1. Given the balanced equation representing a reaction:

$Al_2(SO_4)_3 + 6NaOH \rightarrow 2Al(OH)_3 + 3Na_2SO_4$

The mole ratio of $NaOH$ to $Al(OH)_3$ is

A) 1:1 B) 1:3 C) 3:1 D) 3:7

2. Given the balanced equation representing a reaction:
$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$

What is the total number of moles of $O_2(g)$ required for the complete combustion of 1.5 moles of $C_3H_8(g)$?

A) .30 mol B) 1.5 mol
C) 4.5 mol D) 7.5 mol

3. Given the balanced equation representing a reaction:
$2CO(g) + O_2(g) \rightarrow 2CO_2(g)$
What is the mole ratio of $CO(g)$ to $CO_2(g)$ in this reaction?

A) 1:1 B) 1:2 C) 2:1 D) 3:2

4. Given the balanced equation representing the reaction between propane and oxygen:

$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

According to this equation, which ratio of oxygen to propane is correct?

A) $\frac{5\text{ grams } O_2}{1\text{ gram } C_3H_8}$

B) $\frac{5\text{ moles } O_2}{1\text{ mole } C_3H_8}$

C) $\frac{10\text{ grams } O_2}{11\text{ grams } C_3H_8}$

D) $\frac{10\text{ moles } O_2}{11\text{ moles } C_3H_8}$

5. Given the balanced equation:

$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(\ell) + CO_2(g)$

What is the total number of moles of CO_2 formed when 20. moles of HCl is completely consumed?

A) 5.0 mol B) 10. mol
C) 20. mol D) 40. mol

6. Given the balanced equation representing a reaction:

$F_2(g) + H_2(g) \rightarrow 2HF(g)$
What is the mole ratio of $H_2(g)$ to $HF(g)$ in this reaction?

A) 1:1 B) 1:2 C) 2:1 D) 2:3

7. Given the balanced equation:

$2C + 3H_2 \rightarrow C_2H_6$
What is the total number of moles of C that must completely react to produce 2.0 moles of C_2H_6?

A) 1.0 mol B) 2.0 mol
C) 3.0 mol D) 4.0 mol

8. Given the reaction:

$N_2(g) + 3\ H_2(g) \leftrightarrow 2\ NH_3(g)$
What is the mole-to-mole ratio between nitrogen gas and hydrogen gas?

A) 1:2 B) 1:3 C) 2:2 D) 2:3

9. Given the balanced equation:

$2\ C_4H_{10}(g) + 13\ O_2(g) \rightarrow 8\ CO_2(g) + 10\ H_2O(g)$
What is the total number of moles of $O_2(g)$ that must react completely with 5.00 moles of $C_4H_{10}(g)$?

A) 10.0 B) 20.0 C) 26.5 D) 32.5

10. Given the reaction:

$PbCl_2(aq) + Na_2CrO_4(aq) \rightarrow PbCrO_4(s) + 2\ NaCl(aq)$

What is the total number of moles of NaCl formed when 2 moles of Na_2CrO_4 react completely?

A) 1 mole B) 2 moles
C) 3 moles D) 4 moles

11. Given the equation:

$2\ C_2H_2(g) + 5\ O_2(g) \rightarrow 4\ CO_2(g) + 2\ H_2O(g)$
How many moles of oxygen are required to react completely with 1.0 mole of C_2H_2?

A) 2.5 B) 2.0 C) 5.0 D) 10

12. Given the reaction:

$6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$

What is the total number of moles of water needed to make 2.5 moles of $C_6H_{12}O_6$?

A) 2.5 B) 6.0 C) 12 D) 15

13. Given the reaction:

$C_6H_{12}O_6(s) + 6\ O_2(g) \rightarrow 6\ CO_2(g) + 6\ H_2O(\ell)$

How many moles of $C_6H_{12}O_6(s)$ are needed to produce 24 moles of carbon dioxide?

A) 1.0 moles B) 12 moles
C) 24 moles D) 4.0 moles

14. Given the reaction:

$2\ C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$

What is the total number of moles of CO_2 produced when one mole of C_2H_6 is completely reacted?

A) 1 B) 2 C) 3 D) 4

15. Given the reaction:

$4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$

What is the total number of moles of NO produced when 1.0 mole of O_2 is completely consumed?

A) 1.0 mole B) 1.2 moles
C) 0.80 mole D) 4.0 moles

16. Given the balanced equation:

$Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$

What total mass of iron is necessary to produce 1.00 mole of copper?

A) 26.0 g B) 55.8 g
C) 112 g D) 192 g

17. Given the reaction:

$4\ Al(s) + 3\ O_2(g) \rightarrow 2\ Al_2O_3(s)$

What is the minimum number of grams of oxygen gas required to produce 1.00 mole of aluminum oxide?

A) 32.0 g B) 48.0 g
C) 96.0 g D) 192 g

18. Given the reaction:

$4\ Al + 3\ O_2 \rightarrow 2\ Al_2O_3$

What is the total number of moles of aluminum oxide that can be formed when 54 grams of aluminum reacts completely with oxygen?

