

Assessment

Names and formulas of compounds

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1. F 2. C 3. I 4. B 5. C 6. D 7. A 8. C 9. D 10. D 11. C
12. B

Section 4.3 Chemical Equations

Comprehension

Balancing equations

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- $\text{H}_2 + \text{F}_2 \rightarrow 2 \text{HF}$
- $2 \text{Sn} + \text{O}_2 \rightarrow 2 \text{SnO}$
- $\text{MgCl}_2 \rightarrow \text{Mg} + \text{Cl}_2$
- $2 \text{KNO}_3 \rightarrow 2 \text{KNO}_2 + \text{O}_2$
- $2 \text{BN} + 3 \text{F}_2 \rightarrow 2 \text{BF}_3 + \text{N}_2$
- $\text{CuI}_2 + \text{Fe} \rightarrow \text{FeI}_2 + \text{Cu}$
- $2 \text{Li} + 2 \text{H}_2\text{O} \rightarrow 2 \text{LiOH} + \text{H}_2$
- $4 \text{NH}_3 + 3 \text{O}_2 \rightarrow 2 \text{N}_2 + 6 \text{H}_2\text{O}$
- $\text{V}_2\text{O}_5 + 5 \text{Ca} \rightarrow 5 \text{CaO} + 2 \text{V}$
- $2 \text{C}_9\text{H}_6\text{O}_4 + 17 \text{O}_2 \rightarrow 18 \text{CO}_2 + 6 \text{H}_2\text{O}$
- $\text{H}_2\text{S} + \text{PbCl}_2 \rightarrow \text{PbS} + 2 \text{HCl}$
- $2 \text{C}_3\text{H}_7\text{OH} + 9 \text{O}_2 \rightarrow 6 \text{CO}_2 + 8 \text{H}_2\text{O}$
- $\text{Zn} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{ZnSO}_4$
- $\text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
- $\text{C}_2\text{H}_5\text{OH} + 3 \text{O}_2 \rightarrow 2 \text{CO}_2 + 3 \text{H}_2\text{O}$
- $2 \text{Al} + 3 \text{H}_2\text{SO}_4 \rightarrow 3 \text{H}_2 + \text{Al}_2(\text{SO}_4)_3$
- $2 \text{FeCl}_3 + 3 \text{Ca}(\text{OH})_2 \rightarrow 2 \text{Fe}(\text{OH})_3 + 3 \text{CaCl}_2$
- $\text{Pb}(\text{NO}_3)_2 + \text{K}_2\text{CrO}_4 \rightarrow \text{PbCrO}_4 + 2 \text{KNO}_3$
- $\text{Cd}(\text{NO}_3)_2 + (\text{NH}_4)_2\text{S} \rightarrow \text{CdS} + 2 \text{NH}_4\text{NO}_3$
- $\text{Ca}(\text{OH})_2 + 2 \text{NH}_4\text{Cl} \rightarrow 2 \text{NH}_3 + \text{CaCl}_2 + 2 \text{H}_2\text{O}$

Applying Knowledge

Word equations

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- $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
- $\text{Fe}_2\text{O}_3 + 3 \text{H}_2 \rightarrow 3 \text{H}_2\text{O} + 2 \text{Fe}$
- $2 \text{Na} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOH} + \text{H}_2$
- $\text{Ca}_2\text{C} + \text{O}_2 \rightarrow 2 \text{Ca} + \text{CO}_2$
- $2 \text{KI} + \text{Cl}_2 \rightarrow 2 \text{KCl} + \text{I}_2$
- $4 \text{Cr} + 3 \text{SnCl}_4 \rightarrow 4 \text{CrCl}_3 + 3 \text{Sn}$
- $\text{Mg} + \text{CuSO}_4 \rightarrow \text{MgSO}_4 + \text{Cu}$
- $\text{ZnSO}_4 + \text{SrCl}_2 \rightarrow \text{ZnCl}_2 + \text{SrSO}_4$
- $3 \text{NH}_4\text{Cl} + \text{Pb}(\text{NO}_3)_3 \rightarrow 3 \text{NH}_4\text{NO}_3 + \text{PbCl}_3$
- $2 \text{Fe}(\text{NO}_3)_3 + 3 \text{MgS} \rightarrow \text{Fe}_2\text{S}_3 + 3 \text{Mg}(\text{NO}_3)_2$
- $2 \text{AlCl}_3 + 3 \text{Na}_2\text{CO}_3 \rightarrow \text{Al}_2(\text{CO}_3)_3 + 6 \text{NaCl}$
- $2 \text{Na}_3\text{PO}_4 + 3 \text{Ca}(\text{OH})_2 \rightarrow 6 \text{NaOH} + \text{Ca}_3(\text{PO}_4)_2$

