Self-test Questions

Topic 1 (SL)

1 What is the mass of 0.100 mol C_2H_5OH?
Relative atomic masses: H = 1.01, C = 12.01, O = 16.00
A 3.4 g
B 461 g
C 4.61 g
D 46.1 g

2 How many moles of H atoms are present in 9.01 g of H_2O?
Relative atomic masses: H = 1.01, O = 16.00
A 0.500
B 1.00
C 2.00
D 6.02×10^{23}

3 Which of the following contains the largest number of O atoms?
Relative atomic masses: C = 12.01, N = 14.01, O = 16.00, S = 32.07
A 0.50 mol CO_2
B 8.0 g O_2
C 16 g SO_2
D 0.20 mol N_2O_4

4 1.00 kg of which of the following contains the largest number of molecules?
Relative atomic masses: N = 14.01, O = 16.00, S = 32.07
A N_2O
B NO
C SO_2
D SO_3

5 0.15 mol copper react with nitric acid according to the equation:
$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 4H_2O + 2NO$
How many moles of NO are formed?
Relative atomic masses: H = 1.01, N = 14.01, O = 16.00, Cu = 63.55
A 0.23 mol
B 0.10 mol
C 0.15 mol
D 0.30 mol

6 Phosphorus(III)chloride may be prepared from phosphorus and chlorine:
$P_4 + 6Cl_2 \rightarrow 4PCl_3$
When 0.124 g of phosphorus were reacted with excess chlorine, 0.120 g of PCl_3 were formed. What was the yield of PCl_3?
Relative atomic masses: P = 30.97, Cl = 35.45
A 96.8%
B 90.2%
C 22.6%
D 5.63%

7 $NaClO_3$ decomposes when heated via the formation of $NaClO_4$:
$4NaClO_3(s) \rightarrow 3NaClO_4(s) + NaCl(s)$
$3NaClO_4(s) \rightarrow 3NaCl(s) + 6O_2(g)$
What is the maximum number of moles of oxygen that can be produced when 0.200 mol $NaClO_3$ are heated?
Relative atomic masses: O = 16.00, Na = 22.99, Cl = 35.45
A 0.300 mol
B 0.900 mol
C 0.100 mol
D 0.133 mol

8 Ethane burns in oxygen:
$2C_2H_6(g) + 7O_2(g) \rightarrow 4CO_2(g) + 6H_2O(l)$
What volume of carbon dioxide (measured at STP) is formed when 0.301 g of ethane are burnt in excess oxygen?
Relative atomic masses: H = 1.01, C = 12.01, O = 16.00
Molar volume of an ideas gas at STP = 22.7 $dm^3\ mol^{-1}$
A 0.454 cm^3
B 454 cm^3
C 227 cm^3
D 909 cm^3

9 What is the sum of the coefficients when the following equation is balanced using the smallest possible whole numbers?
$\ldots I_2 + \ldots H_2O \rightarrow \ldots HI + \ldots HIO_3$
A 4
B 8
C 11
D 12

10 Sodium oxide reacts with water:
$Na_2O(s) + H_2O(l) \rightarrow 2NaOH(aq)$
What mass of sodium oxide must be used to produce 100.0 cm^3 of a 0.250 mol dm^{-3} solution of sodium hydroxide?
Relative atomic masses: H = 1.01, O = 16.00, Na = 22.99
A 0.775 g
B 1.55 g
C 0.387 g
D 1.00 g