A) 1.0 mole B) 2.0 moles
C) 3.0 moles D) 4.0 moles

19. Given the reaction:

$2\ C_2H_2(g) + 5\ O_2(g) \rightarrow 4\ CO_2(g) + 2\ H_2O(g)$

What is the total number of grams of $O_2(g)$ needed to react completely with 0.50 mole of $C_2H_2(g)$?

A) 10. g B) 40. g
C) 80. g D) 160 g

20. According to the reaction

$H_2 + Cl_2 \rightarrow 2\ HCl,$

the production of 2.0 moles of HCl would require 71. grams of Cl_2 and

A) 1.0 g of H_2 B) 2.0 g of H_2
C) 3.0 g of H_2 D) 4.0 g of H_2

21. Given the reaction:

$N_2 + 3\ H_2 \rightarrow 2\ NH_3$

How many grams of ammonia are produced when 1.0 mole of nitrogen reacts?

A) 8.5 B) 17 C) 34 D) 68

22. Given the reaction:

$$4\ Al + 3\ O_2 \rightarrow 2\ Al_2O_3$$

How many moles of Al_2O_3 will be formed when 27 grams of Al reacts completely with O_2?

A) 1.0 B) 2.0 C) 0.50 D) 4.0

23. Given the reaction:

$$4\ Na + O_2 \rightarrow 2\ Na_2O$$

How many grams of oxygen are completely consumed in the production of 1.00 mole of Na_2O?

A) 16.0 B) 32.0 C) 62.0 D) 124

24. Given the reaction:

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

The total number of grams of O_2 needed to produce 54 grams of water is

A) 36 B) 48 C) 61 D) 75

25. Given the balanced equation:

$$NaOH + HCl \rightarrow NaCl + H_2O$$

What is the total number of grams of H_2O produced when 116 grams of the product, NaCl, is formed?

A) 9.0 g B) 18 g C) 36 g D) 54 g

26. Given the reaction:

$$Cu + 4\ HNO_3 \rightarrow Cu(NO_3)_2 + 2\ H_2O + 2\ NO_2$$

What is the total mass of H_2O produced when 32 grams of Cu is completely consumed?

A) 9.0 g B) 18 g C) 36 g D) 72 g

27. If 6.02×10^{23} molecules of N_2 react according to the equation $N_2 + 3\ H_2 \rightarrow 2\ NH_3$, the total number of molecules of NH_3 produced is

A) 1.00 B) 2.00
C) 6.02×10^{23} D) 12.0×10^{23}

28. Given the reaction:

$$2\ C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$$

What is the total number of CO_2 molecules produced when one mole of C_2H_6 is consumed?

A) 6.02×10^{23} B) $2(6.02 \times 10^{23})$
C) $3(6.02 \times 10^{23})$ D) $4(6.02 \times 10^{23})$

29. Given the reaction

$$N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$$

How many liters of ammonia, measured at STP, are produced when 28.0 grams of nitrogen is completely consumed?

A) 5.60 B) 11.2 C) 22.4 D) 44.8

30. Given the equation:

$$6\ CO_2(g) + 6\ H_2O(l) \rightarrow C_6H_{12}O_6(s) + 6\ O_2(g)$$

What is the minimum number of liters of $CO_2(g)$, measured at STP, needed to produce 32.0 grams of oxygen?

A) 264 L B) 32.0 L
C) 192 L D) 22.4 L

31. Given the reaction:

$$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$$

What is the total number of liters of $O_2(g)$ at STP needed to produce 6.0×10^{23} molecules of $H_2O(l)$?

A) 11.2 L B) 22.4 L
C) 33.6 L D) 44.8 L

32. Given the reaction:

$$2\ C_8H_{18}(g) + 25\ O_2(g) \rightarrow 16\ CO_2(g) + 18\ H_2O(g)$$

What volume of $C_8H_{18}(g)$ will completely react to produce exactly 36 liters of $H_2O(g)$?

A) 27 L B) 2.0 L C) 36 L D) 4.0 L

33. Given the balanced equation:

$$C_3H_8(g) + 5\ O_2(g) \rightarrow 3\ CO_2(g) + 4\ H_2O(g)$$

What is the total number of liters of $CO_2(g)$ produced when 20.0 liters of $O_2(g)$ are completely consumed?

A) 12.0 L
B) 22.4 L
C) 3.00 L
D) 5.00 L

34. Given the balanced equation:

$$Mg(s) + 2\ HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

At STP, what is the total number of liters of hydrogen gas produced when 3.00 moles of hydrochloric acid solution is completely consumed?

A) 11.2 L
B) 22.4 L
C) 33.6 L
D) 44.8 L

35. Given the reaction:

$$2\ CH_3OH(l) + 3O_2(g) \rightarrow 2\ CO_2(g) + 4\ H_2O(g)$$

How many liters of $O_2(g)$ are needed to produce exactly 200 liters of $CO_2(g)$?

A) 100 L
B) 200 L
C) 300 L
D) 400 L