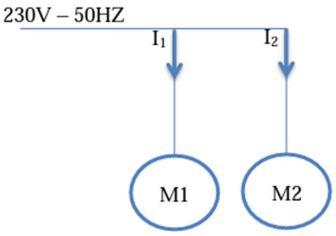
TD N/03

Exercice N° 01

A- The single-phase motor of a washing machine consumes 5 A at a voltage of 230 V, 50 Hz. Its power factor is cos φ = 0,75.

1. Calculate the apparent power of the engine. (Puissance apparente)
2. Calculate the active power absorbed by the motor. (Puissance active)
3. Calculate the reactive power absorbed by the motor. (Puissance réactive)



B- Let the group of motors, in the figure opposite, be powered by an effective voltage of 230V. The group is made up of two dipoles:

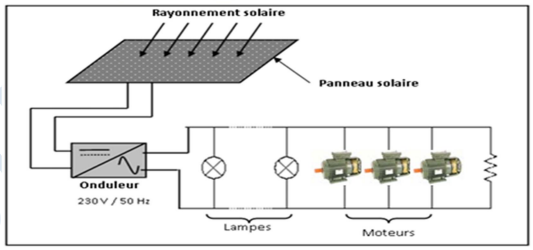
D_1 is a motor such that $I_1 = 5$ A ; $\cos\varphi_1 = 0,8$ et D_2 is a second motor such that $I_2 = 10$ A; $\cos \Phi_2 = 0,7$.

1. Calculate powers (active, reactive and apparent) of each engine, as well as that of the group
2. Calculate the phase shift between the supply voltage and current.

Exercice N°02

A single-phase electrical installation includes: ten (10) bulbs of 75 W each; a 1.875 kW electric heater; three(03) identical electric motors each absorbing a power of 1.5 kW with a power factor of 0.80. These different devices operate simultaneously.

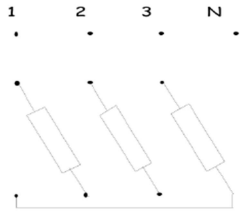
1- What is the active power consumed by the bulbs?
2- What is the reactive power consumed by a motor?
3- What are the active and reactive powers consumed by the installation?
4- What is its power factor?
5- What is the effective intensity of the current in the line cable?



Exercice : 03

Three identical inductive single-phase receivers (coils) with impedance **Z=50Ω** and power factor **0.8** are connected to the **220/380V**; **50Hz** network.

1. The impedances are triangle coupled with neutral. Complete the wiring diagram and calculate the line currents and active and reactive powers.
2. The impedances are star-coupled on the network. Complete the wiring diagram and calculate the line currents and active and reactive powers.
3. Calculate the active power ratio: **PΔ/Py** and conclude.



Exercice : 04

1- On a network **(230 V / 400 V, 50 Hz)** without neutral, three identical capacitive receivers with resistance **R = 20 Ω** are connected in a star pattern with a capacitance **C = 20 µF**. Determine the complex impedance of each receiver. Calculate its module and its argument.
2- Determine the effective value of the line currents, as well as their phase shift with respect to the simple voltages.
3- Calculate the active and reactive powers consumed by the three-phase receiver, as well as the apparent power.

Exercice :05

Study of a freight elevator driven by an alternating three-phase motor. The motor is powered by the **220V/380V50Hz** network. The power absorbed is measured using the 2 Wattmeter method: **P1=4800W and P2=1500W**.

1- Give the diagram for measuring the powers of the 2 wattmeter method
2- Calculate the active and reactive powers.
3- Deduce the line current and the power factor of the motor.
4- Propose another active power measurement setup.

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