

PHYSICS · JEE MAIN

Wave Optics

Chapter-wise previous year questions, with answer key

84

PYQS

2020–2025

PAPERS

5

TOPICS

Young's Double Slit Experiment

Polarisation

Single Slit Diffraction

Interference in Thin Films

Huygens' Principle

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

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Young's Double Slit Experiment · 60 PYQs

Q1 JEE Main 2025 · 8 Apr · Shift 2

In a Young's double slit experiment, the source is white light. One of the slits is covered by red filter and another by a green filter. In this case:

- (A) there shall be alternate interference fringes of red and green.
- (B) there shall be an interference pattern for red distinct from that for green.
- (C) there shall be an interference pattern, where each fringe's pattern center is green and outer edges is red.
- (D) there shall be no interference fringes.

[Step-by-step solution ► prepwiser.in/questions/iBdPW56FBE](https://www.prepwiser.in/questions/iBdPW56FBE)

Q2 JEE Main 2025 · 4 Apr · Shift 2

In a Young's double slit experiment, two slits are located 1.5 mm apart. The distance of screen from slits is 2 m and the wavelength of the source is 400 nm . If the 20 maxima of the double slit pattern are contained within the central maximum of the single slit diffraction pattern, then the width of each slit is $x \times 10^{-3}$ cm, where x -value is _____ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/1FKGC9PwMp](https://www.prepwiser.in/questions/1FKGC9PwMp)

Q3 JEE Main 2025 · 4 Apr · Shift 1

In a Young's double slit experiment, the slits are separated by 0.2 mm . If the slits separation is increased to 0.4 mm , the percentage change of the fringe width is :

- (A) 25% (B) 50%
- (C) 0% (D) 100%

[Step-by-step solution ► prepwiser.in/questions/UpOZmuOj0g](https://www.prepwiser.in/questions/UpOZmuOj0g)

Q4 JEE Main 2025 · 3 Apr · Shift 2

Two monochromatic light beams have intensities in the ratio 1:9. An interference pattern is obtained by these beams. The ratio of the intensities of maximum to minimum is

- (A) 8 : 1 (B) 4 : 1
- (C) 3 : 1 (D) 9 : 1

[Step-by-step solution ► prepwiser.in/questions/OGvd5rWbzS](https://www.prepwiser.in/questions/OGvd5rWbzS)

Q5 JEE Main 2025 · 3 Apr · Shift 1

Two coherent monochromatic light beams of intensities $4I$ and $9I$ are superimposed. The difference between the maximum and minimum intensities in the resulting interference pattern is xI . The value of x is _____ .

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IM_neV9Pq_](https://www.prepwiser.in/questions/IM_neV9Pq_)

Q6 JEE Main 2025 · 3 Apr · Shift 2

Width of one of the two slits in a Young's double slit interference experiment is half of the other slit. The ratio of the maximum to the minimum intensity in the interference pattern is :

- (A) 3 : 1 (B) $(2\sqrt{2} + 1) : (2\sqrt{2} - 1)$
(C) 9 : 1 (D) $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$

Step-by-step solution ► [prepwiser.in/questions/pfHMKjPj65](https://www.prepwiser.in/questions/pfHMKjPj65)

Q7 JEE Main 2025 · 28 Jan · Shift 1

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

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/3vtIJt18ZD](https://www.prepwiser.in/questions/3vtIJt18ZD)

Q8 JEE Main 2025 · 24 Jan · Shift 2

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:

- (A) 0.63 mm (B) 0.33 mm
(C) 0.46 mm (D) 0.23 mm

Step-by-step solution ► [prepwiser.in/questions/WYXptLRq2X](https://www.prepwiser.in/questions/WYXptLRq2X)

Q9 JEE Main 2025 · 24 Jan · Shift 1

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

- (A) 8 (B) 4
(C) 5 (D) 6

Step-by-step solution ► [prepwiser.in/questions/94pZn4RKuI](https://www.prepwiser.in/questions/94pZn4RKuI)

Q10 JEE Main 2025 · 23 Jan · Shift 2

The width of one of the two slits in Young's double slit experiment is d while that of the other slit is xd . 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.)

- (A) 2 (B) 3
(C) 4 (D) 5

Step-by-step solution ► [prepwiser.in/questions/h3foHsMJ4o](https://www.prepwiser.in/questions/h3foHsMJ4o)

Q11 JEE Main 2025 · 22 Jan · Shift 1

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
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.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (A) (A) is false but (R) is true
- (B) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (C) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (D) (A) is true but (R) is false

[Step-by-step solution ► prepwisar.in/questions/Pl42TH0zMx](https://www.prepwisar.in/questions/Pl42TH0zMx)

Q12 JEE Main 2025 · 22 Jan · Shift 2

Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R).
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.

In the light of the above statements, choose the correct answer from the options given below :

- (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)

[Step-by-step solution ► prepwisar.in/questions/VdDpNwsOkY](https://www.prepwisar.in/questions/VdDpNwsOkY)

Q13 JEE Main 2024 · 9 Apr · Shift 1

In a Young's double slit experiment, the intensity at a point is $\left(\frac{1}{4}\right)^{\text{th}}$ of the maximum intensity, the minimum distance of the point from the central maximum is _____ μm . (Given :

$$\lambda = 600\text{nm}, d = 1.0\text{mm}, D = 1.0\text{m}$$

)

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/B3BUYGZzxv](https://www.prepwisar.in/questions/B3BUYGZzxv)

Q14 JEE Main 2024 · 9 Apr · Shift 2

Monochromatic light of wavelength 500nm 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 _____ μm .

