



PHYSICS

BOOKS - BETTER CHOICE PUBLICATION

INTERFERENCE OF LIGHT

Very Short Answer Type Questions 1 Mark

1. What is ether medium?



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2. What is interference of light?



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Short Answer type Questions 2 Marks

1. What is interference of light? Write two essential condition for sustained interference pattern to be produced on the screen.



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2. What are the coherent source of light ?

What are the conditions for obtaining two coherent sources of light ?



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3. Distinguish between interference and diffraction?



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1. What is interference of light?



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2. What is interference of light? Write two essential condition for sustained interference pattern to be produced on the screen.



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3. Prove that the law of conservation of energy is obeyed during interference of light.



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4. Give two points of differences between the phenomenon of interference and diffraction.



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5. Give two points of differences between the phenomenon of interference and diffraction.



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6. State the law of conservation of energy.



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7. Prove that the law of conservation of energy is obeyed during interference of light.



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Long Answer type Questions 5 6 Marks

1. What is interference of light ? What is constructive and destructive interference of light ?



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2. Show that in Young's double slit experiment for interference of light, the widths of the bright and dark fringes are equal.



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3. Derive an expression for fringe width in Young's double slit interference of light.



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4. Show that in Young's double slit experiment for interference of light, the widths of the bright and dark fringes are equal.



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5. Show that in Young's double slit experiment for interference of light, the widths of the bright and dark fringes are equal.



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6. In Young's double slit experiment what is the shape of interference fringes?



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7. In Young's double slit experiment what is the shape of interference fringes?



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8. Describe the condition for constructive and destructive interference.



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9. Describe the condition for constructive and destructive interference.



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10. Show that in Young's double slit experiment for interference of light, the widths of the bright and dark fringes are equal.



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11. Derive an expression for fringe width in Young's double slit interference of light.



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Numericals Problems

1. In young's double slit experiment, the two slits are 0.5 mm apart. The screen is placed 1 m away from the slits. The distance of 11th fringe from the first fringe is 1.0 cm. Calculate the wavelength of light used.



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2. In Young's double slit experiment, light of wavelength $5,000 \text{ \AA}$ is used. The screen on

which fringes are projected is 1.5 m from the centre of the narrow slits. The third bright band on the screen is formed at a distance of 1 cm from the central bright band calculate the separation between the slits.



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3. In young's double slit experiment, the two slits are 0.5 mm apart. The screen is placed 1 m away from the slits. The distance of 11th fringe

from the first fringe is 1.0 cm. Calculate the wavelength of light used.



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4. In Young's double slit experiment, the fringe width obtained is 3 mm in air. If the apparatus is immersed in water ($\mu = 4/3$), what will be the new fringe width?



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5. Young's double - slit experiment for interference is performed with two slits 3×10^{-3} m apart and light of wavelength $6,600\text{\AA}$. If the screen is 1 m away from the slits, find out the position of the fourth dark fringe.



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6. In Young's double slit experiment, the widths of two slits are in the ratio 1:4. Find at

the ratio of maximum and minimum intensity in the interference pattern obtained.



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7. Two coherent sources whose intensity ratio is 81:1 produce interference fringes. Calculate the ratio of intensity of maxima and minima in the fringe system.



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8. Two coherent source of light, whose intensity ratio is 49:1 produces interference fringe. Calculate the ratio of intensity of maximum and minimum in the fringe system.



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9. Two coherent source of light, whose intensity ratio is 49:1 produces interference fringe. Calculate the ratio of intensity of maximum and minimum in the fringe system.





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10. If the two slits in Young's double slit experiment have width ratio $16:1$, deduce the ratio of intensity at maxima and minima in the interference pattern.



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11. If the ratio of width of two slit's in Young's experiment is $1:25$, deduce the ratio of

intensity at maxima and minima in the interference pattern.



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12. If the two slits in Young's double slit experiment have width ratio $16:1$, deduce the ratio of intensity at maxima and minima in the interference pattern.



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13. Green light of wavelength $5,100\text{\AA}$ from a narrow slit is incident on a double slit. If the overall separation of 10 fringes on a screen 200 cm away is 2 cm, find slit separation.



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14. In Young's double slit experiment, two slits are separated by 3 mm distance and illuminated by light of wavelength 480 nm. The screen is at 2 m from the plane of the

slits. Calculate the separation between the 8th bright fringe and the 3rd dark fringe observed with respect to the central bright fringe.



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15. Two slits are 1 m apart and the same slits are 1 m from a screen. Find out fringe separation, when light of wavelength 500 nm is used.



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16. In a Young's double slit experiment the slit are 0.2 mm apart and the screen is 1.5 m away. It is observed that the distance between the central bright fringe and fourth dark fringe is 1.8 cm. Find the wavelength of light used.



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17. In a Young's double slit experiment the slit are 0.2 mm apart and the screen is 1.5 m away. It is observed that the distance between

the central bright fringe and fourth dark fringe is 1.8 cm .Find the wavelength of light used.



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18. In young's double slit experiment,the two slits are 0.5 mm apart .The screen is placed 1 m away from the slits .The distance of 11th fringe from the first fringe is 1.0 cm.Calculate the wavelength of light used.



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19. Light of wavelength $5,000\text{\AA}$ is incident on a double slit. If the overall separation of 10 fringes on a screen 200 cm away is 1.0 cm, find the distance between the two slits.



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20. The fringe width in a Young's double slit interference pattern is $2.4 \times 10^{-4} \text{ m}$, when a red light of wavelength $6,400\text{\AA}$ is used. By how much

will it change, if blue light of wavelength $4,000\text{\AA}$ is used?



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21. In a Young's double slit experiment, the slits are separated by 0.03 cm and the screen is placed 1.5 m away. The distance between the central fringe and the fourth bright fringe is 1 cm . Determine the wavelength of light used in the experiment.



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22. In a Young's double slit experiment, the slits are separated by 0.03 cm and the screen is placed 1.5 m away. The distance between the central fringe and the fourth bright fringe is 1 cm. Determine the wavelength of light used in the experiment.



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23. Two slits 0.125 mm apart are illuminated by light of wavelength 4500 \AA . The screen is one

metre way from the plane of the slits. Find the separation between the second bright fringes on both sides of the central maximum.



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Most Expected Questions 1 Mark

1. What are coherent sources of light?



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2. State conditions which must be satisfied for two light sources to be coherent.



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3. State the essential conditions for two light waves to be coherent.



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