TASK 1:

Radiative Heat Transfer:

Radiative heat transfer is a phenomenon that occurs when any object has a temperature that is bigger than absolute zero. It can happen through gases liquids and also solids. This heat transfer is transported through electromagnetic waves, and to each wave its frequency (v) wavelength (λ)
Thus we note : $\lambda = c/v$

Emissivity:

The emissivity is related to how much the surface of a certain material can emit thermal radiation, it is symbolized by ε. The emissivity varies depending on the temperature of the surface, the wavelength and the direction of the emitted radiation.
The blackbody is also known as a perfect body in this case as it emits all the radiation that is received by its surface.

Absorptivity:

Absorptivity is the ratio between the absorbed amount of heat and the emitted energy. Only a blackbody can absorb all the energy that it's receiving and therefore the rate of absorption is 1.
However, when it comes to real materials, their absorption rate is less than 1 as of course they can't absorb all the energy that they're receiving. Their absorption depends on the material, the color, the roughness the temperature and the shape of the material that is shaping the radiation.

Reflectivity:

The reflectivity from an object always happens from its surface. Each material has its own optical properties that define how much light it would reflect in relation to the received radiation.

Transmissivity:

Transmissivity is the ratio between the transmitted energy through the surface of an object and the received one. So it's basically about how much light or energy would go through a surface.

View Factor:

The view factor is about the energy emitted by a surface 1 and that is received by another surface 2. This factor does not depend on the properties of the surface.

Heat Exchange Between Two Black Surfaces:

When two black bodies are facing each other, both of them will emit and absorb the same amount of energy. However, the view factor of each body is related to the temperature, the angle between the radiation and the surface and the area of the two surfaces.

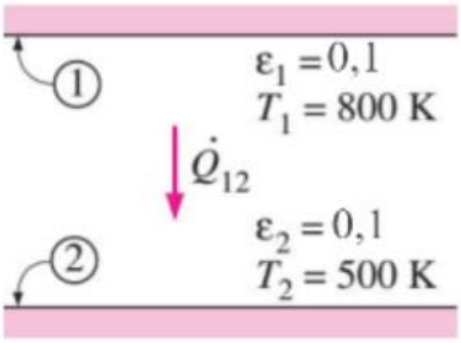
Heat Exchange Between Two Gray Surfaces:

Unlike the blackbodies, the gray surfaces don't absorb nor emit all the received energy, instead it reflects and absorbs a fraction of thermal radiation.

Radiative Resistances:

The radiative resistance depends on the geometry of the object's surface. The energy transferred by radiative resistance don't transform to heat radiation. The net radiative heat transfer from one surface to the other, is the radiation leaving the first surface towards the other subtracted by the one that is arriving from the second surface.

TASK 2:



$$Q_{12} = \frac{A.\sigma(T_1^4 - T_2^4)}{\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1} = \frac{1.5067.10^{-8}(800^4 - 500^4)}{\frac{1}{0.1} + \frac{1}{0.1} - 1} = 1035.81\ W$$

If we compare this result with the previous one, we can notice that the lower the emissivity there is, the lower the heat transfer is going to be.