Worksheet: Electromagnetic Waves

ISC · Class 12 · Physics · 9 questions · 27 marks

Name: _____ Date: _____ Score: _____ / 27

Q1. A radio station broadcasts at 100 MHz. Find the wavelength of the wave in air. *[2 marks]*

Q2. The magnetic field amplitude of an electromagnetic wave in vacuum is 2.0 x 10^-7 T. Find the electric field amplitude. *[2 marks]*

Q3. Arrange radio waves, X-rays, infrared and ultraviolet in order of increasing frequency, and state which carries the most energy per photon. *[2 marks]*

Q4. A parallel plate capacitor of capacitance 20 pF is charged so that the voltage across it rises at 5.0 x 10^9 V/s. Find the displacement current between the plates. *[3 marks]*

Q5. A plane electromagnetic wave has frequency 3.0 x 10^10 Hz. Find its wavelength, angular frequency and propagation constant in vacuum. *[3 marks]*

Q6. Find the photon energy in electronvolts for visible light of wavelength 500 nm. *[3 marks]*

Q7. An electromagnetic wave in vacuum has electric field amplitude 60 V/m. Find the average energy densities of the electric and magnetic fields and show they are equal. *[4 marks]*

Q8. A capacitor with circular plates of radius 8.0 cm is being charged, with the electric field between the plates rising at 2.0 x 10^12 V/m per second. Find the displacement current. *[4 marks]*

Q9. A plane electromagnetic wave travels along the positive x-direction with its electric field along the y-direction. State the direction of the magnetic field, and explain why the wave is called transverse. *[4 marks]*