— University of Mosul —
College of Petroleum & Mining Engineering

Title of the lecture

Lecture One

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Introduction

Petroleum refining plays an important role in our lives. Most transportation vehicles are powered by refined products such as gasoline, diesel, aviation turbine kerosene (ATK) and fuel oil. Petroleum has remained an important aspect of our lives and will do so for the next four or five decades. The fuels that are derived from petroleum supply more than half of the world s total supply of energy. Gasoline, kerosene, and diesel oil provide fuel for automobiles, tractors, trucks, aircraft, and ships. Fuel oil and natural gas are used to heat homes and commercial buildings, as well as to generate electricity. Petroleum products are the basic materials used for the manufacture of synthetic fibers for clothing and in plastics, paints, fertilizers, insecticides, soaps, and synthetic rubber. The uses of petroleum as a source of raw material in manufacturing are central to the functioning of modern industry.

Composition and Classification of Crude Oils

There are three main classes of hydrocarbons. These are based on the type of carbon–carbon
bonds present. These classes are:

- Saturated hydrocarbons contain only carbon–carbon single bonds. They are known as paraffins (or alkanes) if they are acyclic, or naphthenes (or cycloalkanes) if they are cyclic.
- Unsaturated hydrocarbons contain carbon–carbon multiple bonds (double, triple or both). These are unsaturated because they contain fewer hydrogens per carbon than paraffins. Unsaturated hydrocarbons are known as olefins. Those that contain a carbon–carbon double bond are called alkenes, while those with carbon–carbon triple bond are alkyenes.
- Aromatic hydrocarbons are special class of cyclic compounds related in structure to benzene.

Composition and Classification of Crude Oils

- 1- Paraffins
- General formula: CnH2n+2 (n is a whole number, usually from 1 to 20), straight or branchedchain
- molecules, can be gasses or liquids at room temperature depending upon the molecule.
- For example, methane, ethane, propane, butane, isobutane, pentane, hexane

Composition and Classification of Crude Oils

- 2- Olefins (also known as alkenes)
- General formula: CnH2n (n is a whole number, usually from 1 to 20), linear or branched chain
- molecules containing one carboncarbon double-bond, can be liquid or gas. For example:
- ethylene, butene, isobutene

Composition and Classification of Crude Oils

- 3- Naphthenes (cycloalkanes)
- General formula: CnH2n (n is a whole number usually from 1to 20), ringed structures with one
- or more rings, rings contain only single bonds between the carbon atoms, typically liquids at
- room temperature. For example: cyclohexane, methyl cyclopentane

Composition and Classification of Crude Oils

- 4- Aromatics
- General formula: C6H5 - Y (Y is a longer, straight molecule that connects to the benzene
- ring), ringed structures with one or more rings, rings contain six carbon atoms, with
- alternating double and single bonds between the carbons,typically liquids. For examples
- benzene, naphthalene