

Minerals – Practice Questions and Answers

Revised August 2007

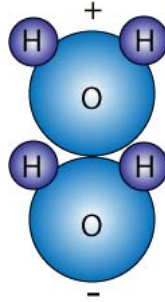
1. The number of electrons in a neutral atom is balanced by the number of _____.
2. Where do the valence electrons occur?
3. All isotopes of a given element would have the same number of _____, but a different number of _____. Hence, their atomic _____ differ.
4. What is the oxidation state of an element?
5. The common oxidation state of oxygen is _____.
6. The common oxidation state of hydrogen is _____.
7. The common oxidation state of calcium is _____.
8. The common oxidation state of sodium is _____.
9. The common oxidation state of magnesium is _____.
10. The common oxidation state of silicon is _____.
11. The common oxidation state of aluminum is _____.
12. The common oxidation state of potassium is _____.
13. The common oxidation state of chlorine is _____.
14. The common oxidation states of iron are _____ and _____.
15. The short hand notation for calcium is _____.
16. The short hand notation for sodium is _____.
17. The short hand notation for potassium is _____.
18. The short hand notation for hydrogen is _____.
19. The short hand notation for magnesium is _____.
20. The short hand notation for iron is _____.
21. The short hand notation for silicon is _____.

22. The short hand notation for aluminum is _____.
23. The short hand notation for oxygen is _____.
24. The short hand notation for chlorine is _____.
25. Which of the following is representative of the formula for plagioclase?
(A) $(\text{Ca,Na})(\text{Al,Si})\text{AlSi}_2\text{O}_8$
(B) KAlSi_3O_8
(C) NaCl
(D) $\text{Ca}_5(\text{PO}_4)(\text{F, Cl, OH})$
(E) CaCO_3
26. Which of the following is representative of the formula for quartz?
(A) SiO_2
(B) CaCO_3
(C) NaCl
(D) $\text{NaAlSi}_3\text{O}_8$
(E) KAlSi_3O_8
27. Which of the following is representative of the formula for calcite?
(A) NaCl ,
(B) CaCO_3 ,
(C) $\text{NaAlSi}_3\text{O}_8$
(D) $(\text{Ca,Na})(\text{Al,Si})\text{AlSi}_2\text{O}_8$
(E) $\text{Ca}_5(\text{PO}_4)(\text{F, Cl, OH})$
28. Which of the following is representative of the formula for K-feldspar?
(A) $\text{NaAlSi}_3\text{O}_8$
(B) KAlSi_3O_8
(C) $\text{CaMg}(\text{CO}_3)_2$
(D) $(\text{Ca,Na})(\text{Al,Si})\text{AlSi}_2\text{O}_8$
(E) SiO_2
29. Which of the following is representative of the formula for halite?
(A) NaCl ,
(B) $(\text{Ca,Mg})\text{CO}_3$,
(C) $\text{NaAlSi}_3\text{O}_8$
(D) $(\text{Ca,Na})(\text{Al,Si})\text{AlSi}_2\text{O}_8$
(E) FeS_2
30. How many oxygen ions are involved in the formation of the silicon-oxygen tetrahedron?
31. How many silicon ions are involved in the formation of the silicon-oxygen tetrahedron?

32. How would you describe the luster of galena, pyrite, silver, and gold?
33. How would you describe the luster of calcite, K-feldspar, and plagioclase?
34. If a mineral is salty and composed of NaCl, then how many cleavage directions does it exhibit?
35. Gypsum can be scratched with your fingernail. Its hardness is less than _____.
36. What common framework silicate breaks along conchoidal fractures, has no cleavage, and is commonly translucent.
37. A cation carries a _____ charge.
38. An anion carries a _____ charge.
39. What does streak refer to?
40. You would use a magnet to determine what property of a mineral?
41. Friedrich Mohs is known for developing the Mohs Index of _____.
42. The hardest mineral is _____.
43. The softest mineral is _____.
44. Which of the following minerals always appears to be darker in color than the other minerals in the list?
 - (A) Quartz
 - (B) Plagioclase
 - (C) K-feldspar
 - (D) Calcite
 - (E) Biotite
45. Which of the following minerals can occur in a multitude of colors, but always exhibits conchoidal fractures, and is commonly translucent?
 - (A) Hornblende
 - (B) Pyroxene
 - (C) Olivine
 - (D) Quartz
 - (E) K-feldspar