Extension

Chemical reactions and chemical equations

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- iron + oxygen \rightarrow iron(II) oxide
 $2\text{Fe} + \text{O}_2 \rightarrow 2 \text{FeO}$
- hydrogen chloride + sodium carbonate \rightarrow carbon dioxide + sodium chloride + water
 $2 \text{HCl} + \text{Na}_2\text{CO}_3 \rightarrow \text{CO}_2 + 2 \text{NaCl} + \text{H}_2\text{O}$
- aluminum + oxygen \rightarrow aluminum oxide
 $4 \text{Al} + 3 \text{O}_2 \rightarrow 2 \text{Al}_2\text{O}_3$
- water + sodium oxide \rightarrow sodium hydroxide
 $\text{H}_2\text{O} + \text{Na}_2\text{O} \rightarrow 2 \text{NaOH}$
- hydrogen + nitrogen trifluoride \rightarrow
nitrogen + hydrogen fluoride
 $3 \text{H}_2 + 2 \text{NF}_3 \rightarrow \text{N}_2 + 6 \text{HF}$
- chromium(III) sulphate + potassium carbonate \rightarrow
chromium(III) carbonate + potassium sulphate
 $\text{Cr}_2(\text{SO}_4)_3 + 3 \text{K}_2\text{CO}_3 \rightarrow \text{Cr}_2(\text{CO}_3)_3 + 3 \text{K}_2\text{SO}_4$
- potassium chlorate \rightarrow oxygen + potassium chloride
 $2 \text{KClO}_3 \rightarrow 3 \text{O}_2 + 2 \text{KCl}$
- zinc + copper(II) sulphate \rightarrow copper + zinc sulphate
 $\text{Zn} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{ZnSO}_4$

Assessment

Chemical equations

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1. B 2. A 3. E 4. D 5. F 6. C 7. G 8. D 9. D 10. D 11. A
12. C 13. B

Chapter 5 Compounds are classified in different ways.

Section 5.1 Acids and Bases

Applying Knowledge

pH scale and pH indicators

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- (a) chemical that changes colour depending on the pH of the solution it is placed in
(b) number scale for measuring how acidic or basic a solution is
- (a)

Substance	pH Value	Acid or Base	Methyl Orange	Bromothymol Blue	Litmus
lemon	2	acid	red	yellow	red
ammonia	11	base	yellow	blue	blue
milk	6	acid	yellow	yellow	red

(b)

Substance	pH Value	Acid or Base	Methyl Red	Phenolphthalein	Indigo Carmine
tomato	4	acid	red	colourless	blue
oven cleaner	13	base	yellow	pink	yellow
egg	8	base	yellow	colourless	blue

3.

Substance	pH Value	Acid or Base	pH Indicator	Colour of pH Indicator
black coffee	5	acid	litmus	red
milk of magnesia	10	base	phenolphthalein	pink
battery acid	0	acid	bromothymol blue	yellow
sea water	8	base	indigo carmine	blue
orange juice	3	acid	methyl orange	red
liquid drain cleaner	14	base	methyl red	yellow

Comprehension

Names of acids

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- ate
- ite
- (a) carbonic acid
(b) acetic acid
(c) phosphoric acid
(d) chlorous acid
(e) sulphurous acid
(f) nitric acid
(g) hydrofluoric acid
(h) hydrochloric acid
- (a) HI
(b) H_2SO_4
(c) HClO_4
(d) HNO_2
(e) HClO_3
(f) HBr
(g) H_3PO_3
(h) HClO

Applying Knowledge

Acids versus bases

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	ACIDS	BASES
definition	compounds containing hydrogen that produce a solution with a pH of less than 7 when they dissolve in water and that produce a salt and water when they react with ionic compounds containing hydroxide ions	chemical compounds containing hydroxide that produce a solution with a pH of more than 7 when they dissolve in water and produce a salt and water when they react with ionic compounds containing positive hydrogen ions
pH	< 7	> 7
what to look for in chemical formula	H	OH
production of ions	H^+	OH^-
electrical conductivity	conductive	conductive
taste	taste sour	taste bitter
touch	burn skin	feel slippery; burn skin
examples	HCl, H_2SO_4 , lemons, stomach acid	NaOH, KOH, drain cleaner, soap

- (a) acid
(b) base
(c) base
(d) acid
(e) base
(f) acid
(g) acid
(h) base
(i) acid
(j) base
(k) base
(l) acid

Assessment

Acids and bases

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- D 2. F 3. A 4. E 5. B 6. G 7. C 8. A 9. A 10. C 11. A 12. C 13. B 14. B

Section 5.2 Salts

Comprehension

Recognizing acids, bases, and salts

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- (a) acid
(b) acid
(c) base
(d) acid
(e) base
(f) acid
(g) acid
(h) acid
(i) salt
(j) base
(k) base
(l) salt
(m) acid
(n) salt
(o) salt
(p) salt
(q) acid
(r) acid
(s) base
(t) acid
(u) acid
(v) salt

- acetic acid, CH_3COOH
- sodium chloride, NaCl
- sulphuric acid, H_2SO_4
- sodium hydroxide, NaOH
- magnesium hydroxide, $\text{Mg}(\text{OH})_2$
- hydrochloric acid, HCl

