

Giridhar Kumar

CLASSMATE

Date :

Page :

Date

19/02/26

SEM-VI paper-II Unit-03.

### Stefan - Boltzmann Law

Total energy density :-

$$u = \int_0^{\infty} u(\nu) d\nu$$

on integrating Planck's formula.

$$u \propto T^4$$

Hence total radiated power

$$E = \sigma T^4$$

Where

$$\sigma = 5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$$

Physical Meaning :- Total radiation increase very rapidly with temperature

### Wien's Displacement Law.

To find peak wavelength.

Differentiate Planck's wavelength form:

$$\frac{d}{d\lambda} u(\lambda) = 0$$

on solving

$$\lambda_{\text{max}} T = b$$

Where,  $b = 2.898 \times 10^{-3} \text{ mK}$