PREVIOUS YEARS' QUESTIONS — EXERCISE-II

1. Electromagnetic waves are transverse in nature is evident by- **[AIEEE - 2002]**

(1) polarization (2) interference

(3) reflection (4) diffraction

2. To demonstrate the phenomenon of interference we require two sources which emit radiations of-

(1) nearly the same frequency **[AIEEE - 2003]**

(2) the same frequency

(3) different wavelength

(4) the same frequency and having a constant phase relationship

3. The maximum number of possible interference maxima for slit-separation equal to twice the wavelength in Young's double-slit experiment, is-

(1) infinite (2) five **[AIEEE - 2004]**

(3) three (4) zero

4. A Young's double slit experiment uses a monochromatic source. The shape of the interference fringes formed on a screen is- **[AIEEE - 2005]**

(1) hyperbola (2) circle

(3) straight line (4) parabola

5. When an unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is- **[AIEEE - 2005]**

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

6. If I_0 is the intensity of the principle maximum in the single slit diffraction pattern, then what will be its intensity when the slit width is doubled- **[AIEEE - 2005]**

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

7. In a Young's double slit experiment the intensity at a point where the path difference is $\frac{\lambda}{6}$ (λ being the wavelength of the light used) is I. If I_0 denotes the maximum intensity, I/I_0 is equal to- **[AIEEE - 2007]**

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

8. A mixture of light, consisting of wavelength 590 nm and an unknown wavelength, illuminates Young's double slit and gives rise to two overlapping interference patterns on the screen. The central maximum of both lights coincide. Further, it is observed that the third bright fringe of known light coincides with the 4th bright fringe of the unknown light. From this data, the wavelength of the unknown light is :- **[AIEEE - 2009]**

(1) 442.5 nm (2) 776.8 nm

(3) 393.4 nm (4) 885.0 nm

9. At two points P and Q on screen in Young's double slit experiment, waves from slits S_1 and S_2 have a path difference of 0 and $\frac{\lambda}{4}$ respectively. the ratio of intensities at P and Q will be : **[AIEEE - 2011]**

(1) 3 : 2 (2) 2 : 1

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

10. In a Young's double slit experiment, the two slits act as coherent sources of waves of equal amplitude A and wavelength λ. In another experiment with the same arrangement the two slits are made to act as incoherent sources of waves of same amplitude and wavelength. If the intensity at the middle point of the screen in the first case is I_1 and in the second case I_2, then the ratio $\frac{I_1}{I_2}$ is :- **[AIEEE - 2011]**

(1) 4 (2) 2 (3) 1 (4) 0.5

11. In Young's double slit interference experiment, the slit widths are in the ratio 1 : 25. Then the ratio of intensity at the maxima and minima in the interference pattern is :- **[AIEEE - 2012 (Online)]**

(1) 1 : 5 (2) 3 : 2 (3) 9 : 4 (4) 1 : 25

12. In a Young's double slit experiment with light of wavelength λ, fringe pattern on the screen has fringe width β. When two thin transparent glass (refractive index μ) plates of thickness t_1 and t_2 ($t_1 > t_2$) are placed in the path of the two beams respectively, the fringe pattern will shift by a distance: **[AIEEE - 2012 (Online)]**

(1) $\frac{\beta(\mu-1)}{\lambda}(t_1 - t_2)$ (2) $\frac{\beta(\mu-1)}{\lambda}\left(\frac{t_1}{t_2}\right)$

(3) $\frac{\mu\beta}{\lambda}\frac{t_1}{t_2}$ (4) $(\mu-1)\frac{\lambda}{\beta}\ .\ (t_1 + t_2)$

13. The maximum number of possible interference maxima for slit separation equal to 1.8 λ, where λ is the wavelength of light, in a Young's double slit experiment is :- **[AIEEE - 2012 (Online)]**

(1) Infinite (2) Zero (3) 5 (4) 3

14. The first diffraction minimum due to a single slit diffraction is seen at $\theta = 30°$ for a light of wavelength 5000 A° falling perpendicularly on the slit. The width of the slit is :- **[AIEEE - 2012 (Online)]**

(1) 5×10^{-5} cm (2) 2.5×10^{-5} cm

(3) 1.25×10^{-5} cm (4) 10×10^{-5} cm

15. Young's double slit experiment is carried out by using green, red and blue light, one color at a time. The fringe widths recorded are β_G, β_R and β_B, respectively. Then **[IIT - 2012]**

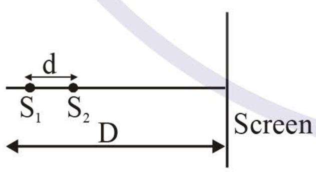
(1) $\beta_G > \beta_B > \beta_R$ (2) $\beta_B > \beta_G > \beta_R$

(3) $\beta_R > \beta_B > \beta_G$ (4) $\beta_R > \beta_G > \beta_B$

16. 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 the emergent light is :- **[JEE(Main)-2013]**

(1) I_0 (2) $I_0/2$ (3) $I_0/4$ (4) $I_0/8$

17. Two coherent point sources S_1 and S_2 are separated by a small distance 'd' as shown. The fringes obtained on the screen will be : **[JEE(Main)-2013]**



(1) points (2) straight lines

(3) semi-circles (4) concentric circles

18. The magnetic field in a travelling electromagnetic wave has a peak value of 20nT. The peak value of electric field strength is : **[JEE(Main)-2013]**

(1) 3 V/m (2) 6 V/m

(3) 9 V/m (4) 12 V/m

19. Two beams, A and B, of plane polarized light with mutually perpendicular planes of polarization are seen through a polaroid. From the position when the beam A has maximum intensity (and beam B has zero intensity), a rotation of polaroid through 30° makes the two beams appear equally bright. If the initial intensitites of the two beams are I_A and I_B respectively, then $\frac{I_A}{I_B}$ equals : **[JEE(Main)-2014]**

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

20. In the Young's double slit experiment using a monochromatic light of wavelength λ, the path difference (in terms of an integer n) corresponding to any point having half the peak intensity is :- **[JEE Advanced 2013]**

(1) $(2n+1)\frac{\lambda}{2}$ (2) $(2n+1)\frac{\lambda}{4}$

(4) $(2n+1)\frac{\lambda}{8}$ (4) $(2n+1)\frac{\lambda}{16}$

21. In a Young's double slit experiment, slits are separated by 0.5 mm, and the screen is placed 150 cm away. A beam of light consisting of two wavelengths, 650 nm and 520 nm, is used to obtain interference fringes on the screen. The least distance from the common central maximum to the point where the bright fringes due to both the wavelengths coincide is : **[JEE(Main)-2017]**

(1) 9.75 mm (2) 15.6 mm

(3) 1.56 mm (4) 7.8 mm

PREVIOUS YEARS QUESTIONS — **ANSWER KEY** — Exercise-II

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	1	4	2	1	1	3	4	1	2	2
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	3	1	4	4	4	3	4	2	2	2
Que.	21									
Ans.	4									