Syllabus

1. History of solid fuel.
2. Protection, present scenario and consumption pattern of fuels.
3. Coal classification, composition and basis.
4. Fundamental definition, properties and various measurements.
5. Different types of coal combustion techniques.
6. Coal gasification.
7. Exploration of crude petroleum.
8. Refinery equipment's.
9. Gaseous fuel.
10. Water gas, hydrogen gas.
11. Acetylene, other fuel gas.
12. Combustion technology, fundamentals of thermochemistry.
13. Mechanism and kinetics of combustion, combustion furnaces, internal combustion engine.
14. Exam.
15. Review week.

المنهج

1-تاريخ الوقود الصلب.
2-الحماية والسيناريو الحالي ونمط استهلاك الوقود.
3-تصنيف الفحم وتكوينه وأساسه.
4-التعريف الأساسي والخصائص والقياسات المختلفة.
5-أنواع مختلفة من تقنيات احتراق الفحم.
6-تغويز الفحم.
7-التنقيب عن النفط الخام.
8-معدات التكرير.
9-الوقود الغازي.
10-غاز الماء وغاز الهيدروجين.
11-الأسيتيلين ، غاز الوقود الآخر.
12-تكنولوجيا الاحتراق ، أساسيات الكيمياء الحرارية.
13-آلية وحركية الاحتراق والاحتراق1-

مسببات الحرائق

History

The first known use of fuel was the combustion of firewood by *Homo erectus* nearly two million years ago.[Throughout most of human history only fuels derived from plants or animal fat were used by humans. Charcoal, a wood derivative, has been used since at least 6,000 BCE for melting metals. It was only supplanted by coke, derived from coal, as European forests started to become depleted around the 18th century. Charcoal briquettes are now commonly used as a fuel for barbecue cooking.(1)

Crude oil was distilled by Persian chemists, with clear descriptions given in Arabic handbooks such as those of Muhammad ibn Zakarīya Rāzi.[2] He described the process of distilling crude oil/petroleum into kerosene, as well as other hydrocarbon compounds, in his *Kitab al-Asrar* (*Book of Secrets*). Kerosene was also produced during the same period from oil shale and bitumen by heating the rock to extract the oil, which was then distilled. Rāzi also gave the first description of a kerosene lamp using crude mineral oil, referring to it as the "naffatah".[3]

Chemical

Chemical fuels are substances that release energy by reacting with substances around them, most notably by the process of combustion.

Chemical fuels are divided in two ways. First, by their physical properties, as a solid, liquid or gas. Secondly, on the basis of their occurrence: *primary (natural fuel)* and *secondary (artificial fuel)*. Thus, a general classification of chemical fuels is:

General types of chemical fuels

	Primary (natural)	Secondary (artificial)
Solid fuels	wood, coal, peat, dung, etc.	coke, charcoal
Liquid fuels	Petroleum	diesel, gasoline, kerosene, LPG, coal tar, naphtha, ethanol
Gaseous fuels	natural gas	hydrogen, propane, methane, coal gas, water gas, blast furnace gas, coke oven gas, CNG

Solid fuel

Solid fuel refers to various types of solid material that are used as fuel to produce energy and provide heating, usually released through combustion. Solid fuels include wood, charcoal, peat, coal, hexamine fuel tablets, and pellets made from wood (see wood pellets), corn, wheat, rye and other grains. Solid-fuel rocket technology also uses solid fuel (see solid propellants). Solid fuels have been used by humanity for many years to create fire. Coal was the fuel source which enabled the industrial revolution, from firing furnaces, to running steam engines. Wood was also extensively used to run steam locomotives. Both peat and coal are still used in electricity generation today. The use of some solid fuels (e.g. coal) is restricted or prohibited in some urban areas, due to unsafe levels of toxic emissions. The use of other solid fuels as wood is decreasing as heating technology and the availability of good quality fuel improves. In some areas, smokeless coal is often the only solid fuel used. In Ireland, peat briquettes are used as smokeless fuel. They are also used to start a coal fire.

Coal is a solid fuel

Firewood was one of the first fuels used by humans.[1]

Liquid fuels

Liquid fuels are combustible or energy-generating molecules that can be harnessed to create mechanical energy, usually producing kinetic energy. They must also take the shape of their container; the fumes of liquid fuels are flammable, not the fluids.

Most liquid fuels in widespread use are derived from the fossilized remains of dead plants and animals by exposure to heat and pressure inside the Earth's crust. However, there are several types, such as hydrogen fuel (for automotive uses), ethanol, jet fuel and bio-diesel, which are all categorized as liquid fuels. Emulsified fuels of oil in water, such as orimulsion, have been developed as a way to make heavy oil fractions usable as liquid fuels. Many liquid fuels play a primary role in transportation and the economy.

Some common properties of liquid fuels are that they are easy to transport and can be handled easily. They are also relatively easy to use for all engineering applications and in home use. Fuels like kerosene are rationed in some countries, for example in government-subsidized shops in India for home use.

Conventional diesel is similar to gasoline in that it is a mixture of aliphatic hydrocarbons extracted from petroleum.

Kerosene is used in kerosene lamps and as a fuel for cooking, heating, and small engines. Natural gas, composed chiefly of methane, can only exist as a liquid at very low temperatures (regardless of pressure), which limits its direct use as a liquid fuel in most applications. LP gas is a mixture of propane and butane, both of which are easily compressible gases under standard atmospheric conditions. It offers many of the advantages of compressed natural gas (CNG) but is denser than air, does not burn as cleanly, and is much more easily compressed. Commonly used for cooking and space heating, LP gas and compressed propane are seeing increased use in motorized vehicles. Propane is the third most commonly used motor fuel globally.

Fuel gas

Fuel gas is any one of a number of fuels that are gaseous under ordinary conditions. Many fuel gases are composed of hydrocarbons (such as methane or propane), hydrogen, carbon monoxide, or mixtures thereof. Such gases are sources of potential heat energy or light energy that can be readily transmitted and distributed through pipes from the point of origin directly to the place of consumption. Fuel gas is contrasted with liquid fuels and from solid fuels, though some fuel gases are liquefied for storage or transport..

While their gaseous nature can be advantageous, avoiding the difficulty of transporting solid fuel and the dangers of spillage inherent in liquid fuels, it can also be dangerous. It is possible for a fuel gas to be undetected and collect in certain areas, leading to the risk of a gas explosion. For this reason, odorizers are added to most fuel gases so that they may be detected by a distinct smell. The most common type of fuel gas in current use is natural gas.


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