

2. Light of wavelength  $5000 \text{ \AA}$  falls on a plane reflecting surface. What are the wavelength and frequency of the reflected light? For what angle of incidence is the reflected ray normal to the incident ray?

**Sol.** Given,

The wavelength of the incident light,  $\lambda = 5000 \text{ \AA}$

The wavelength and frequency of the reflected light are the same as that of the incident light.

Wavelength of reflected light is given by  $= 5000 \text{ \AA} = 5000 \times 10^{-10} \text{ m}$

Frequency of reflected light,  $\nu = \frac{c}{\lambda}$

$$= \frac{3 \times 10^8}{5000 \times 10^{-10}} \text{ Hz}$$

$$= 6 \times 10^{14} \text{ Hz}$$

According to the law of reflection,  $i = r$

When, the reflected ray is normal to the incident ray, we have

$$i + r = 90^\circ$$

$$i + i = 90^\circ$$

$$2i = 90^\circ$$

$$\text{i.e. } i = 45^\circ$$