



Petroleum Economics
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Department



Subject: Petroleum Economics

Second Class

Lecture One

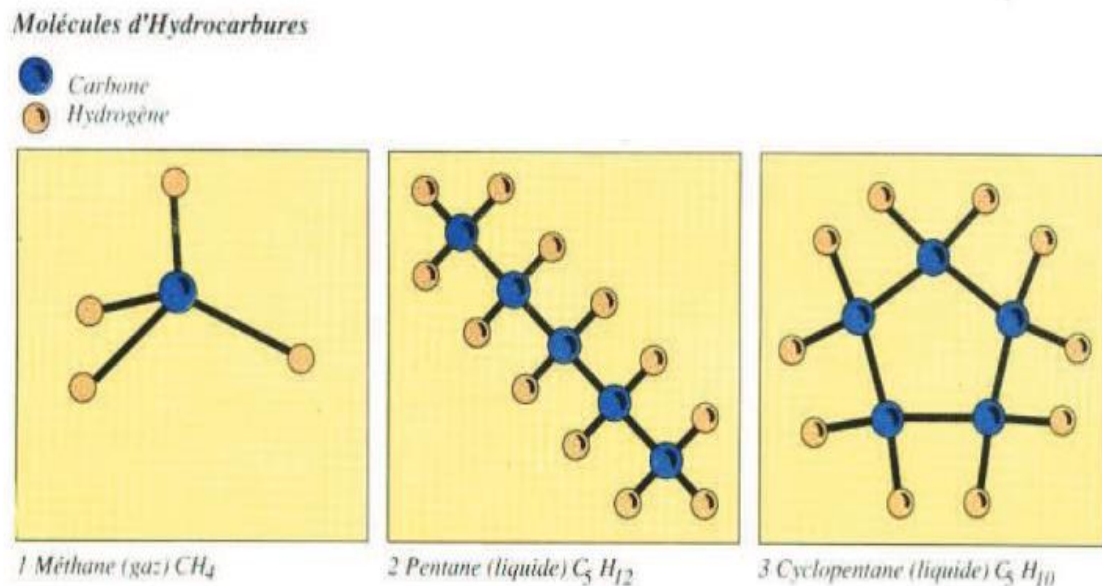
1.1:Introduction:

Oil is one of the most important discoveries made by man since 1859, as it is the first source. It is the mainstay of energy, and the focus of all industrial and agricultural production in the contemporary world a vital component of everyday life. Oil is not only the most important source of energy, but also it has also become a source for the extraction of at least eleven thousand different industrial commodities in the world. As it is no longer just a passing trade commodity, but rather it has become the most important commodity in international trade, as it constitutes 33.2% of the global energy trade in 2008. No other substance has captured the same amount of energy. The commercial and economic importance of oil. Despite the many attempts of industrialized countries in replacing it with other energies, whether they are depleted energies such as gas, coal, nuclear energy, or energies renewable energy such as solar energy, wind energy, hydro energy and other permanent energies Since the first oil crisis in 1973.

1.2:Definition of oil:

The word "oil" is originally a Latin word "Petroleum", meaning "Petr rock + oil, Oleum", meaning "oil". Oil is a simple and complex substance at the same time. Rock Oil is a simple and complex material at the same time. It is simple in that it consists of only two elements, hydrogen and carbon. It is a compound in that the properties of its derivatives differ according to the molecular structure of each of them. Every substance consists of molecules that are the basic units of its structure. Each molecule is made up of atoms. The properties of matter are united by the number and type of atoms that unite to form its molecules, and by the number and type of bonds that contribute to this union in each case, it

results in an oil product with characteristics that differ from other products¹, as shown in the figure below:



1.3:Petroleum Economics :

Petroleum economy known as one of scientific disciplines that deal with studying the oil industry across multiple rings (exploration, extraction, transportation, refining, and consumption). The oil economy as a branch of applied economics, which tries to take advantage of the tools of economic analysis in the study of the behavior of the oil industry as units producing or consuming in terms of the supply, demand, prices, costs, the behavior of the product, and consumer behavior. It is aware of the economics branches, like other types of industrial and agricultural economy and the international economy and the rest of the other branches.

