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JEE MAIN WAVE OPTICS — YOUNG'S DOUBLE SLIT EXPERIMENT (FRINGE WIDTH, INTENSITY) — PYQS

Max. Marks: 64 **Questions:** 16

Section A (MCQ) — 10 questions

Q.1 In interference experiment the path difference between two interfering waves at a point A on the screen is λ/3, where λ is the wavelength of these waves, and at another point B the path difference is λ/6. The ratio of intensities at points A and B is _____. [JEE Main 2026 (Online) 6th April Morning Shift]

(1) 3 (2) 4 (3) 1/3 (4) 1/4

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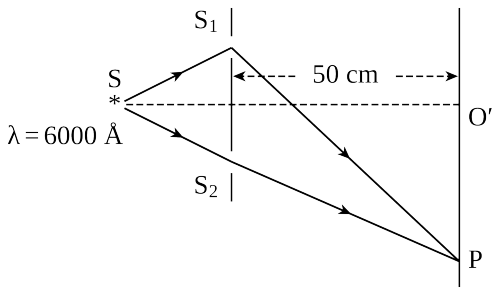
Q.2 In a Young double slit experiment, the wavelength of incident light is 6000 Å, the separation between slits S_1 and S_2 is 5 cm and the distance between slits plane and screen is 50 cm, as shown in the figure below. If the resultant intensity at P is equal to the intensity due to individual slits, the path difference between interfering waves is _____ Å.

[JEE Main 2026 (Online) 6th April Evening Shift]



(1) 4000 (2) 3000 (3) 2000 (4) 1000

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Q.3 In Young's double slit experiment, the fringe width of the interference pattern produced on the screen is 2.4 μm. If the experiment is carried out in another medium having refractive index 1.2, the fringe width will be _____ μm.

[JEE Main 2026 (Online) 5th April Morning Shift]

(1) 1.2 (2) 2 (3) 2.4 (4) 2.88

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Q.4 The maximum intensity in a Young's double slit experiment is I_0. Distance between the slits (d) is 5λ, where λ is the wavelength of light used. The intensity of the fringe, exactly opposite to one of the slits on the screen, placed at D = 10d is _____.

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) $\frac{I_0}{4}$ (2) $\frac{I_0}{2}$ (3) I_0 (4) $\frac{3I_0}{4}$

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Q.5 In the Young's double slit experiment the intensity produced by each one of the individual slits is I_o. The distance between two slits is 2 mm. The distance of screen from slits is 10 m. The wavelength of light is 6000 Å. The intensity of light on the screen in front of one of the slits is _____

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) $\frac{I_o}{2}$ (2) I_o (3) $2I_o$ (4) $4I_o$

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Q.6 In a double slit experiment the distance between the slits is 0.1 cm and the screen is placed at 50 cm from the slits plane. When one slit is covered with a transparent sheet having thickness t and refractive index n(= 1.5), the central fringe shifts by 0.2 cm. The value of t is _____ cm.

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) 6.0×10^{-3} (2) 8×10^{-4}
(3) 5.0×10^{-3} (4) 5.6×10^{-4}

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Q.7 Given below are two statements :

Statement-I: In a Young's double slit experiment, the angular separation of fringes will increase as the screen is moved away from the plane of the slits

Statement-II: In a Young's double slit experiment, the angular separation of fringes will increase when monochromatic source is replaced by another monochromatic source of higher wavelength

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

[JEE Main 2026 (Online) 21st January Evening Shift]

(1) Both Statement-I and Statement-II are true
(2) Statement-I is true but Statement-II is false
(3) Statement-I is false but Statement-II is true
(4) Both Statement-I and Statement-II are false

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Q.8 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 :

[JEE Main 2025 (Online) 4th April Morning Shift]

(1) 25% (2) 50% (3) 0% (4) 100%

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Q.9 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

[JEE Main 2025 (Online) 3rd April Evening Shift]

(1) 8:1 (2) 4:1 (3) 3:1 (4) 9:1

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Q.10 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:

[JEE Main 2025 (Online) 3rd April Evening Shift]

(1) 3:1
(2) $(2\sqrt{2}+1):(2\sqrt{2}-1)$
(3) 9:1
(4) $(3+2\sqrt{2}):(3-2\sqrt{2})$

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Section B (Numerical) — 6 questions

Q.11 In a double slit experiment, when one of the slits is covered by a transparent mica sheet of refractive index 1.56, the central fringe shifts to the position of 7th bright fringe, obtained with both slits uncovered. If the light source wavelength is 450 nm, the thickness of mica sheet is $\alpha \times 10^{-9}$ m. The value of α is _____.

[JEE Main 2026 (Online) 4th April Evening Shift]

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Q.12 In a Young's double slit experiment, the intensity at some point on the screen is found to be $\frac{3}{4}$ times of the maximum of the interference pattern. The path difference between the interfering waves at this point is $\frac{\lambda}{x}$ where λ is wavelength of the incident light. The value of x is _____.

[JEE Main 2026 (Online) 2nd April Evening Shift]

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Q.13 A beam of light consisting of wavelengths 650 nm and 550 nm illuminates the Young's double slits with separation of 2 mm such that the interference fringes are formed on a screen, placed at a distance of 1.2 m from the slits. The least distance of a point from the central maximum, where the bright fringes due to both the wavelengths coincide, is _____ $\times 10^{-5}$ m.

[JEE Main 2026 (Online) 28th January Evening Shift]

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Q.14 In two separate Young's double-slit experimental set-ups and two monochromatic light sources of different wavelengths are used to get fringes of equal width. The ratios of the slits separations and that of the wavelengths of light used are 2:1 and 1:2 respectively. The corresponding ratio of the distances between the slits and the respective screens (D_1/D_2) is _____.

[JEE Main 2026 (Online) 23rd January Morning Shift]

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Q.15 In a Young's double slit experiment set up, the two slits are kept 0.4 mm apart and screen is placed at 1 m from slits. If a thin transparent sheet of thickness 20 μm is introduced in front of one of the slits then center bright fringe shifts by 20 mm on the screen. The refractive index of transparent sheet is given by $\frac{\alpha}{10}$, where α is _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

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Q.16 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.

[JEE Main 2025 (Online) 28th January Morning Shift]

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ANSWER KEY

Section A (MCQ) — 10 questions

Ques.	1	2	3	4	5	6	7	8	9	10	
Ans.	**3**	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**4**	

Section B (Numerical) — 6 questions

Ques.	11	12	13	14	15	16	
Ans.	**5625**	**6**	**429**	**4**	**14**	**11**	