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/3xIJZ0_XwF](https://www.prepwisar.in/questions/3xIJZ0_XwF)

Q15 JEE Main 2024 · 6 Apr · Shift 2

Two coherent monochromatic light beams of intensities I and $4I$ are superimposed. The difference between maximum and minimum possible intensities in the resulting beam is xI . The value of x is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IJjY0kupjr](https://www.prepwiser.in/questions/IJjY0kupjr)

Q16 JEE Main 2024 · 5 Apr · Shift 1

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

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/zoxuWpzFtx](https://www.prepwiser.in/questions/zoxuWpzFtx)

Q17 JEE Main 2024 · 4 Apr · Shift 2

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:

- (A) 1 : 1 (B) 4 : 1
(C) 16 : 1 (D) 9 : 1

[Step-by-step solution ► prepwiser.in/questions/X2guSg3pEz](https://www.prepwiser.in/questions/X2guSg3pEz)

Q18 JEE Main 2024 · 4 Apr · Shift 1

Two wavelengths λ_1 and λ_2 are used in Young's double slit experiment. $\lambda_1 = 450\text{nm}$ and $\lambda_2 = 650\text{nm}$. The minimum order of fringe produced by λ_2 which overlaps with the fringe produced by λ_1 is n . The value of n is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/QSVHavDEIU](https://www.prepwiser.in/questions/QSVHavDEIU)

Q19 JEE Main 2024 · 1 Feb · Shift 2

In Young's double slit experiment, monochromatic light of wavelength 5000 Å is used. The slits are 1.0mm apart and screen is placed at 1.0m away from slits. The distance from the centre of the screen where intensity becomes half of the maximum intensity for the first time is _____ $\times 10^{-6}\text{ m}$.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/6vxJ75LHg7](https://www.prepwiser.in/questions/6vxJ75LHg7)

Q20 JEE Main 2024 · 29 Jan · Shift 2

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 :

- (A) $\frac{1}{2}$ (B) $\frac{3}{4}$
(C) $\frac{1}{3}$ (D) $\frac{1}{4}$

[Step-by-step solution ► prepwiser.in/questions/QoOd4FbRXw](https://www.prepwiser.in/questions/QoOd4FbRXw)

Q21 JEE Main 2023 · 13 Apr · Shift 2

In a Young's double slits experiment, the ratio of amplitude of light coming from slits is 2 : 1. The ratio of the maximum to minimum intensity in the interference pattern is:

- (A) 25 : 9 (B) 9 : 1
(C) 9 : 4 (D) 2 : 1

Step-by-step solution ► [prepwiser.in/questions/mzfaTv4A-Y](https://www.prepwiser.in/questions/mzfaTv4A-Y)

Q22 JEE Main 2023 · 10 Apr · Shift 2

The ratio of intensities at two points P and Q on the screen in a Young's double slit experiment where phase difference between two waves of same amplitude are $\pi/3$ and $\pi/2$, respectively are

- (A) 2 : 3 (B) 1 : 3
(C) 3 : 1 (D) 3 : 2

Step-by-step solution ► [prepwiser.in/questions/baDrIeW-aa](https://www.prepwiser.in/questions/baDrIeW-aa)

Q23 JEE Main 2023 · 8 Apr · Shift 2

The width of fringe is 2mm on the screen in a double slits experiment for the light of wavelength of 400nm. The width of the fringe for the light of wavelength 600 nm will be:

- (A) 4 mm (B) 1.33 mm
(C) 2 mm (D) 3 mm

Step-by-step solution ► [prepwiser.in/questions/KrhoA-s0Sf](https://www.prepwiser.in/questions/KrhoA-s0Sf)

Q24 JEE Main 2023 · 6 Apr · Shift 2

A beam of light consisting of two wavelengths $7000 \text{ \AA}$ and $5500 \text{ \AA}$ is used to obtain interference pattern in Young's double slit experiment. The distance between the slits is 2.5 mm and the distance between the plane of slits and the screen is 150 cm . The least distance from the central fringe, where the bright fringes due to both the wavelengths coincide, is $n \times 10^{-5} \text{ m}$. The value of n is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/kM7bROob1A](https://www.prepwiser.in/questions/kM7bROob1A)

Q25 JEE Main 2023 · 6 Apr · Shift 2

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: The phase difference of two light waves change if they travel through different media having same thickness, but different indices of refraction.

Reason R: The wavelengths of waves are different in different media.