1.4:Effect of Oil Economics with other Branches of Science:

1- The relationship of oil economics with other branches of knowledge, such as geography and history and politics, for example, geography (the oil economy relation to the geographical distribution of oil sites in the world), and history (the evolution of the oil industry in the world) by several indicators and patterns of ownership and its evolution over time and the control of companies and countries on the industry.

2- Relationship of oil economy with the branches of statistics and mathematics, and the intervene in many areas and operations research as well as the functions of demand and supply, prices and functions (linear and non-linear and logarithmic) in building models and estimate and analyze the behavior of the product oil as well as the growth rates of oil consumption, energy and oil production as well as quantitative analysis and the other different fields.



Terminology and some aspects Energy map:

Divided into different energy sources, whether the sources of energy depleted or non-depleted sources and distributed between what is commercial and non-commercial, and as shown below:

- Conventional (classical) energy sources (wood, animal waste).

- Sources of Commercial Energy (Normal):

1- Depleted energy sources (oil, gas, and coal).

2- A renewable energy sources (hydropower, geothermal energy).

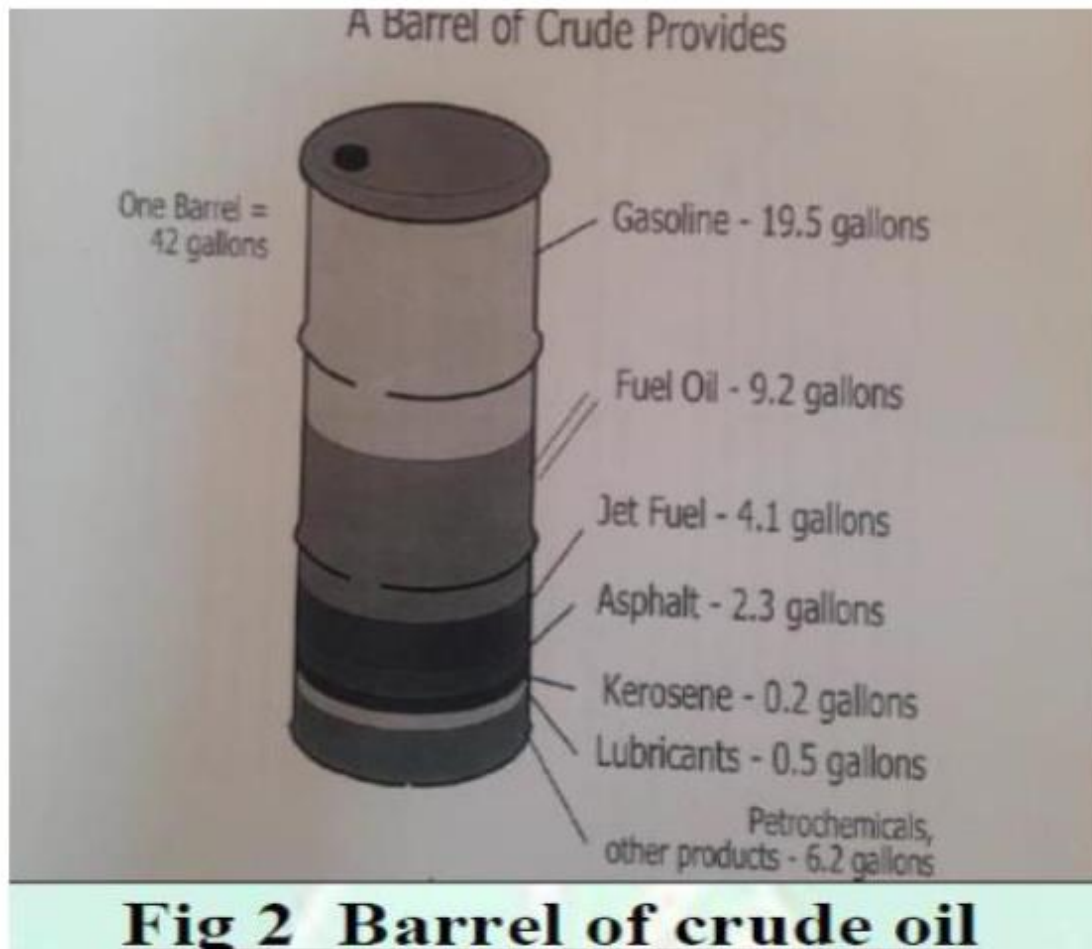
- Sources of commercial energy (unusual) future:

1- Depleted sources (heavy oil, oil sands asphalt, and tear gas from the unusual sources).

2- Renewable sources (indirect solar energy; direct solar energy (thermal conversion

and photoelectric transformation) (wind, waves, tides, and organic energy).

2- A map of a barrel of oil It can be identify as the components of a barrel of oil refining process before and after the process of refining it to be valid for direct consumption in all known areas and as shown in the attached figure (2) for a barrel of crude oil.



3- Metrics and conversion factors in the oil industry and energy It is a set of scales and transactions for transferring crude oil and energy in order to deviate from the measurements between overlapping sources of fuel and energy, and it can be seen below:

A-The units of measure are supported in the calculation of units

$$10^3=1000$$

$$10^6=1000000$$

$$10^9=1000000000$$

$$10^{12}=1000000000000$$

B- Switcher units in crude oil:

- metric ton = 7.333 barrels

1 barrels of oil=42 gal

- 100 barrels of oil/day=50(1013)/ton/year

C-Supported standards in terms of oil and energy :

- bd=barrels per day

- cfd=cubic feet per day

- mbd=million barrels per day

Crude oil is usually measured in either barrels or metric tons. The most common measurement of oil production is the number of barrels per day or metric tons per year. Because a barrel is a measure of volume and a ton is a measure of weight, there is no exact relationship between them. As the weight of crude oil varies according to its type, but the following measures can be adopted:

A- to measure the size

1. 1 Barrel = 42 American Gallon = 159 Litter

2. Cubic Meter = 6.28 Barrel

3. 1 barrel = 4.5 UK Gallon

B- To measure the weight

1. 1 tone of oil = 7.33 barrels

2. Production 1 barrel/day = 49.8 Metric tone

C-Conversion coefficients

1. 1 tone of (LG) = 16 barrels of oil

2. 1 tone of (cool) = 0.67 million tone (oil)

3. 1 barrel of oil = 5 million BTU

4. 1 tone of oil = 39 million BTU

Oil unit scale: Every substance created and used by man except that a specific measure was set for it with the aim of determining the amount of that unit or units. These scales have varied and varied over time, but they have become more stable and accurate

It is widely used in the world today.

1.5:Oil density

The American Petroleum Institute (API) scale represents the standard adopted in measuring the density on the basis of the specific gravity of crude oil and the degree of density inversely related to the first scale.

(Specific weight) as the oils with the largest specific weight have a low density on the scale of the American Petroleum Institute, in contrast to the oils with the lowest specific weight, which are light and medium oils, and the specific density is calculated according to the equation set by the American Petroleum Institute,

$$\text{Degree API} = 141.5 / \text{Density grade for crude oil at } 60 \text{ F} * 131.5$$

Or

$$\text{Degree API} = (141.5 / \text{Specific gravity}) - 131.5$$

Example: If the specific gravity of oil is 0.82, find the degree of density of the oil?

$$\text{API score} = 141.5/0.82 - 131.5 = 41.1$$

Table No. (2) Classification of Crude Oil by Density Degrees

Crude oil type	consistency API
heavy	1-28
medium	28-34
light	more than 34

- The second importance of the scale API Calculation of the number of barrels of crude oil per metric ton

$$\text{barrels of crude oil per metric ton} = \frac{\text{API gravity} + 131.5}{141.5 \times 0.159}$$