

## Section - 2

Question:- Obtain the Expression for refraction  
Critical frequency:

Answer:- Critical frequency:- Critical frequency  
is different for  
different layers of ionosphere.

⇒ The maximum frequency which can be reflected by a  
particular layer of ionosphere at vertical incidence,  
This highest frequency is called critical frequency for  
that particular layer.

⇒ Critical frequency for particular layer is proportional  
to square root of the maximum electron density in the  
layer

$$f_c = 9\sqrt{N_m}$$

where  $f_c$  is critical frequency.

$N_m$  is maximum electron density (in per cubic mtr)

Derivation →

Refractive index of ionized medium is given by

$$\mu = \sqrt{1 - \frac{81N}{f^2}}$$

From Snell's Law

$$\mu = \frac{\sin i}{\sin r}$$

Angle of incidence =  $\angle i = 0$ ,  $N_i = N_m$  if  $f = f_c$

$$\mu = \frac{\sin i}{\sin r} = \sqrt{1 - \frac{81N_m}{f_c^2}} = 0$$

$$\boxed{f_c = 9\sqrt{N_m}}$$