In the light of the above statements, choose the most appropriate answer from the options given below

- (A) Both A and R are correct but R is NOT the correct explanation of A
(B) A is correct but R is not correct
(C) A is not correct but R is correct
(D) Both A and R are correct and R is the correct explanation of A

Step-by-step solution ► [prepwiser.in/questions/SEc1IJ9Dwv](https://www.prepwiser.in/questions/SEc1IJ9Dwv)

Q26 JEE Main 2023 · 31 Jan · Shift 2

Two light waves of wavelengths 800 and 600 nm are used in Young's double slit experiment to obtain interference fringes on a screen placed 7 m away from plane of slits. If the two slits are separated by 0.35 mm, then shortest distance from the central bright maximum to the point where the bright fringes of the two wavelength coincide will be _____ mm.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/OJ4Y4sS_Y9](https://www.prepwiser.in/questions/OJ4Y4sS_Y9)

Q27 JEE Main 2023 · 30 Jan · Shift 2

In a Young's double slit experiment, the intensities at two points, for the path differences $\frac{\lambda}{4}$ and $\frac{\lambda}{3}$ (λ being the wavelength of light used) are I_1 and I_2 respectively. If I_0 denotes the intensity produced by each one of the individual slits, then $\frac{I_1 + I_2}{I_0} = \underline{\hspace{2cm}}$.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/sAW-VkIk7P](https://www.prepwiser.in/questions/sAW-VkIk7P)

Q28 JEE Main 2023 · 25 Jan · Shift 1

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 :

- (A) 60 μm (B) 48 μm
(C) 36 μm (D) 12 μm

Step-by-step solution ► [prepwiser.in/questions/RyRtwagz_B](https://www.prepwiser.in/questions/RyRtwagz_B)

Q29 JEE Main 2022 · 29 Jul · Shift 1

Two light beams of intensities 4I and 9I interfere on a screen. The phase difference between these beams on the screen at point A is zero and at point B is π . The difference of resultant intensities, at the point A and B, will be _____ I.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/E6Kq8JRMav](https://www.prepwiser.in/questions/E6Kq8JRMav)

Q30 JEE Main 2022 · 28 Jul · Shift 1

In a Young's double slit experiment, a laser light of 560 nm produces an interference pattern with consecutive bright fringes' separation of 7.2 mm. Now another light is used to produce an interference pattern with consecutive bright fringes' separation of 8.1 mm. The wavelength of second light is _____ nm.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/IjFfGm7KyC](https://www.prepwiser.in/questions/IjFfGm7KyC)

Q31 JEE Main 2022 · 27 Jul · Shift 2

Two coherent sources of light interfere. The intensity ratio of two sources is 1 : 4. For this interference pattern if the value of $\frac{I_{\max} + I_{\min}}{I_{\max} - I_{\min}}$ is equal to $\frac{2\alpha + 1}{\beta + 3}$, then $\frac{\alpha}{\beta}$ will be :

- (A) 1.5 (B) 2
(C) 0.5 (D) 1

Step-by-step solution ► [prepwiser.in/questions/buQFFC7I2A](https://www.prepwiser.in/questions/buQFFC7I2A)

Q32 JEE Main 2022 · 27 Jul · Shift 1

Two beams of light having intensities I and $4I$ interfere to produce a fringe pattern on a screen. The phase difference between the two beams are $\pi/2$ and $\pi/3$ at points A and B respectively. The difference between the resultant intensities at the two points is xI . The value of x will be _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/xhlvoeSm0n](https://www.prepwisar.in/questions/xhlvoeSm0n)

Q33 JEE Main 2022 · 26 Jul · Shift 1

In Young's double slit experiment, the fringe width is 12mm. If the entire arrangement is placed in water of refractive index $\frac{4}{3}$, then the fringe width becomes (in mm):

- (A) 16 (B) 9
(C) 48 (D) 12

[Step-by-step solution ► prepwisar.in/questions/_2nnKL5Zkf](https://www.prepwisar.in/questions/_2nnKL5Zkf)

Q34 JEE Main 2022 · 30 Jun · Shift 1

Find the ratio of maximum intensity to the minimum intensity in the interference pattern if the widths of the two slits in Young's experiment are in the ratio of 9 : 16. (Assuming intensity of light is directly proportional to the width of slits)

- (A) 3 : 4 (B) 4 : 3
(C) 7 : 1 (D) 49 : 1

[Step-by-step solution ► prepwisar.in/questions/PCuO3QFUh3](https://www.prepwisar.in/questions/PCuO3QFUh3)

Q35 JEE Main 2022 · 29 Jun · Shift 1

Using Young's double slit experiment, a monochromatic light of wavelength $5000 \text{ \AA}$ produces fringes of fringe width 0.5 mm. If another monochromatic light of wavelength $6000 \text{ \AA}$ is used and the separation between the slits is doubled, then the new fringe width will be :

- (A) 0.5 mm (B) 1.0 mm
(C) 0.6 mm (D) 0.3 mm

[Step-by-step solution ► prepwisar.in/questions/foOc0OUGoa](https://www.prepwisar.in/questions/foOc0OUGoa)

Q36 JEE Main 2022 · 29 Jun · Shift 2

In a double slit experiment with monochromatic light, fringes are obtained on a screen placed at some distance from the plane of slits. If the screen is moved by $5 \times 10^{-2} \text{ m}$ towards the slits, the change in fringe width is $3 \times 10^{-3} \text{ cm}$. If the distance between the slits is 1 mm, then the wavelength of the light will be _____ nm.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/qioor00Xam](https://www.prepwisar.in/questions/qioor00Xam)

