Exercise

Exercise 1

A pycnometer was used to determine crude oil density:

- Empty pycnometer: **45g**
- Filled with water at **20°C**: **95g**
- Filled with crude oil at **20°C**: **91g**

1. Calculate the **relative density** (at **20°C**).
2. Calculate the **API gravity**.

Exercise 02

A crude oil has a boiling point of **650 °F** and a specific gravity of **0.85**.

Calculate the $\mathbf{K_{UOP}}$ **factor** and determine the **hydrocarbon type**.

Exercise 03

A gaseous hydrocarbon produces **2 moles of water** on combustion.

Given:

- $\mathbf{\Delta H_{cond(H_2O)}}$ = 44 kJ/mol
- **Molar mass** = 30 g/mol
- **L.C.V** = – 850 kJ/mol

Calculate the **H.C.V**.

Exercise 04

I – Write the reactions of the complete combustion at **25°C** of benzene $\mathbf{C_6H_6}$ and toluene $\mathbf{C_7H_8}$**.**

II – Calculate the Higher Heating Value (**HCV**) at **25°C** in **Kcal/Kg** for benzene ($\mathbf{C_6H_6}$**)** and toluene **(**$\mathbf{C_7H_8}$**).**

Given:

- At 25°C: $\Delta H_{cond(H2O)} = -588$ cal/g = **− 588 000 cal/kg**
- Lower Heating Value (LCV) of benzene = **9595 Kcal/kg**
- Lower Heating Value (LCV) of toluene = **9686 Kcal/kg.**