Solutions

1) What does the Law of Conservation of Mass state?

mass cannot be created and destroyed during chemical reactions	▼

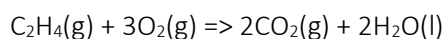2) A balanced chemical equation does not show

the size of the reactant particles or the size of the product particles.	▼

3) What must be the same on each side of a balanced chemical equation?

the number of atoms of each element	▼

4) Consider the equation below.
Ethene burns in oxygen to produce carbon dioxide and water according to the equation below.

$C_2H_4(g) + 3O_2(g) => 2CO_2(g) + 2H_2O(l)$

a) How many carbon atoms are on the left of the equation? | 2 ▼ |

b) Does this equation obey the Law of Conservation of Mass? | True ▼ |

c)
Why

the number of atoms of each element are the same on both sides	▼

d) Each molecule of ethene has | 2 ▼ | carbon atoms

and | 4 ▼ | atoms of hydrogen.

e) Each molecule of oxygen is made of | 2 ▼ | atoms of oxygen

f) 5 molecules of ethene react with 15 molecules of oxygen to form 10 molecules of carbon dioxide and 10 molecules of water.

g) The water formed is in the | liquid ▼ | state.

h) For every two molecules of ethene that react | 4 ▼ | molecules of water form.

i) If 6 molecules of oxygen react, how many molecules of carbon dioxide will form? | 4 ▼ |

5) Consider the equation below.
Sodium carbonate powder is placed in a solution of hydrochloric acid and reacts vigorously to produce carbon dioxide gas, liquid water and dissolved sodium chloride according to the equation below.

$Na_2CO_3(s) + 2HCl(aq) => CO_2(g) + H_2O(l) + 2NaCl(aq)$

a) How many oxygen atoms are on the left of the equation? | 3 ▼ |

b) Does this equation obey the Law of Conservation of Mass? | True ▼ | . Explain why.
Equal number of atoms of each element are present on both sides of the equation.

c) Each molecule of carbon dioxide has | 1 ▼ | carbon atom and | 2 ▼ | atoms of oxygen .

d) If 2 molecules of HCl reacted how many molecules of CO_2 are produced? | 1 ▼ |

e) If 4 molecules of HCl reacted how many molecules of CO_2 are produced? | 2 ▼ |

f) The salt (NaCl) formed is in the | aqueous ▼ | state.

g) For every one molecule of water that is produced, | 2 ▼ | molecules of HCl react..

h) If 6 molecules of HCl react, how many molecules of carbon dioxide will form? | 3 ▼ |

6) Consider the chemical equation below. It shows nitrogen and hydrogen gases reacting to form ammonia gas.

$N_2(g) + H_2(g) => NH_3(g)$
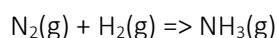
a) All the reactant particles are in the | gas ▼ | state

b) An ammonia molecule consists of | one nitrogen and three hydrogen atoms ▼ |
c) Explain why this chemical equation is not considered to be balanced?
Equal numbers of each element do not exist on both sides of the equation. For example two hydrogen atoms are present on the reactant side but three appear on the product side.
d) Select the appropriate prefixes that should be placed in front of each reactant and product in order to balance this equation. | 1 ▼ | $N_2(g)$ + | 3 ▼ | $H_2(g)$ => | 2 ▼ | $NH_3(g)$
e) In your balanced equation given in question d) above :
   i. how many ammonia molecules appear on the products side of the equation. | 2 ▼ |
equation.
   ii. how many hydrogen atoms appear on the products side of the equation. *6*