Q37 JEE Main 2022 · 28 Jun · Shift 2

In a Young's double slit experiment, an angular width of the fringe is 0.35° on a screen placed at 2 m away for particular wavelength of 450 nm. The angular width of the fringe, when whole system is immersed in a medium of refractive index $\frac{7}{5}$, is $\frac{1}{\alpha}$. The value of α is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/9ffOVUdf4e](https://www.prepwisar.in/questions/9ffOVUdf4e)

Q38 JEE Main 2022 · 28 Jun · Shift 2

In Young's double slit experiment performed using a monochromatic light of wavelength λ , when a glass plate ($\mu = 1.5$) of thickness $x\lambda$ is introduced in the path of the one of the interfering beams, the intensity at the position where the central maximum occurred previously remains unchanged. The value of x will be :

- (A) 3 (B) 2
(C) 1.5 (D) 0.5

Step-by-step solution ► [prepwiser.in/questions/NirWC6HdVO](https://www.prepwiser.in/questions/NirWC6HdVO)

Q39 JEE Main 2022 · 27 Jun · Shift 1

In Young's double slit experiment the two slits are 0.6 mm distance apart. Interference pattern is observed on a screen at a distance 80 cm from the slits. The first dark fringe is observed on the screen directly opposite to one of the slits. The wavelength of light will be _____ nm.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/YzW417L0uK](https://www.prepwiser.in/questions/YzW417L0uK)

Q40 JEE Main 2022 · 25 Jun · Shift 1

The two light beams having intensities I and $9I$ interfere to produce a fringe pattern on a screen. The phase difference between the beams is $\pi/2$ at point P and π at point Q. Then the difference between the resultant intensities at P and Q will be :

- (A) $2I$ (B) $6I$
(C) $5I$ (D) $7I$

Step-by-step solution ► [prepwiser.in/questions/Dt4Cz_9GFa](https://www.prepwiser.in/questions/Dt4Cz_9GFa)

Q41 JEE Main 2022 · 25 Jun · Shift 2

The interference pattern is obtained with two coherent light sources of intensity ratio 4 : 1. And the ratio $\frac{I_{\max} + I_{\min}}{I_{\max} - I_{\min}}$ is $\frac{5}{x}$. Then, the value of x will be equal to :

- (A) 3 (B) 4
(C) 2 (D) 1

Step-by-step solution ► [prepwiser.in/questions/WldMchhW71](https://www.prepwiser.in/questions/WldMchhW71)

Q42 JEE Main 2022 · 24 Jun · Shift 2

Two light beams of intensities in the ratio of 9 : 4 are allowed to interfere. The ratio of the intensity of maxima and minima will be :

- (A) 2 : 3 (B) 16 : 81
(C) 25 : 169 (D) 25 : 1

Step-by-step solution ► [prepwiser.in/questions/1wvk0aT0LY](https://www.prepwiser.in/questions/1wvk0aT0LY)

Q43 JEE Main 2021 · 1 Sep · Shift 2

The width of one of the two slits in a Young's double slit experiment is three times the other slit. If the amplitude of the light coming from a slit is proportional to the slit-width, the ratio of minimum to maximum intensity in the interference pattern is $x : 4$ where x is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/gXFetr3LeI](https://www.prepwiser.in/questions/gXFetr3LeI)

Q44 JEE Main 2021 · 31 Aug · Shift 2

In a Young's double slit experiment, the slits are separated by 0.3 mm and the screen is 1.5 m away from the plane of slits. Distance between fourth bright fringes on both sides of central bright is 2.4 cm. The frequency of light used is _____ $\times 10^{14}$ Hz.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/bM2W2OYROH](https://www.prepwiser.in/questions/bM2W2OYROH)

Q45 JEE Main 2021 · 27 Aug · Shift 2

The light waves from two coherent sources have same intensity $I_1 = I_2 = I_0$. In interference pattern the intensity of light at minima is zero. What will be the intensity of light at maxima?

- (A) I_0
- (B) $2 I_0$
- (C) $5 I_0$
- (D) $4 I_0$

[Step-by-step solution ► prepwiser.in/questions/IXz_GBS3AN](https://www.prepwiser.in/questions/IXz_GBS3AN)

Q46 JEE Main 2021 · 26 Aug · Shift 1

White light is passed through a double slit and interference is observed on a screen 1.5 m away. The separation between the slits is 0.3 mm. The first violet and red fringes are formed 2.0 mm and 3.5 mm away from the central white fringes. the difference in wavelengths of red and violet light is nm.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/0d_58-K-7P](https://www.prepwiser.in/questions/0d_58-K-7P)

Q47 JEE Main 2021 · 27 Jul · Shift 1

In Young's double slit experiment, if the source of light changes from orange to blue then :

- (A) the central bright fringe will become a dark fringe.
- (B) the distance between consecutive fringes will decrease.
- (C) the distance between consecutive fringes will increases.
- (D) the intensity of the minima will increase.