46. Which of the following minerals display one direction of well developed cleavage?
 (A) Quartz
 (B) Calcite
 (C) Galena
 (D) Biotite
 (E) Pyroxene

47. What kind of a bond is represented in the following illustration?

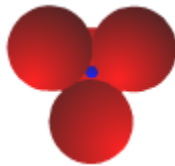


48. What kind of bond is formed when sodium and chloride combine to form halite?

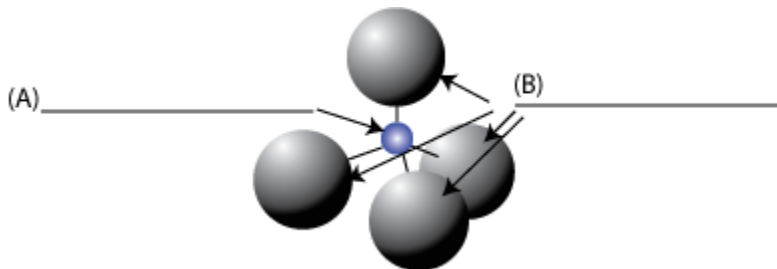
49. What kind of a bond forms when one or more electrons are shared by two atoms?

50. What kind of a bond is represented in an aggregate of copper atoms?

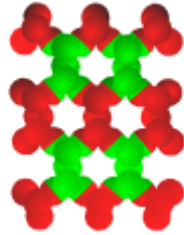
51. Below is the name of the molecule shown in the following illustration?



52. For the following illustration please fill in the labels.



53. What silicate structure is represented by the following illustration?



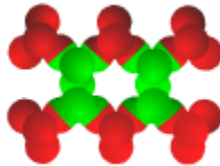
54. List below a mineral that exemplifies the silicate structure shown in question 53.

55. What silicate structure is represented by the following illustration?



56. List below a mineral that exemplifies the silicate structure shown in question 55.

57. What silicate structure is represented by the following illustration?



58. List below a mineral that exemplifies the silicate structure shown in question 57.

59. Which of the following minerals belong to the sulfide group?

- (A) Pyrite (FeS_2)
- (B) Halite (NaCl)
- (C) Calcite (CaCO_3)
- (D) Apatite ($\text{Ca}_5(\text{PO}_4)(\text{F}, \text{Cl}, \text{OH})$)
- (E) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

60. Which of the following minerals belong to the oxide group?

- (A) Pyrite (FeS_2)
- (B) Hematite (Fe_2O_3)
- (C) Calcite (CaCO_3)
- (D) Apatite ($\text{Ca}_5(\text{PO}_4)(\text{F}, \text{Cl}, \text{OH})$)

(E) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

61. Which of the following minerals belong to the halide group?

- (A) Pyrite (FeS_2)
- (B) Halite (NaCl)
- (C) Calcite (CaCO_3)
- (D) Apatite ($\text{Ca}_5(\text{PO}_4)(\text{F}, \text{Cl}, \text{OH})$)
- (E) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

62. Which of the following minerals belong to the carbonate group?

- (A) Pyrite (FeS_2)
- (B) Halite (NaCl)
- (C) Calcite (CaCO_3)
- (D) Apatite ($\text{Ca}_5(\text{PO}_4)(\text{F}, \text{Cl}, \text{OH})$)
- (E) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

63. Which of the following minerals belong to the phosphate group?

- (A) Pyrite (FeS_2)
- (B) Halite (NaCl)
- (C) Calcite (CaCO_3)
- (D) Apatite ($\text{Ca}_5(\text{PO}_4)(\text{F}, \text{Cl}, \text{OH})$)
- (E) Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

