- Destructive interference occurs when two light waves superimpose in opposite phase.

  $[\boldsymbol{Phase\ difference = \pi,\ 3\pi, 5\pi} \quad \{(2n-1)\pi\,; n = 1, 2, \ldots\}]$ **Odd π**

  And $[\boldsymbol{Path\ difference = \frac{\lambda}{2},\ 3\frac{\lambda}{2},\ 5\frac{\lambda}{2},\ 7\frac{\lambda}{2}, \ldots\ldots} \quad \{(2n-1)\frac{\lambda}{2}\,; n = 1, 2, \ldots\}]$

Destructive interference occurs when two waves superimpose in such a way that crest meets trough and trough meets crest.

- At constructive interference: amplitude: $\boldsymbol{A = A_{min} = |A_1 - A_2|}$

  and intensity: $I = I_{min} = I_1 + I_2 - 2\sqrt{I_1\, I_2}$

Note: $\vec{A} = \overrightarrow{A_1} + \overrightarrow{A_2}$

$\therefore \quad A^2 = {A_1}^2 + {A_2}^2 + 2A_1\, A_2\, cos\phi \qquad I = I_1 + I_2 + 2\sqrt{I_1\, I_2}\, cos\phi$

For maxima, $\phi = 0^o$ (same phase) $\therefore A_{max} = A_1 + A_2 \quad and, \quad I_{max} = kA_{max}{}^2$

$$I_{max} = I_1 + I_2 + 2\sqrt{I_1\, I_2}$$

For minima, $\phi = 180^o$ (out of phase) $\therefore A_{min} = A_1 - A_2 \quad and, \quad I_{min} = kA_{min}{}^2$

$$I_{min} = I_1 + I_2 - 2\sqrt{I_1\, I_2}$$

- Intensity of wave A is $4I$ and that of B is I. The ratio of maximum to minimum intensity in Young's double slit experiment is:
  a. 1:9 b. 9:1 c. 1:4 d. 5:3
- Ratio of intensity of two waves is 25 : 1. If interference occurs, then ratio of maximum to minimum intensity will be
  a. 25 : 1 b. 1 : 25 c. 9 : 4 d. 4 : 9
- Two waves with amplitude a and $4a$ interfere. If the phase difference at a point is 60^o , the intensity at the point is
  a. 25 *units* b. 21 *units* c. 15 *units* d. 5 *units*
- Two coherent sources produce a dark fringe when the phase difference between interfering wave is
  a. π b. $(2n+1)\pi$ c. $(2n-1)\pi$ d. All
- The resultant amplitude in interference with two coherent source depends upon
  a. Amplitude b. phase difference d. only a d. both a and b
- Twos coherent source of light produce constructive interference when phase difference between them is
  a. π b. 3π c. $n\pi$ d. All
- If the intensity of waves observed by two coherent sources is I. Then intensity of resultant wave in constructive interference will be
  a. I b. 21 c. $4I$ d. $8I$
- Two waves with amplitude a and $4a$ interfere. The ratio of maximum to minimum intensity is
  a. 25 : 9 b. 9 : 25 c. 5 : 3 d. 3 : 5