

Chem11 Chemical Reactions : Test 2 - 180

- 1) a) Define : Chemical reaction.
- b) Give an example of an exothermic reaction. Write down the equation.

c) Is the following reaction possible? :



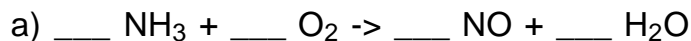
2) Which one of the following is a chemical reaction ?

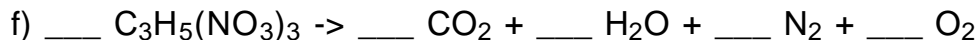
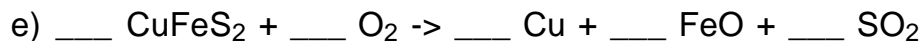
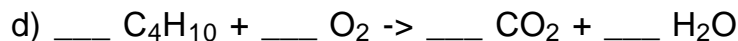
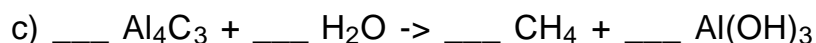
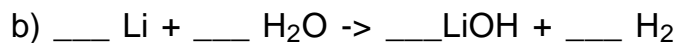
- a) $\text{CaCl}_2 \rightarrow \text{Ca}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq})$
- b) $2\text{KNO}_3 + \text{S} + 3\text{C} \rightarrow \text{Na}_2\text{S} + 3\text{CO}_2 + \text{N}_2$
- c) $\text{HCl} + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaCl}$
- d) $\text{FeSO}_4 + \text{Cu} \rightarrow \text{Fe} + \text{CuSO}_4$

3) Complete the following reactions (**do not balance**). State the type of the reaction : synthesis, decomposition, water-forming, combustion, single-replacement or double-replacement. If there is no reaction, write N.R.

- a) $\text{Pb}(\text{NO}_3)_2(\text{aq}) + \text{CaI}_2(\text{aq}) \rightarrow$
- b) $\text{FeBr}_3(\text{s}) \rightarrow$
- c) $\text{Mg}(\text{s}) + \text{S}(\text{s}) \rightarrow$
- d) $\text{AgNO}_3(\text{aq}) + \text{Zn}(\text{s}) \rightarrow$
- e) $\text{C}_5\text{H}_{12}(\text{l}) + \text{O}_2(\text{g}) \rightarrow$
- f) $\text{Mg}(\text{NO}_3)_2(\text{aq}) + \text{Cu}(\text{s}) \rightarrow$
- g) $\text{H}_3\text{PO}_4(\text{aq}) + \text{Ba}(\text{OH})_2(\text{aq}) \rightarrow$
- h) $\text{Al}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow$

4) Balance these equations.





5) For the word equations given below, write **balanced** equations using symbols for the elements and compounds.

a) Aluminum metal burns in oxygen gas to give solid aluminum oxide.

b) Calcium hydride reacts with water to form hydrogen gas and calcium hydroxide.

c) Heptane (C₇H₁₆) burns in an oxygen atmosphere.

d) Aluminum oxide and sulfuric acid (H₂SO₄) produce water and aluminum sulfate.

6) Explain in detail, how the simple fire extinguisher works. Write down the chemical reaction. It uses sodium bicarbonate combined with sulfuric acid.

Answers : 1)a) It is a reaction in which new compounds are formed. b) Burning of methane. CH₄ + 2O₂ -> 2H₂O + CO₂, c) No. Mg is higher than Al in the activity series. Al is not as active as Mg., 2) Answer : c). It is a chemical reaction, a) is a physical reaction, b) is not possible (elements are not the same on both sides), d) this reaction is not possible as Cu is lower than Fe in the activity series., 3)a) Pb(NO₃)₂ + CaI₂ -> PbI₂ + Ca(NO₃)₂, (d.r.), b) FeBr₃ -> Fe + Br₂, (dec), c) Mg + S₈ ->

MgS , (syn), d) $\text{AgNO}_3 + \text{Zn} \rightarrow \text{Zn(NO}_3)_2 + \text{Ag}$, (s.r.), e) $\text{C}_5\text{H}_{12} + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2$, (com), f) $\text{Mg(NO}_3)_2 + \text{Cu} \rightarrow \text{N.R.}$, g) $\text{H}_3\text{PO}_4 + \text{Ba(OH)}_2 \rightarrow \text{Ba}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$, (w.f), h) $\text{Al} + \text{H}_2\text{SO}_4 \rightarrow \text{H}_2 + \text{Al}_2(\text{SO}_4)_3$, (s.r.), 4)a) 4, 5, 4, 6, b) 2, 2, 2, 1, c) 1, 12, 3, 4, d) 2, 13, 8, 10, e) 2, 5, 2, 2, 4, f) 4, 12, 10, 6, 1, g) 8, 16, 3, 16, 5)a) $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$, b) $\text{CaH}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2 + \text{Ca(OH)}_2$, c) $\text{C}_7\text{H}_{16} + 11\text{O}_2 \rightarrow 8\text{H}_2\text{O} + 7\text{CO}_2$, d) $\text{Al}_2\text{O}_3 + 3\text{H}_2\text{SO}_4 \rightarrow 3\text{H}_2\text{O} + \text{Al}_2(\text{SO}_4)_3$, 6) In the simple fire extinguisher, sodium bicarbonate combines with sulfuric acid to produce sodium sulfate, water and carbon dioxide. The water cools down the burning object and the carbon dioxide smothers the flame because it is heavier than air and so prevents oxygen from feeding the flame. (See important equations worksheet. A different reaction is used in modern fire extinguishers).