64. Which of the following minerals are built from the independent silicate structure?

- (A) Olivine ($(\text{Mg}, \text{Fe})_2\text{SiO}_4$)
- (B) Pyroxene ($(\text{Mg}, \text{Fe})\text{Si}_2\text{O}_6$)
- (C) Amphibole ($\text{NaCa}_2(\text{Mg}, \text{Fe}, \text{Al})_5(\text{Si}, \text{Al})_9\text{O}_{22}(\text{OH})_2$)
- (D) Biotite ($\text{K}(\text{Mg}, \text{Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$)
- (E) Quartz (SiO_2)

65. Which of the following minerals are built from the single chain silicate structure?

- (A) Olivine ($(\text{Mg}, \text{Fe})_2\text{SiO}_4$)
- (B) Pyroxene ($(\text{Mg}, \text{Fe})\text{Si}_2\text{O}_6$)
- (C) Amphibole ($\text{NaCa}_2(\text{Mg}, \text{Fe}, \text{Al})_5(\text{Si}, \text{Al})_9\text{O}_{22}(\text{OH})_2$)
- (D) Biotite ($\text{K}(\text{Mg}, \text{Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$)
- (E) Quartz (SiO_2)

66. Which of the following minerals are built from the double chain silicate structure?

- (A) Olivine ($(\text{Mg}, \text{Fe})_2\text{SiO}_4$)
- (B) Pyroxene ($(\text{Mg}, \text{Fe})\text{Si}_2\text{O}_6$)
- (C) Amphibole ($\text{NaCa}_2(\text{Mg}, \text{Fe}, \text{Al})_5(\text{Si}, \text{Al})_9\text{O}_{22}(\text{OH})_2$)
- (D) Biotite ($\text{K}(\text{Mg}, \text{Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$)
- (E) Quartz (SiO_2)

67. Which of the following minerals are built from the sheet silicate structure?

- (A) Olivine $((\text{Mg, Fe})_2\text{SiO}_4)$
- (B) Pyroxene $((\text{Mg, Fe})\text{Si}_2\text{O}_6)$
- (C) Amphibole $(\text{NaCa}_2(\text{Mg, Fe, Al})_5(\text{Si, Al})_9\text{O}_{22}(\text{OH})_2)$
- (D) Biotite $(\text{K}(\text{Mg, Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2)$
- (E) Quartz (SiO_2)

68. Which of the following minerals are built from the framework silicate structure?

- (A) Olivine $((\text{Mg, Fe})_2\text{SiO}_4)$
- (B) Pyroxene $((\text{Mg, Fe})\text{Si}_2\text{O}_6)$
- (C) Amphibole $(\text{NaCa}_2(\text{Mg, Fe, Al})_5(\text{Si, Al})_9\text{O}_{22}(\text{OH})_2)$
- (D) Biotite $(\text{K}(\text{Mg, Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2)$
- (E) Quartz (SiO_2)

Answers

1. protons
2. In the outermost electron shell.
3. protons, neutrons, weights
4. The oxidation state of an element is the charge that it would have if it were an ion
5. -2
6. +1
7. +2
8. +1
9. +2
10. +4
11. +3
12. +1
13. -1
14. +2, +3
15. Ca
16. Na
17. K
18. H
19. Mg
20. Fe
21. Si
22. Al
23. O
24. Cl
25. (a)
26. (a)
27. (b)
28. (b)
29. (a)
30. 4
31. 1
32. metallic
33. nonmetallic
34. 3
35. 2.5
36. quartz
37. positive
38. negative
39. Streak is the color of powder derived from a mineral that has been dragged across a porcelain plate.
40. It's magnetic property
41. Hardness
42. diamond
43. talc

44. biotite
45. quartz
46. biotite
47. Van der Waals
48. ionic
49. covalent
50. metallic
51. silicon-oxygen tetrahedron
52.
 - (A) silicon
 - (B) oxygen
53. sheet
54. biotite or muscovite
55. single chain
56. pyroxene
57. double chain
58. amphibole or hornblende
59. (A) pyrite
60. (B) hematite
61. (B) halite
62. (C) calcite
63. (D) apatite
64. (A) olivine
65. (B) pyroxene
66. (C) amphibole
67. (D) biotite
68. (E) quartz