(1) According to Wien's law $\lambda_m T = \lambda_m' T' =$ constant.

$\therefore T' = \dfrac{\lambda_m T}{\lambda_m'} = \dfrac{4700 \times 10^{-10} \times 6174}{1.4 \times 10^{-5}} = 207.27\ K$

(2) $R_{sun} = 7 \times 10^8$ m, $\therefore$ surface area $A = 4\pi R_{sun}^2$

$= 4 \times 3.14 \times (7 \times 10^8)^2\ m^2$

$\sigma = 5.672 \times 10^{-8}$ SI unit, $T = 5800K$.

$\therefore$ Total emitted energy by sun/second $U = AE = A\sigma T^4$

$= 4 \times 3.14 \times (7 \times 10^8)^2 \times 5.672 \times 10^{-8} \times (5800)^4$

$= 3.95 \times 10^{26}$ Jouls.

$R_{sun-earth} = 1.5 \times 10^{11}$ m. $\therefore$ Energy reaching/unit area/sec

$= \dfrac{U}{4\pi R_{sun-earth}^2} = \dfrac{3.95 \times 10^{26}}{4 \times 3.14 \times (1.5 \times 10^{11})^2} = 1.4 \times 10^3\ W/m^2$

$= 1.4\ KW/m^2$.

(3) Energy received from sun to earth's surface/unit area/sec

$E = 10^{-1}\ J/cm^2 sec = 10^{3}\ J/m^2 sec$

$\therefore$ Radiation pressure $P = \dfrac{E}{c} = \dfrac{10^3}{3 \times 10^8}\ N/m^2 = 3.33 \times 10^{-6}\ N/m^2$

$\therefore$ Total force due to solar radiation on the earth

$= P \times$ surface area $= 3.33 \times 10^{-6} \times 4\pi r^2$

$= 3.33 \times 10^{-6} \times 4 \times 3.14 \times \left(\dfrac{10^7}{2}\right)^2$

$= 1.05 \times 10^9$ N

radiation

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