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

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

Section A (MCQ) — 16 questions

Q.1 In Young's double slit experiment, 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 $\frac{\lambda}{3}$ will be :

[NEET (UG) 2026]

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

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Q.2 If the monochromatic source in Young's double slit experiment is replaced by white light, then

[NEET (UG) 2024]

(1) Interference pattern will disappear
(2) There will be a central dark fringe surrounded by a few coloured fringes
(3) There will be a central bright white fringe surrounded by a few coloured fringes
(4) All bright fringes will be of equal width

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Q.3 Two slits in Young's double slit experiment are 1.5 mm apart and the screen is placed at a distance of 1 m from the slits. If the wavelength of light used is 600×10^{-9} m then the fringe separation is

[RE-NEET (UG) 2024]

(1) 4×10^{-5} m (2) 9×10^{-8} m
(3) 4×10^{-7} m (4) 4×10^{-4} m

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Q.4 For Young's double slit experiment, two statements are given below :

Statement-I: If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement-II: If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular separation of fringes decreases.

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

[NEET (UG) 2023]

(1) Both Statement-I and Statement-II are false
(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 true

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Q.5 In a Young's double slit experiment, a student observes 8 fringes in a certain segment of screen when a monochromatic light of 600 nm wavelength is used. If the wavelength of light is changed to 400 nm, then the number of fringes he would observe in the same region of the screen is

[NEET (UG) 2022]

(1) 6 (2) 8 (3) 9 (4) 12

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Q.6 If the screen is moved away from the plane of the slits in a Young's double slit experiment, then the :

[NEET (UG) 2022 (Phase 2)]

(1) linear separation of the fringes decreases
(2) angular separation of the fringes increases
(3) angular separation of the fringes decreases
(4) linear separation of the fringes increase

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Q.7 In Young's double slit experiment, if the separation between coherent sources is halved and the distance of the screen from the coherent sources is doubled, then the fringe width becomes : [NEET (UG) 2020]

(1) half (2) four times
(3) one-fourth (4) double

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Q.8 In a double slit experiment, when light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed 1 m away, was found to be 0.2°. What will be the angular width of the first minima, (μ_{water} = 4/3) if the entire experimental apparatus is immersed in water?

[NEET (UG) 2019]

(1) 0.15° (2) 0.05° (3) 0.1° (4) 0.266°

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Q.9 In Young's double slit experiment the separation d between the slits is 2 mm, the wavelength λ of the light used is 5896 Å and distance D between the screen and slits is 100 cm. It is found that the angular width of the fringes is 0.20°. To increase the fringe angular width to 0.21° (with same λ and D) the separation between the slits needs to be changed to [NEET 2018]

(1) 1.9 mm (2) 1.8 mm (3) 2.1 mm (4) 1.7 mm

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Q.10 Young's double slit experiment is first performed in air and then in a medium other than air. It is found that 8th bright fringe in the medium lies where 5th dark fringe lies in air. The refractive index of the medium is nearly [NEET 2017]

(1) 1.59 (2) 1.69 (3) 1.78 (4) 1.25

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Q.11 The intensity at the maximum in a Young's double slit experiment is I_0. Distance between two slits is d = 5λ, where λ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance D = 10d? [NEET 2016 (Phase 1)]

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

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Q.12 The interference pattern is obtained with two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max} - I_{min}}{I_{max} + I_{min}}$ will be [NEET 2016 (Phase 2)]

(1) $\frac{\sqrt{n}}{n+1}$ (2) $\frac{2\sqrt{n}}{n+1}$

(3) $\frac{\sqrt{n}}{(n+1)^2}$ (4) $\frac{2\sqrt{n}}{(n+1)^2}$

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Q.13 Two slits in Young's experiment have widths in the ratio 1 : 25. The ratio of intensity at the maxima and minima in the interference pattern, $\frac{I_{max}}{I_{min}}$ is [AIPMT 2015]

(1) $\frac{49}{121}$ (2) $\frac{4}{9}$ (3) $\frac{9}{4}$ (4) $\frac{121}{49}$

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Q.14 In the Young's double slit experiment, the intensity of light at a point on the screen where the path difference is λ is K, (λ being the wavelength of light used). The intensity at a point where the path difference is λ/4 will be [AIPMT 2014]

(1) K (2) K/4 (3) K/2 (4) zero

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Q.15 In Young's double slit experiment, the slits are 2 mm apart and are illuminated by photons of two wavelengths $\lambda_1 = 12000$ Å and $\lambda_2 = 10000$ Å. At what minimum distance from the common central bright fringe on the screen 2 m from the slit will a bright fringe from one interference pattern coincide with a bright fringe from the other ? [NEET 2013]

(1) 4 mm (2) 3 m (3) 8 mm (4) 6 mm

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Q.16 In Young's double slit experiment the distance between the slits and the screen is doubled. The separation between the slits is reduced to half. As a result the fringe width [NEET 2013 (Karnataka)]

(1) is halved (2) becomes four times

(3) remains unchanged (4) is doubled

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**4**	**3**	**4**	**2**	**4**	**4**	**2**	**1**	**1**	**3**	**2**
Ques.	12	13	14	15	16						
Ans.	**2**	**3**	**3**	**4**	**2**						