I. INTRODUCTION

Lubricants are used with high-speed vehicles, which means an increase in additive dosage, because base oils alone don not give high performance level. Petroleum companies go to produce lubricating oils with higher performance levels. There are many types of additives mixed with base oil to produce different performance levels of motor oil. The most important one is viscosity index improver and pour point additives.

I.1 Crude Oils Classification

Crude oils vary widely in appearance and consistency from country to country and from field to field. They range from yellowish brown, mobile liquids to black, viscous semi-solids. However, all crude oils consist essentially of hydrocarbons. Their differences are due to the different proportion of the various molecular types and sizes of hydrocarbons.[1]

Crude are usually classified into three groups, according to the nature of the hydrocarbons they contain.

I.1.1 Paraffinic crude oils

These contain paraffin wax (higher molecular weight paraffinic which are solid at room temperature), but little or no asphaltic (bituminous) matter. They consist mainly of paraffinic hydrocarbons and usually give good yields of paraffin wax and high-grade lubricating oils.

I.1.2 Asphaltic crude oils

These contain little or no paraffin wax, but asphaltic matter is usually present in large properties. They consist mainly of naphthenes and yield lubricating oils whose viscosities are more sensitive to

temperature than those from paraffin crude, but which can be made equivalent to the latter by special refining methods. This crude are now often referred to as naphthenes crude oils. [2]

I.1.4 Mixed crude oils

These contain substantial properties of both paraffin wax and asphaltic matter. Both paraffins and naphthenes are present, together with a certain properties of aromatic hydrocarbons.

This classification is a rough and ready division into types and should not be used too strictly. Most crude exhibit considerable overlapping of the types described and by far the majority is of the mixed base type. The nature of the crude governs to a certain extent the nature of the products that can be manufactured from it and their suitability for special applications. Naphthenes crude will be more suitable for the production of asphaltic bitumen, paraffinic crude for wax. Naphthenes crude and even more so an aromatic one will yield lubricating oils whose viscosities are rather sensitive to temperature. However, modern refining methods permit greater flexibility in their use of crude to produce any desired type of product [3]

I.2 Crude Oils Refining

A modern petroleum refinery is a complex of many highly interrelated processes, the objective of which is to derive from a crude oil of given type and cost higher value products meeting required quality and demand.[4]

Separation is a physical division of crude oil or products into various fractions. The most common technique used throughout a refinery is distillation. Conversion involves chemically changing the size of molecular structure to yield more desirable properties without necessarily

changing the boiling range. Treating removes contaminants or reduces them to innocuous forms. Blending involves mixing various refinery streams to make finished products of the required quality. Overall flow various is from the crude distillation unit at the left, through various process units, to the product blending streams on the right. [5, 6]

I.2.1 Distillations

The first step in the manufacture of petroleum products is the separation of crude oil into the main fractions by distillation. This is the most important process in the refinery, because, in addition to its use for separation, it plays an important part in refining the products to marketing specifications.

I.2.1.1 Atmospheric distillations

The products obtained by distillation of crude oil do not consist of single hydrocarbons, except in the case of simple gases such as ethane and propane. Each product fraction contains many hydrocarbons compounds boiling within a certain range and these can be broadly classified in order of decreasing volatility into gases, light distillates, middle distillates and residue.

A simple continuous crude distillation unit is shown in Figure (1). The crude oil feed first passes through a heat exchanger in countercurrent flow with the outgoing hot residue product, then enters the furnace, where it is heated to about 350 °C depending on crude feedstock and products to be made; higher temperatures could lead to "cracking" and thermal decomposition. The hot vapour/liquid leaving the furnace enters the main fractionating column in the form of a mist which separates, the vapour passing upwards and liquid downwards. This column normally operates slightly above atmospheric pressure and therefore the majority of