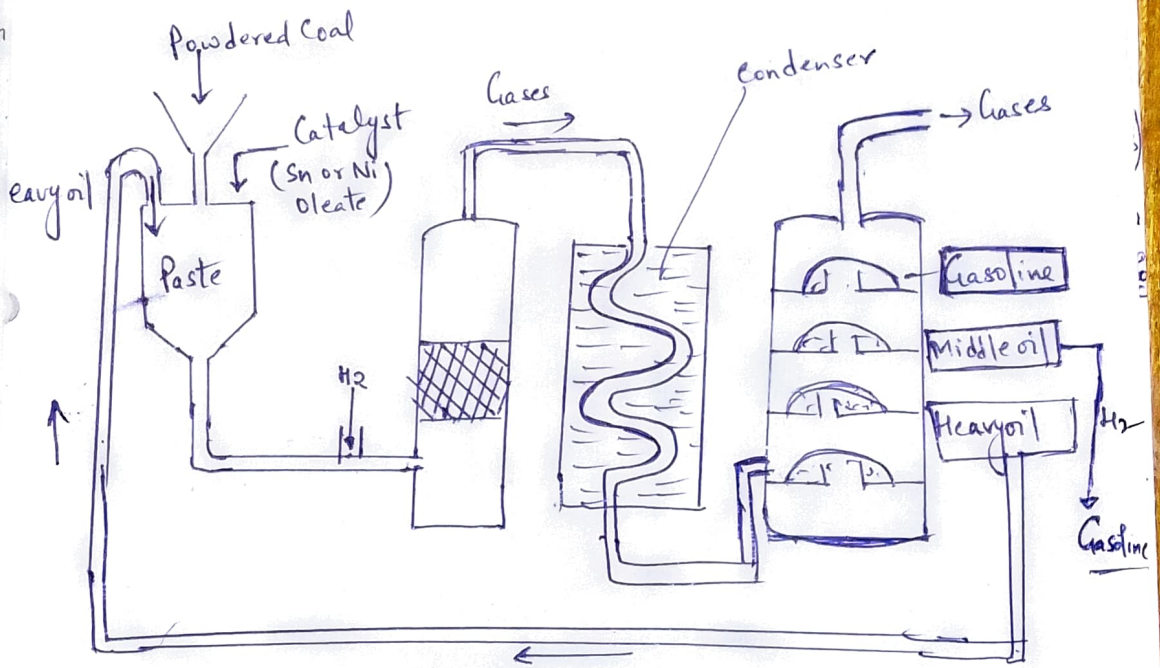
BERGIUS METHOD :→

1) In this process, a paste of finely powdered coal, heavy oil & Catalyst (tin or nickel oleate) is heated with hydrogen at 450°c & 200-250 Atm pressure.

2.) Hydrogen reacts with coal to give saturated hydrocarbons, ~~oil~~ which decompose at high temperature and pressure to give low-boiling liquid hydrocarbons.

3) The liquid hydrocarbon is then fractionated to get.

A.) Gasoline (petrol) B.) Middle Oil c.) Heavy oil.



BERGIUS METHOD

METHODS OF PRODUCING SYNTHETIC PETROL FROM COAL :

PETROL can be synthesized by following methods :

1) Fischer - Tropsch Method.
2) BERGIUS METHOD.

1.) Fischer Tropsch METHOD : →

A.) The raw material is heated coke, which is converted into water gas ($CO + H_2$) by passing steam over coke

$$C + H_2O \xrightarrow{1200^\circ C} \underbrace{CO + H_2}_{\text{water gas}}$$

B.) It is then purified by passing first through Fe_2O_3 (to remove H_2S) & then to a mixture of $Fe_2O_3 + Na_2CO_3$ (to remove Organic Sulphur Compounds)

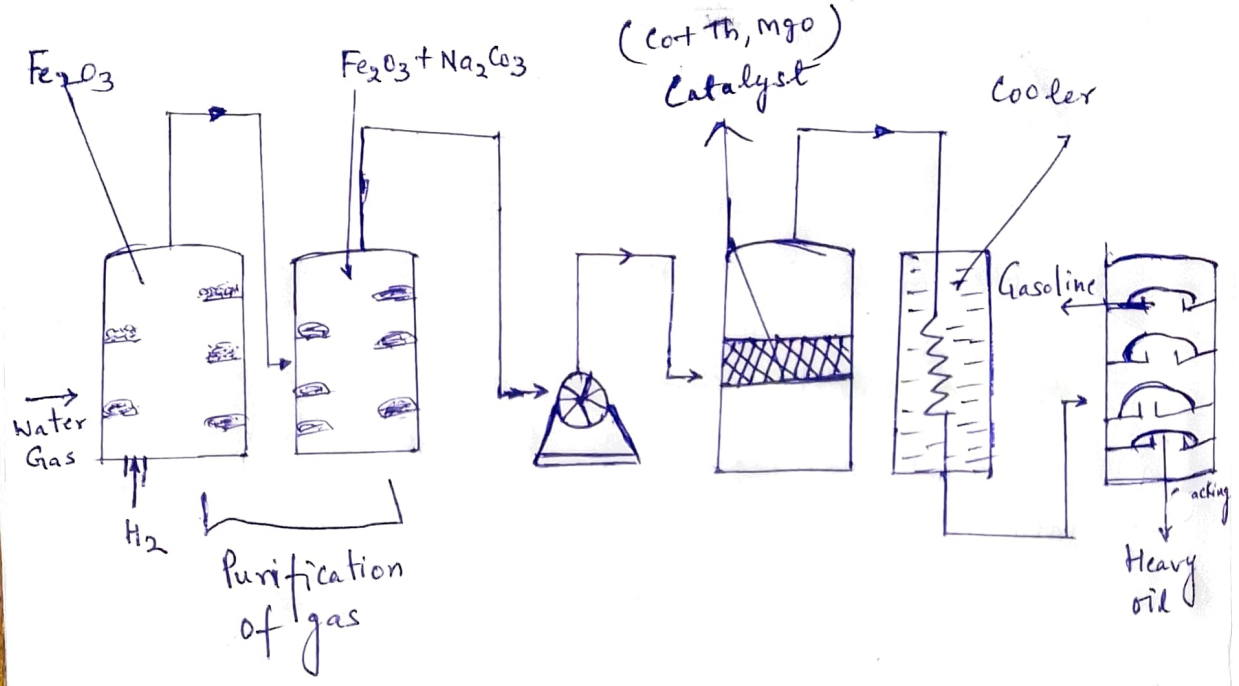
C.) The purified gas is then compressed to 5-25 atm & then passed through a convertor at 200°C - 300°C in presence of catalyst (mixture of Cobalt (Co), Thorium (Th), Magnesia (MgO).

d.) A mixture of saturated & unsaturated hydro-Carbons is formed.

$$n CO + 2n H_2 \longrightarrow C_nH_{2n} + n H_2O$$

$$n CO + (2n+1) H_2 \longrightarrow C_nH_{2n+2} + n H_2O$$

e.) The Crude oil obtained is fractionated to yield
i) Gasoline (Petrol) (ii) Heavy oil.



Fischer - Tropsch METHOD.

INDUSTRIAL Applications of lubricants :→

1.) In machines, for cutting & grinding of metals.
2.) In internal combustion engines.
3.) Animal & vegetable oil used in scientific instrument watches, sewing machines etc.
4.) Use of synthetic lubricants in air-craft engines
5.) Grease, a semi-solid lubricant used in railway axle-boxes.
6.) Use of lubricants like graphite, soap-stone in railway track joints.