octets is often attributed to the availability of:

- a) s orbitals
- b) p orbitals
- c) d orbitals
- d) f orbitals

11. Which of the following statements is true about the octet rule?

- a) It is a strict rule followed by all elements.
- b) It is a useful guideline for predicting molecular structure.
- c) It is only applicable to covalent compounds.
- d) It is irrelevant to modern chemistry.

12. Electron-deficient molecules often act as:

- a) Oxidizing agents
- b) Reducing agents
- c) Lewis acids
- d) Lewis bases

13. Which of the following is not an exception to the octet rule?

- a) BF_3 b) SF_6 c) NaCl d) NO

14. The octet rule is based on the electron configuration of:

- a) Alkali metals b) Halogens c) Noble gases d) Transition metals

15. Which of the following molecules does not have a complete octet around the central atom?

- a) CO_2 b) BeCl_2 c) CH_4 d) NH_3

16. In the molecule PCl_5 , the phosphorus atom has:

- a) 8 valence electrons b) 10 valence electrons c) 12 valence electrons
d) 14 valence electrons

17. Which of the following ions follows the octet rule?

- a) Na^+ b) Cu^{2+} c) Cr^{3+} d) Fe^{2+}

18. Which of the following elements can form compounds with expanded octets?

- a) Carbon b) Nitrogen c) Oxygen d) Sulfur

19. The ability of an atom to accommodate more than eight electrons in its outer shell is related to the availability of:

a) s orbitals

b) p orbitals

c) d orbitals

d) f orbitals

Answers

1. a)

2. b)

3. c)

4. b)

5. b)

6. c)

7. b)

8. b)

9. a)

10.c)

11.b)

12.c)

13.c)

14.c)

15.b)

16.b)

17.a)

18.d)

19.c)