[Step-by-step solution ► prepwiser.in/questions/KpnaktWqV0](https://www.prepwiser.in/questions/KpnaktWqV0)

Q48 JEE Main 2021 · 25 Jul · Shift 1

In the Young's double slit experiment, the distance between the slits varies in time as $d(t) = d_0 + a_0 \sin \omega t$; where d_0 , ω and a_0 are constants. The difference between the largest fringe width and the smallest fringe width obtained over time is given as :

- (A) $\frac{2\lambda D(d_0)}{(d_0^2 - a_0^2)}$
- (B) $\frac{2\lambda D a_0}{(d_0^2 - a_0^2)}$
- (C) $\frac{\lambda D}{d_0^2} a_0$
- (D) $\frac{\lambda D}{d_0 + a_0}$

[Step-by-step solution ► prepwiser.in/questions/7ujcuuw7zE](https://www.prepwiser.in/questions/7ujcuuw7zE)

Q49 JEE Main 2021 · 18 Mar · Shift 1

In Young's double slit arrangement, slits are separated by a gap of 0.5 mm, and the screen is placed at a distance of 0.5 m from them. The distance between the first and the third bright fringe formed when the slits are illuminated by a monochromatic light of $5890 \text{ \AA}$ is :-

- (A) $1178 \times 10^{-9} \text{ m}$
- (B) $1178 \times 10^{-6} \text{ m}$
- (C) $1178 \times 10^{-12} \text{ m}$
- (D) $5890 \times 10^{-7} \text{ m}$

[Step-by-step solution ► prepwiser.in/questions/UZEAT8EUZv](https://www.prepwiser.in/questions/UZEAT8EUZv)

Q50 JEE Main 2021 · 16 Mar · Shift 1

A fringe width of 6 mm was produced for two slits separated by 1 mm apart. The screen is placed 10 m away. The wavelength of light used is 'x' nm. The value of 'x' to the nearest integer is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/NvKLwy_yyz](https://www.prepwiser.in/questions/NvKLwy_yyz)

Q51 JEE Main 2021 · 26 Feb · Shift 1

In a Young's double slit experiment two slits are separated by 2 mm and the screen is placed one meter away. When a light of wavelength 500 nm is used, the fringe separation will be :

- (A) 0.50 mm
- (B) 0.25 mm
- (C) 1 mm
- (D) 0.75 mm

[Step-by-step solution ► prepwiser.in/questions/ZngU6qDkcu](https://www.prepwiser.in/questions/ZngU6qDkcu)

Q52 JEE Main 2021 · 25 Feb · Shift 1

Two coherent light sources having intensity in the ratio $2x$ produce an interference pattern. The ratio

$\frac{I_{\max} - I_{\min}}{I_{\max} + I_{\min}}$ will be :

- (A) $\frac{2\sqrt{2x}}{2x+1}$
- (B) $\frac{2\sqrt{2x}}{x+1}$
- (C) $\frac{\sqrt{2x}}{x+1}$
- (D) $\frac{\sqrt{2x}}{2x+1}$

[Step-by-step solution ► prepwiser.in/questions/_KhcQwN8Ru](https://www.prepwiser.in/questions/_KhcQwN8Ru)

Q53 JEE Main 2021 · 24 Feb · Shift 1

In a Young's double slit experiment, the width of the one of the slit is three times the other slit. The amplitude of the light coming from a slit is proportional to the slit-width. Find the ratio of the maximum to the minimum intensity in the interference pattern.

- (A) 4 : 1
- (B) 2 : 1
- (C) 1 : 4
- (D) 3 : 1

[Step-by-step solution ► prepwiser.in/questions/XK09fO0JYK](https://www.prepwiser.in/questions/XK09fO0JYK)

Q54 JEE Main 2021 · 24 Feb · Shift 2

If the source of light used in a Young's double slit experiment is changed from red to violet :

- (A) the fringes will become brighter.
- (B) the intensity of minima will increase.
- (C) consecutive fringe lines will come closer.
- (D) the central bright fringe will become a dark fringe.

Step-by-step solution ► [prepwiser.in/questions/qbZ859bCVw](https://www.prepwiser.in/questions/qbZ859bCVw)

Q55 JEE Main 2020 · 6 Sep · Shift 2

A Young's double-slit experiment is performed using monochromatic light of wavelength λ . The intensity of light at a point on the screen, where the path difference is λ , is K units. The intensity of light at a point where the path difference is $\frac{\lambda}{6}$ is given by $\frac{nK}{12}$, where n is an integer. The value of n is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/5TyksKFjRS](https://www.prepwiser.in/questions/5TyksKFjRS)

Q56 JEE Main 2020 · 3 Sep · Shift 1

In a Young's double slit experiment, light of 500 nm is used to produce an interference pattern. When the distance between the slits is 0.05 mm, the angular width (in degree) of the fringes formed on the distance screen is close to

- (A) 0.17°
- (B) 1.7°
- (C) 0.57°
- (D) 0.07°

Step-by-step solution ► [prepwiser.in/questions/iFEsj1_VOA](https://www.prepwiser.in/questions/iFEsj1_VOA)

Q57 JEE Main 2020 · 2 Sep · Shift 2

In a Young's double slit experiment, 16 fringes are observed in a certain segment of the screen when light of a wavelength 700 nm is used. If the wavelength of light is changed to 400 nm, the number of fringes observed in the same segment of the screen would be

