

Balancing Chemical Equations Questions

1. Write a balanced chemical equation for each of the following:

a) hydrogen + oxygen form water

b) nitrogen + hydrogen form ammonia (NH₃)

c) hydrogen sulfide forms hydrogen + sulfur

d) magnesium + oxygen form magnesium oxide

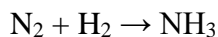
e) calcium + water form calcium hydroxide + hydrogen gas

(P, D) f) copper(II) oxide + hydrogen form copper + water

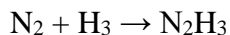
(P, D) g) lead(II) nitrate + potassium iodide form lead(II) iodide + potassium nitrate

(P, D) h) lead(II) sulfide + oxygen form lead + sulfur dioxide

2. a) How can you tell the following equation is not balanced?



b) Imagine a friend tried to balance the equation as shown below. What would you say is wrong with the way it is balanced?



3. Nitrogen oxides are a group of air pollutants produced by internal combustion engines in automobiles. These pollutants are formed by the reaction of atmospheric nitrogen (N₂) and oxygen (O₂) to form various combinations, including NO, NO₂, N₂O₄, N₂O₃, and N₂O₅.

a) Write balanced chemical equations to show the formation of each of these compounds.

b) By using a catalytic converter and keeping engines properly tuned so that the right amount of oxygen enters the combustion cylinder at the right temperature, the formation of nitrogen oxides (NO_x) can be greatly reduced. Why do you think this is important?

(D) 4. Imagine that you are an engineer trying to determine how much air has to be supplied to burn gasoline in a car engine. Assuming that gasoline is heptane (C₇H₁₆), the word equation is
heptane + oxygen → carbon dioxide + water vapour

a) Write the skeleton equation for the reaction.

b) Balance the equation by adding coefficients as necessary.

c) How many molecules of oxygen are required for every molecule of heptane that burns?