

3. Brewster's angle is sometimes called  
 (a) reflection coefficient  
 (b) transmission coefficient  
 (c) polarising angle  
 (d) critical angle.
4. The value of intrinsic impedance of free space is  
 (a) 520 ohms (b) 250 ohms  
 (c) 737 ohms (d) 377 ohms.
5. The Biot-Savart expression for the magnetic field of a moving charge is

(a)  $\frac{\mu_0 q}{4\pi} \cdot \frac{(V \times r')}{r'^3}$  (b)  $\frac{\mu_0}{4\pi\epsilon_0}$   
 (c)  $\frac{4\pi \epsilon_0 q}{r'^3}$  (d)  $\frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2}$

Answer in 1 or 2 sentences :

6. What is meant by Cerenkov-radiation?  
 7. Mention the two postulates of Special theory of relativity.  
 8. Mention the law of frequency of reflection and refraction.  
 9. Define Poynting vector.  $S = E \times H$   
 10. Define Electric potential.

SECTION B — (5 × 4 = 20 marks)

11. (a) Deduce the differential form of Gauss's law for dielectrics.

Or

- (b) Derive Clausius-Mosotti equation.

12. (a) Show that the charge density in a conductor obeys the equation

$$\frac{\sigma}{\epsilon} \rho + \frac{\partial q}{\partial t} = 0$$

Or

- (b) Mention the Maxwell's equations.

13. (a) A plane electromagnetic wave travels through a uniform plasma. Calculating the Poynting vector, show that it vanishes if the frequency of the wave is equal to the plasma frequency.

Or

- (b) Mention the expression for skin depth and find the same for good conductors.

14. (a) Define the differential and total scattering cross-section.

Or

- (b) Calculate the value and dimension of Thomson Scattering cross-section.