- | | |
|--------|--------|
| (A) 28 | (B) 24 |
| (C) 30 | (D) 18 |

Step-by-step solution ► [prepwiser.in/questions/P7Twb98Qer](https://www.prepwiser.in/questions/P7Twb98Qer)

Q58 JEE Main 2020 · 9 Jan · Shift 2

In a Young's double slit experiment 15 fringes are observed on a small portion of the screen when light of wavelength 500 nm is used. Ten fringes are observed on the same section of the screen when another light source of wavelength λ is used. Then the value of λ is (in nm) _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/YMzEob8UMp](https://www.prepwiser.in/questions/YMzEob8UMp)

Q59 JEE Main 2020 · 8 Jan · Shift 2

In a double slit experiment, at a certain point on the screen the path difference between the two interfering waves is $\frac{1}{8}$ th of a wavelength. The ratio of the intensity of light at that point to that at the centre of a bright fringe is :

- (A) 0.853 (B) 0.568
(C) 0.672 (D) 0.760

[Step-by-step solution ► prepwisar.in/questions/eij6fGX0sf](https://www.prepwisar.in/questions/eij6fGX0sf)

Q60 JEE Main 2020 · 7 Jan · Shift 2

In a Young's double slit experiment, the separation between the slits is 0.15 mm. in the experiment, a source of light of wavelength 589 nm is used and the interference pattern is observed on a screen kept 1.5 m away. The separation between the successive bright fringes on the screen is :

- (A) 4.9 mm (B) 5.9 mm
(C) 6.9 mm (D) 3.9 mm

[Step-by-step solution ► prepwisar.in/questions/ajkNkpbwby](https://www.prepwisar.in/questions/ajkNkpbwby)

Polarisation · 11 PYQs

Q61 JEE Main 2025 · 7 Apr · Shift 1

Two plane polarized light waves combine at a certain point whose electric field components are

$$E_1 = E_0 \sin \omega t$$
$$E_2 = E_0 \sin \left(\omega t + \frac{\pi}{3} \right)$$

Find the amplitude of the resultant wave.

- (A) $1.7E_0$ (B) E_0
(C) $0.9E_0$ (D) $3.4E_0$

[Step-by-step solution ► prepwisar.in/questions/NVo16COHji](https://www.prepwisar.in/questions/NVo16COHji)

Q62 JEE Main 2024 · 30 Jan · Shift 2

A beam of unpolarised light of intensity I_0 is passed through a polaroid A and then through another polaroid B which is oriented so that its principal plane makes an angle of 45° relative to that of A . The intensity of emergent light is:

- (A) $I_0/2$ (B) $I_0/8$
(C) $I_0/4$ (D) I_0

[Step-by-step solution ► prepwisar.in/questions/cZ4tFENiZh](https://www.prepwisar.in/questions/cZ4tFENiZh)

Q63 JEE Main 2024 · 27 Jan · Shift 2

When a polaroid sheet is rotated between two crossed polaroids then the transmitted light intensity will be maximum for a rotation of :

- (A) 90° (B) 30°
(C) 45° (D) 60°

[Step-by-step solution ► prepwisar.in/questions/99bWwM9Ut0](https://www.prepwisar.in/questions/99bWwM9Ut0)

Q64 JEE Main 2023 · 10 Apr · Shift 1

Unpolarised light of intensity 32 Wm^{-2} passes through the combination of three polaroids such that the pass axis of the last polaroid is perpendicular to that of the pass axis of first polaroid. If intensity of emerging light is 3 Wm^{-2} , then the angle between pass axis of first two polaroids is _____ °.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/tfKTcj66bp](https://www.prepwiser.in/questions/tfKTcj66bp)

Q65 JEE Main 2023 · 1 Feb · Shift 1

'n' polarizing sheets are arranged such that each makes an angle 45° with the preceeding sheet. An unpolarized light of intensity I is incident into this arrangement. The output intensity is found to be $I/64$. The value of n will be:

- (A) 4 (B) 5
(C) 3 (D) 6

[Step-by-step solution ► prepwiser.in/questions/zY7z_3014P](https://www.prepwiser.in/questions/zY7z_3014P)

Q66 JEE Main 2023 · 31 Jan · Shift 1

Two polaroids A and B are placed in such a way that the pass-axis of polaroids are perpendicular to each other. Now, another polaroid C is placed between A and B bisecting angle between them. If intensity of unpolarized light is I_0 then intensity of transmitted light after passing through polaroid B will be:

- (A) $\frac{I_0}{4}$ (B) $\frac{I_0}{8}$
(C) Zero (D) $\frac{I_0}{2}$

[Step-by-step solution ► prepwiser.in/questions/ue2Mj-xUCR](https://www.prepwiser.in/questions/ue2Mj-xUCR)

Q67 JEE Main 2023 · 29 Jan · Shift 2

Unpolarised light is incident on the boundary between two dielectric media, whose dielectric constants are 2.8 (medium –1) and 6.8 (medium –2), respectively. To satisfy the condition, so that the reflected and refracted rays are perpendicular to each other, the angle of incidence should be $\tan^{-1}\left(1 + \frac{10}{\theta}\right)^{\frac{1}{2}}$ the value of θ is _____.

