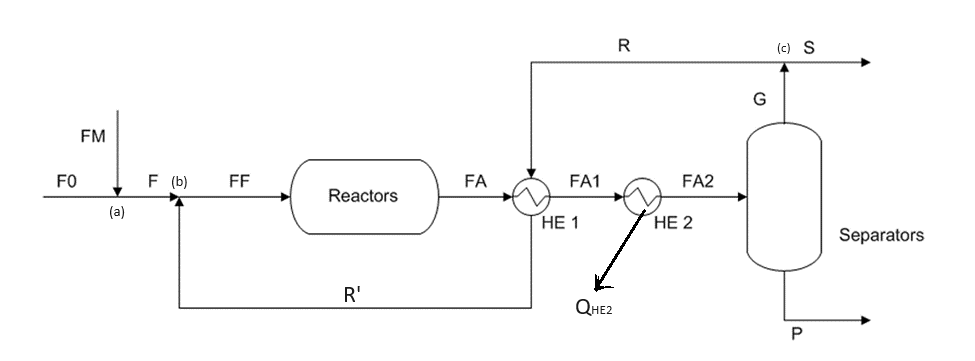
**Theory:**

The schematic of Problem is shown in the figure below:



The **F0** stream is known because we take a basis for our calculations.

In **FM** stream, the temperature and purity of CO2 are known (yCO2 = 1).

In **FF** stream, we know the temperature and recycle modulus (M = 3 = ).

In **FA** stream, we just know the temperature.

In the second H.Ex., the stream is cooled down!

In the reactor, two simultaneous reactions are occurring:

In the case of separation unit, we assign some values for components:

The CO conversion defined as:

The MeOH yield with respect to Carbon equals to

We will define a recycle fraction (). Once we have defined this, we want to find the value of to have .

The second duty is to calculate all the flow rates.

Third request is to find the recycle ratio (= )