Politechnico di Milano

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Task 1:

$U_{wood} = 1/ R_{wood} = 1/1.109 = 0.901 w/m^2c$

$U_{ins} = 1/4.009 = 0.249\ w/m^2c$

$U_{tot} = U_{wood} * A_{WOOD}/ A_{tot} + U_{INS} * A_{WOOD}/ A_{tot} = 0.413\ \ w/m^2c$

$R_{total} = 1/ U_{total} = 1/0.413 = 2.42\ cm^2/w$

$Q_{total} = U_{tot} * A_{tot} * ˈ\Delta T = 0.413*100*24 = 991\ w$

TASK2 :

Radiation is one of the heat transfer model and each item in the room emit radiation energy and it happens in all elements namely, solid, liquid and gas.

Radiation have electric and magnetic field so it gets its energy from electromagnetic waves that has a different ranges with different wavelengths and frequencies.

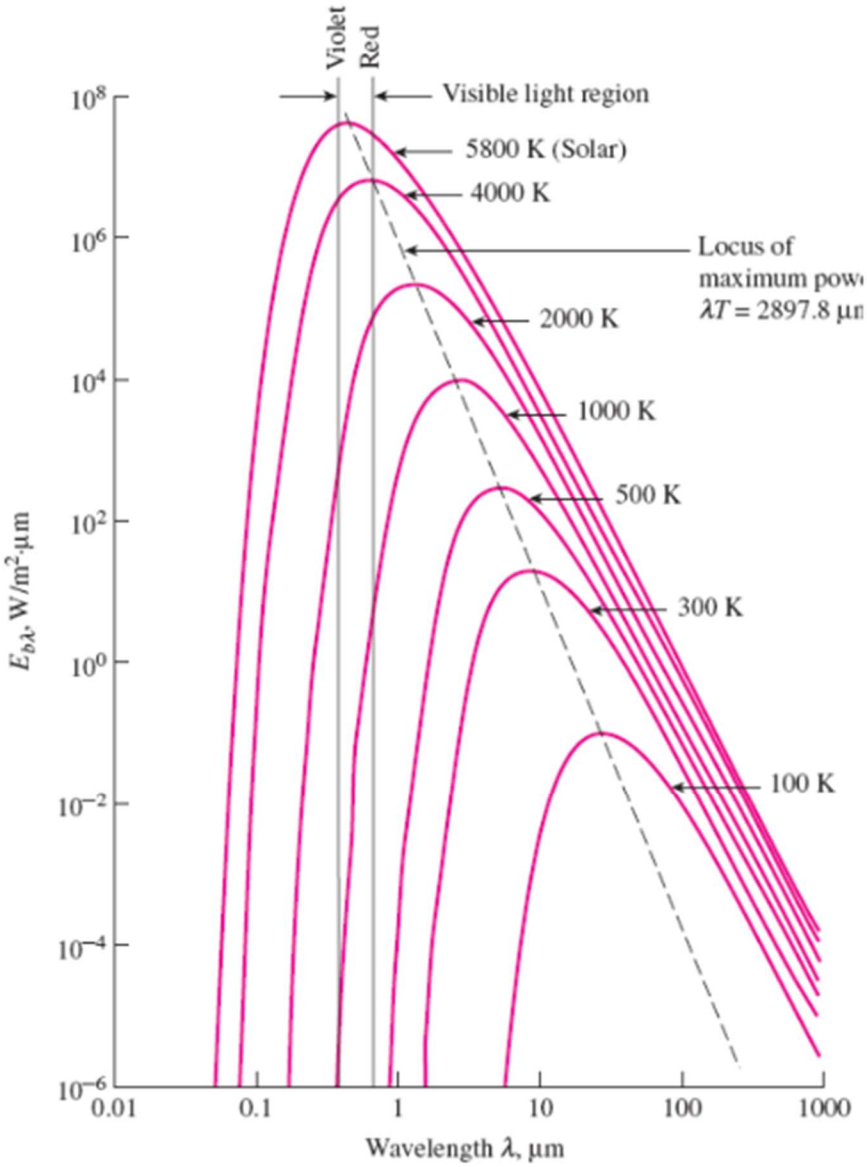
Black Body is an idealized body that is emit and absorb all energy and it does not reflect light and integrated power in all possible waves.

From the following graph we can conclude that:

1.The higher the absolute temperature is, the emissive power is more within lower wavelength ranges.

2. Visible light region is the range when the objects starts to change color and turn to a light source.

3. the biggest curve represents the half of it would be visible.


Violet
Red
Visible light region
5800 K (Solar)
4000 K
Locus of
maximum pow
$\lambda T = 2897.8$ µn
2000 K
1000 K
500 K
300 K
100 K
10^{8}
10^{6}
10^{4}
10^{2}
10^{0}
10^{-2}
10^{-4}
10^{-6}
$E_{b\lambda}$, W/m^2-µm
0.01
0.1
1
10
100
1000
Wavelength λ, µm