(Given for dielectric media, $\mu_r = 1$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/6NXtaWfC5K](https://www.prepwiser.in/questions/6NXtaWfC5K)

Q68 JEE Main 2022 · 25 Jun · Shift 2

A light whose electric field vectors are completely removed by using a good polaroid, allowed to incident on the surface of the prism at Brewster's angle. Choose the most suitable option for the phenomenon related to the prism.

- (A) Reflected and refracted rays will be perpendicular to each other.
(B) Wave will propagate along the surface of prism.
(C) No refraction, and there will be total reflection of light.
(D) No reflection, and there will be total transmission of light.

[Step-by-step solution ► prepwiser.in/questions/FDJDW8Pkij](https://www.prepwiser.in/questions/FDJDW8Pkij)

Q69 JEE Main 2021 · 24 Feb · Shift 1

An unpolarised light beam is incident on the polarizer of a polarization experiment and the intensity of light beam emerging from the analyzer is measured as 100 Lumens. Now, if the analyzer is rotated around the horizontal axis (direction of light) by 30° in clockwise direction, the intensity of emerging light will be _____ Lumens.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/xKCt18nUKj](https://www.prepwiser.in/questions/xKCt18nUKj)

Q70 JEE Main 2020 · 4 Sep · Shift 1

A beam of plane polarised light of large cross-sectional area and uniform intensity of 3.3 Wm^{-2} falls normally on a polariser (cross sectional area $3 \times 10^{-4} \text{ m}^2$) which rotates about its axis with an angular speed of 31.4 rad/s . The energy of light passing through the polariser per revolution, is close to :

- (A) $1.0 \times 10^{-5} \text{ J}$
- (B) $1.0 \times 10^{-4} \text{ J}$
- (C) $1.5 \times 10^{-4} \text{ J}$
- (D) $5.0 \times 10^{-4} \text{ J}$

[Step-by-step solution ► prepwiser.in/questions/VnoqZ9ab1_](https://www.prepwiser.in/questions/VnoqZ9ab1_)

Q71 JEE Main 2020 · 7 Jan · Shift 1

A polarizer - analyser set is adjusted such that the intensity of light coming out of the analyser is just 10% of the original intensity. Assuming that the polarizer - analyser set does not absorb any light, the angle by which the analyser need to be rotated further to reduce the output intensity to be zero, is :

- (A) 71.6°
- (B) 90°
- (C) 18.4°
- (D) 45°

[Step-by-step solution ► prepwiser.in/questions/IRsbcRxp49](https://www.prepwiser.in/questions/IRsbcRxp49)

Single Slit Diffraction · 10 PYQs

Q72 JEE Main 2024 · 5 Apr · Shift 2

In a single slit experiment, a parallel beam of green light of wavelength 550 nm passes through a slit of width 0.20 mm . The transmitted light is collected on a screen 100 cm away. The distance of first order minima from the central maximum will be $x \times 10^{-5} \text{ m}$. The value of x is :

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/hOOH3hXZJV](https://www.prepwiser.in/questions/hOOH3hXZJV)

Q73 JEE Main 2024 · 1 Feb · Shift 1

A monochromatic light of wavelength $6000\text{\AA}$ is incident on the single slit of width 0.01mm . If the diffraction pattern is formed at the focus of the convex lens of focal length 20cm , the linear width of the central maximum is :

- (A) 12mm (B) 24mm
(C) 60mm (D) 120mm

[Step-by-step solution ► prepwiser.in/questions/DPgpFkA4S](https://www.prepwiser.in/questions/DPgpFkA4S)

Q74 JEE Main 2024 · 1 Feb · Shift 2

A microwave of wavelength 2.0cm falls normally on a slit of width 4.0cm . The angular spread of the central maxima of the diffraction pattern obtained on a screen 1.5m away from the slit, will be :

- (A) 60° (B) 45°
(C) 15° (D) 30°

[Step-by-step solution ► prepwiser.in/questions/CwbELddvkZ](https://www.prepwiser.in/questions/CwbELddvkZ)

Q75 JEE Main 2024 · 30 Jan · Shift 1

The diffraction pattern of a light of wavelength 400nm diffracting from a slit of width 0.2mm is focused on the focal plane of a convex lens of focal length 100cm . The width of the 1st secondary maxima will be :

- (A) 2 mm (B) 0.2 mm
(C) 0.02 mm (D) 2 cm

[Step-by-step solution ► prepwiser.in/questions/yq_CeeoqtC](https://www.prepwiser.in/questions/yq_CeeoqtC)

Q76 JEE Main 2024 · 27 Jan · Shift 2

A parallel beam of monochromatic light of wavelength $5000\text{\AA}$ is incident normally on a single narrow slit of width 0.001mm . The light is focused by convex lens on screen, placed on its focal plane. The first minima will be formed for the angle of diffraction of _____ (degree).

