

CHAPTER REVIEW ANSWERS

Checking Concepts

- (a) 7
(b) Greater than 7
(c) Less than 7

2.

Term	Definition	Used to Describe Acids, Bases, or Both?
Alkaline	Basic	Bases
Corrosive	Highly reactive	Both
Caustic	Strongly alkaline	Bases
Low pH	Less than pH 7	Acids

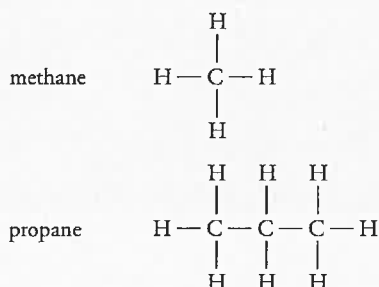
- (a) 7
(b) 6
(c) 4
(d) 6.5–7.4
(e) 7.3–7.5
- A 10 times increase in acidity
- Red and blue litmus both turn red in an acid and blue in a base. In a neutral solution, red litmus stays red and blue litmus stays blue.
- (a) The chemical formula of an acid has an H on the left side. (Organic acids have the H on the right, as in CH_3COOH .)
(b) The chemical formula of a base has an OH on the left side.
- (a) HNO_3
(b) NaOH
(c) NH_4OH
(d) $\text{Mg}(\text{OH})_2$
(e) HCl
(f) H_2SO_4
(g) $\text{Ca}(\text{OH})_2$
(h) CH_3COOH
- (a) Nitric acid
(b) Sodium hydroxide
(c) Ammonium hydroxide
(d) Magnesium hydroxide
(e) Hydrochloric acid
(f) Sulfuric acid
(g) Calcium hydroxide
(h) Acetic acid
- (a) Acids
(b) Bases
(c) Bases
(d) Both
(e) Bases
(f) Acids
(g) Acids
- Neutralization is the reaction of an acid with a base to produce a salt and water.

- (a) Basic
(b) Acidic
- Lime is a base, so adding it to lake water allows it to neutralize the acid from acid precipitation.
- (a) An organic compound is a compound of the element carbon, with the exception of a very few small carbon compounds such as carbonate and some oxides.
(b) An inorganic compound is a compound that does not contain carbon, as well as a few small carbon compounds such as carbon dioxide, carbon monoxide, and ionic carbonates.
- (a) Carbon and hydrogen
(b) For example: natural gas heaters, manufacturing plastic, gasoline
- (a) Carbon, hydrogen, and oxygen
(b) Fuels, solvents, cleaners

Understanding Key Ideas

- 100 times more basic
- (a) Blue
(b) Yellow
(c) Pink
(d) Colourless
(e) Blue
- (a) Hydrofluoric acid
(b) Perchloric acid
(c) Sulfuric acid
(d) Hydrochloric acid
- (a) $3\text{HNO}_3 + \text{Al}(\text{OH})_3 \rightarrow \text{Al}(\text{NO}_3)_3 + 3\text{H}_2\text{O}$
Reactants: nitric acid, aluminum hydroxide; products: aluminum nitrate, water
(b) $\text{HF} + \text{KOH} \rightarrow \text{KF} + \text{H}_2\text{O}$
Reactants: hydrofluoric acid, potassium hydroxide; products: potassium fluoride, water
(c) $2\text{H}_3\text{PO}_3 + 3\text{Ca}(\text{OH})_2 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 6\text{H}_2\text{O}$
Reactants: phosphoric acid, calcium hydroxide; products: calcium phosphate, water
(d) $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{NaCH}_3\text{COO} + \text{H}_2\text{O}$
Reactants: acetic acid, sodium hydroxide; products: sodium acetate, water
(e) $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
Reactants: sulfuric acid, sodium hydroxide; products: sodium sulphate, water
- (a) $2\text{HBr} + \text{Mg} \rightarrow \text{MgBr}_2 + \text{H}_2$
(b) $3\text{H}_2\text{SO}_4 + 2\text{Al} \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{H}_2$
(c) $2\text{HI} + \text{Ca} \rightarrow \text{CaI}_2 + \text{H}_2$

- (d) $2\text{HClO} + \text{Zn} \rightarrow \text{Zn}(\text{ClO})_2 + \text{H}_2$
 (e) $2\text{H}_3\text{PO}_3 + 6\text{Na} \rightarrow 2\text{Na}_3\text{PO}_3 + 3\text{H}_2$
21. (a) Acid
 (b) Base
 (c) Base
 (d) Salt
 (e) Salt
 (f) Acid
22. (a) Organic
 (b) Inorganic (does contain an organic ion)
 (c) Inorganic
 (d) Inorganic
 (e) Inorganic
 (f) Organic
 (g) Inorganic
 (h) Inorganic
- 23.



Applying Your Understanding

24. No. A solution cannot be both acidic and basic at the same time, even though it is possible under some circumstances to contain both an acid and a base at the same time. The solution will have only one pH value. If this value is greater than 7, the solution is basic; at 7, it is neutral; and below 7, it is acidic.

Pause and Reflect Answer

Students' answers may include some of these points in describing knowledge learned in this chapter and its application to daily life.

- Acids, bases, salts, and organic compounds all are present in our own bodies and are part of all living systems as well.
- Aspects of daily life such as cooking, hygiene, and energy production make use of concepts in this chapter.