Name :- Hitesh Bingrawat

University RollNo : 22019582007

College RollNo : 22/4013

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with Computer Science.

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Hitesh

Q1. The temperature of the human body is $37°c$. Calculate maximum wavelength at which the intensity of radiation emitted by the human body is maximum?

Sol^n : Wein's Law is given by the equation

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

where:

λ_{max} is the peak wavelength

b is Wein's displacement constant $(2.898 \times 10^{-3} \, mk)$

T is the temperature in kelvin

The human body temperature is $37°c$

$$T = 37°C + 273.15 = 310.15 \, k$$

$$\lambda_{max} = \frac{2.898 \times 10^{-3}}{310.15}$$

$$= 9.3 \times 10^{-6} \, m$$

3. The relationship between the rms velocity (V_{rms}) and most probable velocity (V_{mp}) for a gas is given by the following relation

$$V_{rms} = \sqrt{\frac{3}{2}} \cdot V_{mp}$$

To find the most probable velocity (V_{mp}) rearrange

$$V_{mp} = \frac{1}{\sqrt{\frac{3}{2}}} V_{rms}$$

$$: \sqrt{\frac{2}{3}} \times 12240 \ cm/s$$

$$= 0.816 \times 12,240$$