

Solutions

2.1 Answer: A. $\sin \theta = \lambda/a$ increases.

Compare the rejected options: smaller; unchanged. Use the stated model and conditions.

2.2 Answer: B. Averaging the squared projection gives half.

Compare the rejected options: I; zero. Use the stated model and conditions.

2.3 10. $v = f\lambda = 5 \times 2 = 10$.

2.4 False. Coherent waves interfere through amplitude addition.

3.1 Amplitudes scale as $\sqrt{I}$ and $2\sqrt{I}$. $I_{max} = (\sqrt{I} + 2\sqrt{I})^2 = 9I$ and $I_{min} = (2\sqrt{I} - \sqrt{I})^2 = I$. Visibility is $(9I - I)/(9I + I) = 0.8$. Unequal amplitudes cannot cancel completely. Award maximum, minimum, visibility and explanation: one mark each.