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/xzK0i7HVuz](https://www.prepwiser.in/questions/xzK0i7HVuz)

Q77 JEE Main 2023 · 15 Apr · Shift 1

A single slit of width a is illuminated by a monochromatic light of wavelength 600nm . The value of ' a ' for which first minimum appears at $\theta = 30^\circ$ on the screen will be :

- (A) $3\mu\text{m}$ (B) $0.6\mu\text{m}$
(C) $1.8\mu\text{m}$ (D) $1.2\mu\text{m}$

[Step-by-step solution ► prepwiser.in/questions/sR3v3SVPK4](https://www.prepwiser.in/questions/sR3v3SVPK4)

Q78 JEE Main 2022 · 26 Jun · Shift 1

In free space, an electromagnetic wave of 3GHz frequency strikes over the edge of an object of size $\frac{\lambda}{100}$, where λ is the wavelength of the wave in free space. The phenomenon, which happens there will be :

- (A) Reflection (B) Refraction
(C) Diffraction (D) Scattering

[Step-by-step solution ► prepwiser.in/questions/YmbwDjYQwZ](https://www.prepwiser.in/questions/YmbwDjYQwZ)

Q79 JEE Main 2021 · 25 Feb · Shift 2

Consider the diffraction pattern obtained from the sunlight incident on a pinhole of diameter $0.1 \mu\text{m}$. If the diameter of the pinhole is slightly increased, it will affect the diffraction pattern such that:

- (A) its size increases, but intensity decreases
- (B) its size increases, and intensity increases
- (C) its size decreases, but intensity increases
- (D) its sizes decreases, and intensity decreases

Step-by-step solution ► [prepwisar.in/questions/ckT0V8rMiL](https://www.prepwisar.in/questions/ckT0V8rMiL)

Q80 JEE Main 2020 · 4 Sep · Shift 2

Orange light of wavelength $6000 \times 10^{-10} \text{ m}$ illuminates a single slit of width $0.6 \times 10^{-4} \text{ m}$. The maximum possible number of diffraction minima produced on both sides of the central maximum is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisar.in/questions/qM8Ko5Izwo](https://www.prepwisar.in/questions/qM8Ko5Izwo)

Q81 JEE Main 2020 · 7 Jan · Shift 1

Visible light of wavelength $6000 \times 10^{-8} \text{ cm}$ falls normally on a single slit and produces a diffraction pattern. It is found that the second diffraction minimum is at 60° from the central maximum. If the first minimum is produced at θ_1 , then θ_1 , is close to :

- (A) 45°
- (B) 30°
- (C) 25°
- (D) 20°

Step-by-step solution ► [prepwisar.in/questions/6Dc_UFVia9](https://www.prepwisar.in/questions/6Dc_UFVia9)

Interference in Thin Films · 2 PYQs

Q82 JEE Main 2025 · 28 Jan · Shift 2

A thin transparent film with refractive index 1.4, is held on circular ring of radius 1.8 cm. The fluid in the film evaporates such that transmission through the film at wavelength 560 nm goes to a minimum every 12 seconds. Assuming that the film is flat on its two sides, the rate of evaporation is _____ $\pi \times 10^{-13} \text{ m}^3/\text{s}$.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisar.in/questions/Ba_U2vTnYd](https://www.prepwisar.in/questions/Ba_U2vTnYd)

Q83 JEE Main 2020 · 3 Sep · Shift 2

Two light waves having the same wavelength λ in vacuum are in phase initially. Then the first wave travels a path L_1 through a medium of refractive index n_1 while the second wave travels a path of length L_2 through a medium of refractive index n_2 . After this the phase difference between the two waves is :

(A) $\frac{2\pi}{\lambda} (n_1 L_1 - n_2 L_2)$

(B) $\frac{2\pi}{\lambda} (n_2 L_1 - n_1 L_2)$

(C) $\frac{2\pi}{\lambda} \left(\frac{L_1}{n_1} - \frac{L_2}{n_2} \right)$

(D) $\frac{2\pi}{\lambda} \left(\frac{L_2}{n_1} - \frac{L_1}{n_2} \right)$

[Step-by-step solution ► prepwisar.in/questions/bRPrtUxCky](https://www.prepwisar.in/questions/bRPrtUxCky)

Huygens' Principle · 1 PYQs

Q84 JEE Main 2024 · 31 Jan · Shift 1

Two waves of intensity ratio 1 : 9 cross each other at a point. The resultant intensities at that point, when (a) Waves are incoherent is I_1 (b) Waves are coherent is I_2 and differ in phase by 60° . If $\frac{I_1}{I_2} = \frac{10}{x}$ then $x =$

_____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/qNiMt9OFcd](https://www.prepwisar.in/questions/qNiMt9OFcd)

Answer key — Wave Optics

Numbers match the question numbers above. For full working, open the solution link under each question.

1	D	2	15	3	B	4	B	5	24	6	D	7	11	8	D
9	C	10	D	11	C	12	C	13	200	14	4	15	8	16	10
17	D	18	9	19	125	20	A	21	B	22	D	23	D	24	462
25	D	26	48	27	3	28	A	29	24	30	630	31	B	32	2
33	B	34	D	35	D	36	600	37	4	38	B	39	450	40	B
41	B	42	D	43	1	44	5	45	D	46	300	47	B	48	B
49	B	50	600	51	B	52	A	53	A	54	C	55	9	56	C
57	A	58	750	59	A	60	B	61	A	62	C	63	C	64	30
65	D	66	B	67	7	68	D	69	75	70	B	71	C	72	275
73	B	74	A	75	A	76	30	77	D	78	D	79	C	80	200
81	C	82	54	83	A	84	13								

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