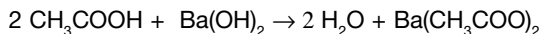
Applying Knowledge

Acid-base neutralization reactions

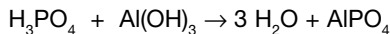
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- (a) $\text{H}_2\text{SO}_4 + 2 \text{NaOH} \rightarrow 2 \text{H}_2\text{O} + \text{Na}_2\text{SO}_4$
(b) $\text{HNO}_3 + \text{KOH} \rightarrow \text{H}_2\text{O} + \text{KNO}_3$
(c) $2 \text{HCl} + \text{Ca}(\text{OH})_2 \rightarrow 2 \text{H}_2\text{O} + \text{CaCl}_2$
(d) $2 \text{H}_3\text{PO}_4 + 3 \text{Ba}(\text{OH})_2 \rightarrow 6 \text{H}_2\text{O} + \text{Ba}_3(\text{PO}_4)_2$
(e) $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaCH}_3\text{COO}$
(f) $2 \text{HNO}_3 + \text{Sr}(\text{OH})_2 \rightarrow 2 \text{H}_2\text{O} + \text{Sr}(\text{NO}_3)_2$
(g) $3 \text{HF} + \text{Fe}(\text{OH})_3 \rightarrow 3 \text{H}_2\text{O} + \text{FeF}_3$
(h) $4 \text{HBr} + \text{Sn}(\text{OH})_4 \rightarrow 4 \text{H}_2\text{O} + \text{SnBr}_4$
- (a) sulphuric acid + potassium hydroxide \rightarrow
water + potassium sulphate
 $\text{H}_2\text{SO}_4 + 2 \text{KOH} \rightarrow 2 \text{H}_2\text{O} + \text{K}_2\text{SO}_4$

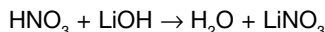
(b) acetic acid + barium hydroxide \rightarrow
water + barium acetate



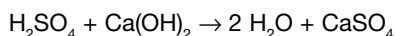
(c) phosphoric acid + aluminum hydroxide \rightarrow
water + aluminum phosphate



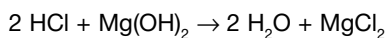
(d) nitric acid + lithium hydroxide \rightarrow
water + lithium nitrate



(e) sulphuric acid + calcium hydroxide \rightarrow
water + calcium sulphate



(f) hydrochloric acid + magnesium hydroxide \rightarrow
water + magnesium chloride



Applying Knowledge

Metal oxides and non-metal oxides

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- oxygen
- metal oxide
- non-metal oxide
- it becomes basic
- it becomes acidic
- a base
- an acid
- (a) metal oxide
(b) non-metal oxide
(c) non-metal oxide
(d) metal oxide
(e) non-metal oxide
(f) metal oxide
(g) non-metal oxide
(h) metal oxide
- (a) a base
(b) an acid
(c) a base
(d) an acid

Assessment

Salts

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- A 2. C 3. F 4. E 5. D 6. B 7. C 8. B 9. D 10. B 11. B
12. D 13. B

Section 5.3 Organic Compounds

Cloze Activity

Organic chemistry

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1. organic compounds; organic chemistry
2. inorganic compounds
3. carbon
4. hydrocarbons
5. methane
6. ethane
7. propane
8. butane
9. alcohol; oxygen
10. solvent
11. ethanol

Comprehension

Recognizing organic and inorganic compounds

Page 99

1. inorganic
2. organic
3. inorganic
4. inorganic
5. inorganic
6. inorganic
7. organic
8. organic
9. organic
10. organic
11. inorganic
12. inorganic
13. organic
14. inorganic
15. organic
16. organic
17. inorganic
18. organic
19. inorganic
20. inorganic
21. inorganic
22. inorganic
23. organic
24. inorganic
25. organic
26. organic
27. organic
28. organic

29. organic

30. organic

Applying Knowledge

Organic compounds versus inorganic compounds

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1. organic
2. organic
3. inorganic
4. organic
5. organic
6. organic
7. inorganic
8. organic

Assessment

Organic compounds

Page 101

1. B 2. A 3. D 4. C 5. A 6. D 7. D 8. A

Chapter 6 Chemical reactions occur in predictable ways.

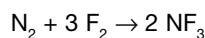
Section 6.1 Types of Chemical Reactions

Comprehension

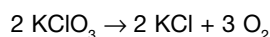
Classifying chemical reactions

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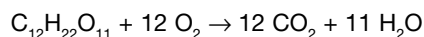
1. S



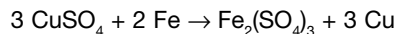
2. D



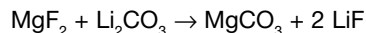
3. C



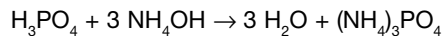
4. SR



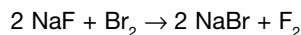
5. DR



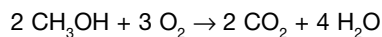
6. N



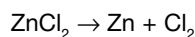
7. SR



8. C



9. D



10. DR

