

Solutions

2.1 Answer: C. The first output is $I_0/2$; later angles are 30° and 60° . Multiply $(1/2)(3/4)(1/4)=3/32$.

Compare the rejected options: 0; $I_0/8$; $3I_0/8$; $I_0/2$. Use the stated model and conditions.

2.2 Answer: C. Equal nonzero amplitudes with quarter-cycle phase give constant magnitude and a rotating transverse direction.

Compare the rejected options: Linear along x; Linear at 45° ; Unpolarised; Longitudinal. Use the stated model and conditions.

2.3 6. $24 \cos^2 60^\circ = 24/4 = 6$.

2.4 True. The reflected p component is zero; the surviving s electric field is perpendicular to the incidence plane.

3.1 $I_f = (I_0/2) \cos^2 \theta \sin^2 \theta = (I_0/8) \sin^2(2\theta)$. The maximum is $I_0/8$ at 45 degrees between the outer axes (modulo equivalent axes). Removing the middle analyser gives zero. It changes polarisation while reducing intensity; it does not create energy. Award chain, identity, optimum and comparison/interpretation.