Modern Physics and Electronics

Assignment # 1

Express Planks Radiation formula in term of wavelength.

Plank's law explained the spectral density of electromagnetic radiation emitted by a blackbody in thermal equilibrium at a given temperature T, where there is no net of flow of matter or energy between the body and its environment.

E∞V

E=hv (h is a plank constant)

The average energy of planks

E=$\frac{hv}{\frac{hv}{ekt}1}$ $\ldots\ldots\ldots\ldots(1)$

N=$\frac{8\pi v^2}{c^3}dv$ $\ldots\ldots\ldots\ldots(2)$

Multiply Equation 1 and 2

E.N = Evdv=$\frac{8\pi v^2}{c^3}\frac{hv}{\frac{hv}{ekt}1}$dv………… (3)

Evdv=$\frac{8\pi v^3}{c^3}.\frac{1}{\frac{hv}{ekt}1}$ dv.

This is the planks radiation law.

In Term of Wavelength

V=$\frac{c}{\lambda}$

Taking derivative on both sides

.dv=$\frac{-c}{\lambda\ 2}$dλ

Eλdλ=$\frac{8\pi h}{c^3}$ $(\frac{c^3}{\lambda^3})$ $(\frac{1}{\frac{hc}{e\lambda kt}1})$ $(\frac{-c}{\lambda^2})$ dλ

Planks radiation law in term of wavelength can be written as

Eλdλ=$\frac{-8\pi hc}{\lambda^5}.\frac{1}{\frac{hc}{e\lambda kt}1}$dλ