

## Most Repeated Questions in JEE Main Physics from Young's double-slit experiment

Q: . In a Young's double slit experiment, three polarizers are kept as shown in the figure. The transmission axes of  $P_1$  and  $P_2$  are orthogonal to each other. The polarizer  $P_3$  covers both the slits with its transmission axis at  $45^\circ$  to those of  $P_1$  and  $P_2$  . An unpolarized light of wavelength  $\lambda$  and intensity  $I_0$  is incident on  $P_1$  and  $P_2$  . The intensity at a point after  $P_3$  where the path difference between the light waves from  $s_1$  and  $s_2$  is  $\lambda/3$ , is

Q: Young's double slit interference apparatus is immersed in a liquid of refractive index 1.44. It has slit separation of 1.5 mm. The slits are illuminated by a parallel beam of light whose wavelength in air is 690 nm. The fringe-width on a screen placed behind the plane of slits at a distance of 0.72 m, will be:\

Q: The Young's double slit interference experiment is performed using light consisting of 480 nm and 600 nm wavelengths to form interference patterns. The least number of the bright fringes of 480 nm light that are required for the first coincidence with the bright fringes formed by 600 nm light is

Q: The width of one of the two slits in Young's double slit experiment is  $d$  while that of the other slit is  $2d$ . If the ratio of the maximum to the minimum intensity in the interference pattern on the screen is  $9 : 4$  then what is the value of  $x$  ? (Assume that the field strength varies according to the slit width.

Q: Assertion (A): In Young's double slit experiment, the fringes produced by red light are closer as compared to those produced by blue light.

Reason (R): The fringe width is directly proportional to the wavelength of light.

- (a) (A) is true but (R) is false
- (b) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (c) (A) is false but (R) is true
- (d) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)

Q: Assertion-(A): If Young's double slit experiment is performed in an optically denser medium than air, then the consecutive fringes come closer.

Reason-(R): The speed of light reduces in an optically denser medium than air while its frequency does not change.

- (a) (A) is true but (R) is false

- (b) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (c) (A) is false but (R) is true
- (d) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)

Q: A double slit interference experiment performed with a light of wavelength 600 nm forms an interference fringe pattern on a screen with 10th bright fringe having its centre at a distance of 10 mm from the central maximum. Distance of the centre of the same 10th bright fringe from the central maximum when the source of light is replaced by another source of wavelength 660 nm would be \_\_\_\_\_ mm.

Q: The width of one of the two slits in a Young's double slit experiment is 4 times that of the other slit. The ratio of the maximum of the minimum intensity in the interference pattern is:

Q: In Young's double slit experiment, light from two identical sources are superimposing on a screen. The path difference between the two lights reaching at a point on the screen is  $7\lambda/4$ . The ratio of intensity of fringe at this point with respect to the maximum intensity of the fringe is:

Q: Monochromatic light of wavelength 500 nm is used in Young's double slit experiment. An interference pattern is obtained on a screen. When one of the slits is covered with a very thin glass plate (refractive index = 1.5), the central maximum is shifted to a position previously occupied by the 4th bright fringe. The thickness of the glass-plate is \_\_\_\_\_  $\mu\text{m}$ .

Q: In a Young's double slit experiment, the intensity at a point is  $(1/4)$ th of the maximum intensity, the minimum distance of the point from the central maximum is \_\_\_\_\_  $\mu\text{m}$ . (Given :  $\lambda = 600 \text{ nm}$ ,  $d = 1.0 \text{ mm}$ ,  $D = 1.0 \text{ m}$ )

Q: In Young's double slit experiment, carried out with light of wavelength 5000 Å, the distance between the slits is 0.3 mm and the screen is at 200 cm from the slits. The central maximum is at  $x = 0 \text{ cm}$ . The value of  $x$  for third maxima is \_\_\_\_\_ mm.

Q: In young's double slit experiment, the fringe width is 12mm. If the entire arrangement is placed in water of refractive index  $4/3$ , then the fringe width becomes (in mm)

Q: . In Young's double slits experiment, the position of 5th bright fringe from the central maximum is 5 cm. The distance between slits and screen is 1 m and wavelength of used monochromatic light is 600 nm. The separation between the slits is :