Definitions and Concepts for Edexcel Chemistry GCSE

Topic 8 - Fuels and Earth Science

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*Definitions in **bold** are for higher tier only*

Definitions marked by '' are for separate sciences only*

Definitions have been taken, or modified from the Edexcel Specification for GCSE Chemistry, 1CH0, Issue 3, February 2018

Acid rain: Rain that is acidic due to gases, such as sulfur dioxide, reacting with water vapour in the clouds. Sulfur dioxide is produced from the burning of fossil fuels which contain sulfur impurities.

Alkanes: The most common hydrocarbon found in crude oil. Alkanes have the general formula C_nH_{2n+2}.

Alkenes: Alkenes are hydrocarbons with a double bond between two of the carbon atoms in their chain, causing them to be unsaturated. They have the general formula C_nH_{2n}.

Catalytic cracking: Long-chain hydrocarbons are heated to turn them into a gas. The vapour is then passed over a hot powdered aluminium oxide catalyst. The long chain molecules split apart on the surface of the catalyst.

Climate change: A change in global climate patterns largely believed to be caused by the increase in concentration of carbon dioxide in the atmosphere.

Combustion: The burning of a substance in oxygen causing energy to be transferred to the surroundings as heat and light. During combustion, the carbon and hydrogen in the fuels are oxidised.

Complete combustion: Combustion carried out in sufficient oxygen. Water and carbon dioxide are the only products of the complete combustion of a hydrocarbon.

Cracking: A process that involves breaking down larger hydrocarbons to produce smaller more useful molecules. Cracking can be done by catalytic cracking or steam cracking.

Crude oil: A finite resource found in rocks. It is the remains of an ancient biomass consisting mainly of plankton that was buried in mud. Most of the compounds in crude oil are hydrocarbons.

Finite resource: A resource which will one day run out.

Fossil fuel: Natural fuels, such as coal and gas, formed in the past from the remains of living organisms.

Fractional distillation: A process used to separate a mixture of liquids. The liquids have different boiling points so can be separated into different fractions within a fractionating column.

General formula: A chemical formula which applies to a class of compounds, representing the composition of the atoms present in the compound. For example, alkanes have the general formula C_nH_{2n+2} where n is the number of carbon atoms in the molecule.

Greenhouse effect: The increase in the temperature of the Earth's atmosphere due to the greenhouse gases in the atmosphere trapping infra-red radiation from the surface.

Greenhouse gases: Gases in the atmosphere which maintain temperatures on Earth high enough to support life. Greenhouse gases include water vapour, carbon dioxide and methane.

Homologous series: A series of compounds with the same functional group and similar chemical properties.

Hydrocarbons: Molecules that are made up of hydrogen and carbon atoms only.

Incomplete combustion: Combustion which is carried out with insufficient oxygen. It can lead to the production of toxic carbon monoxide and carbon particulates.

Non-renewable energy: An energy resource which is finite. Methane, petrol and diesel oil are all examples of non-renewable fossil fuels.

Particulates: Polluting particles which cause global dimming and health problems for humans. Carbon particulates (soot) are a product of incomplete combustion.

Photosynthesis: A reaction which occurs in plants and algae which led to the production of oxygen in the early atmosphere. This simultaneously decreased the amount of carbon dioxide in the early atmosphere. Equation for photosynthesis:

$$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2.$$

Pollutants: A substance introduced into the environment that has undesired effects.

Steam cracking: Long-chain hydrocarbons are heated to turn them into a gas. The hydrocarbon vapour is then mixed with steam and heated to a very high temperature which caused them to split into smaller molecules.