

CLASS 10

SCIENCE

EXTRA QUESTIONS

Extra Questions: Class 10 Science Chapter 1 Chemical Reactions and Equations

These go beyond the standard exercise into genuine HOTS (Higher Order Thinking Skills) territory -- equation-balancing with fresh compounds, reaction-type classification, assertion-reason, and everyday-life application questions. See the standard-level Solutions first if you have not already. These Class 10 Science ...

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Extra Questions (HOTS Level): Chemical Reactions and Equations (Class 10 Science Chapter 1)

Q1 (Balancing, fresh compound). Balance the following equation: $\text{Pb}(\text{NO}_3)_2$ heated on strong heating gives lead oxide, nitrogen dioxide and oxygen gas.

Solution: $2\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO} + 4\text{NO}_2\uparrow + \text{O}_2\uparrow$. This is a thermal decomposition reaction — a single compound breaks down into simpler products on heating.

Q2 (Reverse-engineering / reaction type). A strip of zinc metal is dipped into a colourless solution of silver nitrate. After some time, a shiny grey deposit forms on the zinc strip and the solution turns colourless-to-pale. Identify the reaction, write the balanced equation, and name the type of reaction.

Solution: Zinc is more reactive than silver, so it displaces silver from silver nitrate solution: $\text{Zn} + 2\text{AgNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}\downarrow$. This is a displacement reaction (a more reactive metal displaces a less reactive one from its salt solution); the grey deposit is metallic silver.

Q3 (Assertion-Reason). Assertion (A): Silver chloride turns grey/black when exposed to sunlight.

Reason (R): Sunlight causes AgCl to decompose into silver and chlorine, and this is an example of a photolytic decomposition reaction.

Solution: Both statements are individually true, and R correctly explains A. $2\text{AgCl} \xrightarrow{\text{sunlight}} 2\text{Ag} + \text{Cl}_2\uparrow$. The reaction is used in black-and-white photography, where exposed silver chloride/bromide darkens on developing.

Both A and R are true, and R is the correct explanation of A.

Q4 (General/conceptual proof-style). Explain, with one example each, why every combination reaction is not necessarily exothermic, but why a reaction that combines quicklime with water always releases heat.

Solution: Most combination reactions (two or more substances combining into one product) do release heat and are exothermic — for example, $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{heat}$, used to slake lime, is strongly exothermic because new, more stable bonds form while releasing energy. However, some combination reactions absorb heat instead, such as the combination of nitrogen and oxygen at very high temperature to form nitric oxide ($\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$), which is endothermic. So whether a combination reaction is exothermic or endothermic depends on the specific substances involved, not on it being a combination reaction as such; the calcium-oxide-and-water reaction specifically is always exothermic because of the strongly favourable energy change on forming $\text{Ca}(\text{OH})_2$.

Q5 (Applied / distinguishing test). Two colourless solutions, sodium sulphate and barium chloride, are mixed and a white precipitate forms immediately. (a) Write the balanced equation. (b) Name the type of reaction. (c) How would you confirm, using a physical test, that a genuine chemical reaction (not just mixing) has occurred?

Solution: (a) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4\downarrow + 2\text{NaCl}$. (b) This is a double displacement (precipitation) reaction — the two compounds exchange ions to form an insoluble product, barium sulphate. (c) Confirm a genuine chemical change occurred by checking that a new insoluble substance (the white BaSO_4 precipitate) has formed that was not present in either original clear solution — formation of a precipitate, along with the fact that filtering it out leaves a solution with different properties (sodium chloride solution) from either starting solution, is direct evidence of a chemical reaction rather than a physical mixture.

Q6 (Everyday-life application). Explain, using the concept of corrosion, why iron articles are usually

galvanised (coated with zinc) rather than being left uncoated, and why keeping cut fruit like apple or potato exposed to air changes its colour — are these the same kind of change?

Solution: Iron corrodes (rusts) when its surface reacts with atmospheric oxygen and moisture to form hydrated iron(III) oxide (rust); galvanising coats the iron with a layer of zinc, which reacts with air first (and is also less easily attacked), protecting the iron underneath from direct exposure. Cut fruit turning brown is a different, non-metallic kind of change: an enzyme in the fruit reacts with atmospheric oxygen (enzymatic oxidation) to form brown-coloured compounds. Both are oxidation reactions with air/oxygen as a common cause, but rusting is corrosion of a metal (a slow chemical change that damages a metal object over time), while fruit browning is an enzymatic reaction affecting a plant tissue, not a metal — so while both involve oxidation, they are not the same class of everyday phenomenon.

Class 10 Science Chapter 1 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the [Class 10 Science Chapter 1 Solutions](#) and [Class 10 Science Chapter 1 Revision Notes](#).

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