



**Ministry of Higher Education and  
Scientific Research  
Technology University  
Petroleum Technology Department  
Guide Manual  
Petroleum Properties Laboratory**

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**2019 - 2020**

### **Introduction :-**

The oil properties laboratory is considered one of the departments most important laboratories as it has been equipped with the latest equipment and modern technologies that keep pace with the developments of the oil industry and also gives all the tests on the oil side and urges students to diagnose the specifications of the different oils and determine their chemical and physical properties.

### **The Base:-**

The laboratory aims to teach students the characteristics of crude oil and oil derivatives the most important of which are density ,specific weight ,flash point ,carbon residue and other according to standard specifications and to identify the specifications of oil through combustion.



## **1- The first Experiment**

**(Density and specific gravity)**

**The purpose of the experiment :-**

Used to measure the density and specific weight of  
petroleum products .

Density = mass/volume

$1000\text{kg/m}^3$   
 $1\text{g/cm}^3$

**The device used:-**

- 1- Hydrometer
- 2- Pycnometer



**pycnometer**



## hydrometer

### Samples used:-

All used oil derivatives or any chemical substance for the pycnometer .

As for the hydrometer device it is done according to its specific weight

## **2-The second experience**

### **( Simple distillation )**

#### **The purpose of the experiment :-**

This experiment is used to find the degree of measurement of the oil derivative or chemical and to draw the curve between the volume of the dropper and the boiling point .

#### **The device used:-**



#### **Samples used:-**

All samples and all chemicals are used

### **3-The third experience**

**(Flash & fire point )**

**The purpose of the experiment :-**

The experiment is used to find the flash and ignition point

**The device used:-**

**1- cleveland open cup**



Cleveland open cup for flash and fire points of petroleum products, except fuel oils and those having an open cup flash below 79°C (175°F).

## 2- pensky marten able (closed cup)



### Samples used:-

1-The device (**Cleveland open cup**) is used to measure heavy petroleum derivatives such as gasoil.

2-The device (**pensky marten able (closed cup)**) is used to measure light petroleum derivatives such as kerosene and light metaphors .

#### **4-The fourth experience**

**(sediment in crude oil )**

#### **The purpose of the experiment :-**

This instrument is used to measure the percentage of deposits in crude oil that cause corrosion reduce oil quality and reduce value.

#### **The device used:-**



#### **Samples used:-**

Crude oil is used as a fractional derivative and mixed with an amount of toluene to find the percentage of sediment .

Vine type :- katan



## **5-The fifth experience**

**(Carbon residue)**

### **The purpose of the experiment :-**

The experiment is used to measure the remaining carbon in crude oil by burning a certain amount of oil derivative completely isolated from the air for a period of an hour or more.

### **The device used :-**



### **Samples used:-**

**Oil derivative :- crude oil**

**Vine type :- ceramic**

## **6-the sixth experience**

**(Ash content )**

### **The purpose of the experiment :-**

The experiment is used to find the percentage of ash in crude oil by burning a certain amount of oil derivative with the presence of air and then burning it in the incineration furnace at a degree of 700-800 c for a period of time.

### **The device used:-**



### **Samples used:-**

Oil derivative :- crude oil

Vine type :-Graphic

## **7- The seventh experience**

**(viscosity )**

### **The purpose of the experiment :-**

The experiment is used to find the viscosity by finding time .

1-Dynamic viscosity

2-Kinematic viscosity

### **The device used :-**



### **Samples used:-**

Samples are used according to viscometer diameters and this

experiment used a diameter of 0.6mm.

Oil derivative :- gasoil

## **8- The eighth experience:-**

**( sulfur content )**

### **The purpose of the experiment :-**

The experiment is used to find the percentage of sulfur in the oil derivative by burning 1 gm of the sample by means of a gas burner for a period of time to produce the sulfuric acid that is crushed with a strong base in the presence of chemical evidence.

### **The device used:-**



### **Samples used:-**

Oil derivative :- crude oil with an amount of the chemical substance (hydrogen peroxide)

## **9- The ninth experience**

**( smoke point)**

**The purpose of the experiment :-**

**This experiment is used to find a smoke point in petroleum products that are used as heating fuel in homes.**

**The device used:-**



**Samples used :-**

**Oil derivative:- kerosene**

## **10- The tenth experience**

**( Aniline & Diesel index )**

### **The purpose of the experiment :-**

This experiment is used to find the aniline point and the diesel coefficient for petroleum products .

### **The device used:-**



### **Samples used:-**

Oil derivative:- gasoil

Chemical substance:- Aniline

## **11-The eleventh experience**

**(water content )**

### **The purpose of the experiment :-**

**This experiment is used to find the water content in crude oil by heating the oil derivative with a chemical substance and with the presence of a water trap to give a percentage.**

### **The device used :-**



### **Simples used:-**

**Oil derivative:- gasoil**

**Chemical substance:- Toluene**

## **12- Experience twelve**

### **pour point & cloud point**

#### **The purpose of the experiment :-**

Use The experiment to measure the degree of pour and the degree of cloud .

#### **The device used:-**



#### **Samples used:-**

Oil derivative:- gasoil

Chemical substance:- ethanol



### 13- The thirteenth experience

(Octane number & cetane number )

#### The purpose of the experiment :-

The experiment is used to measure the octane number and

the cetane number of the petroleum derivative

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#### الجهاز المستخدم :-



#### Samples used:-

Oil derivative:- gasoline (benzene)

## **14- The fourteenth experience**

**(Salt content )**

**The purpose of the experiment :-**

The experiment is used to find the salt content of the crude oil and its PH conductivity .

**The device used:-**



**Samples used:-**

**Oil derivative:- crude oil**