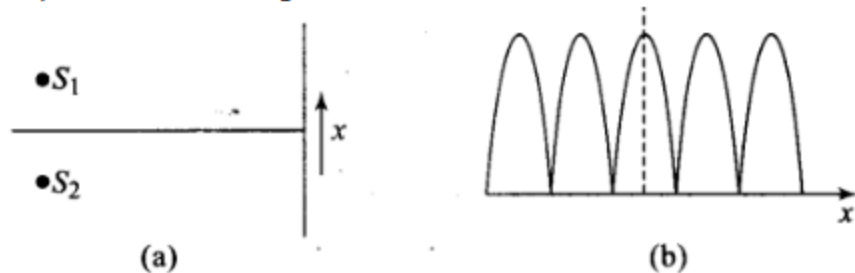


Q7. Two sources  $S_1$  and  $S_2$  of intensity  $I_1$  and  $I_2$  are placed in front of a screen .

(a) The pattern of intensity distribution seen in the central portion is given by Fig. (b).

In this case, which of the following statements are true?



In this case, which of the following statements are true?

- (a)  $S_1$  and  $S_2$  have the same intensities
- (b)  $S_1$  and  $S_2$  have a constant phase difference
- (c)  $S_1$  and  $S_2$  have the same phase
- (d)  $S_1$ , and  $S_2$  have the same wavelength

Solution: Key concept:

**Key concept:**

- For getting the sustained interference the initial phase difference between the interfering waves must remain constant, i.e., sources should be coherent.

For two coherent sources, the resultant intensity is given by

$$I = I_1 + I_2 + 2\sqrt{I_1 I_2} \cos \phi$$

- Resultant intensity at the point of observation will be maximum.

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

$$I_{\max} = (\sqrt{I_1} + \sqrt{I_2})^2$$

- Resultant intensity at the point of observation will be minimum.

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

$$I_{\min} = (\sqrt{I_1} - \sqrt{I_2})^2$$