

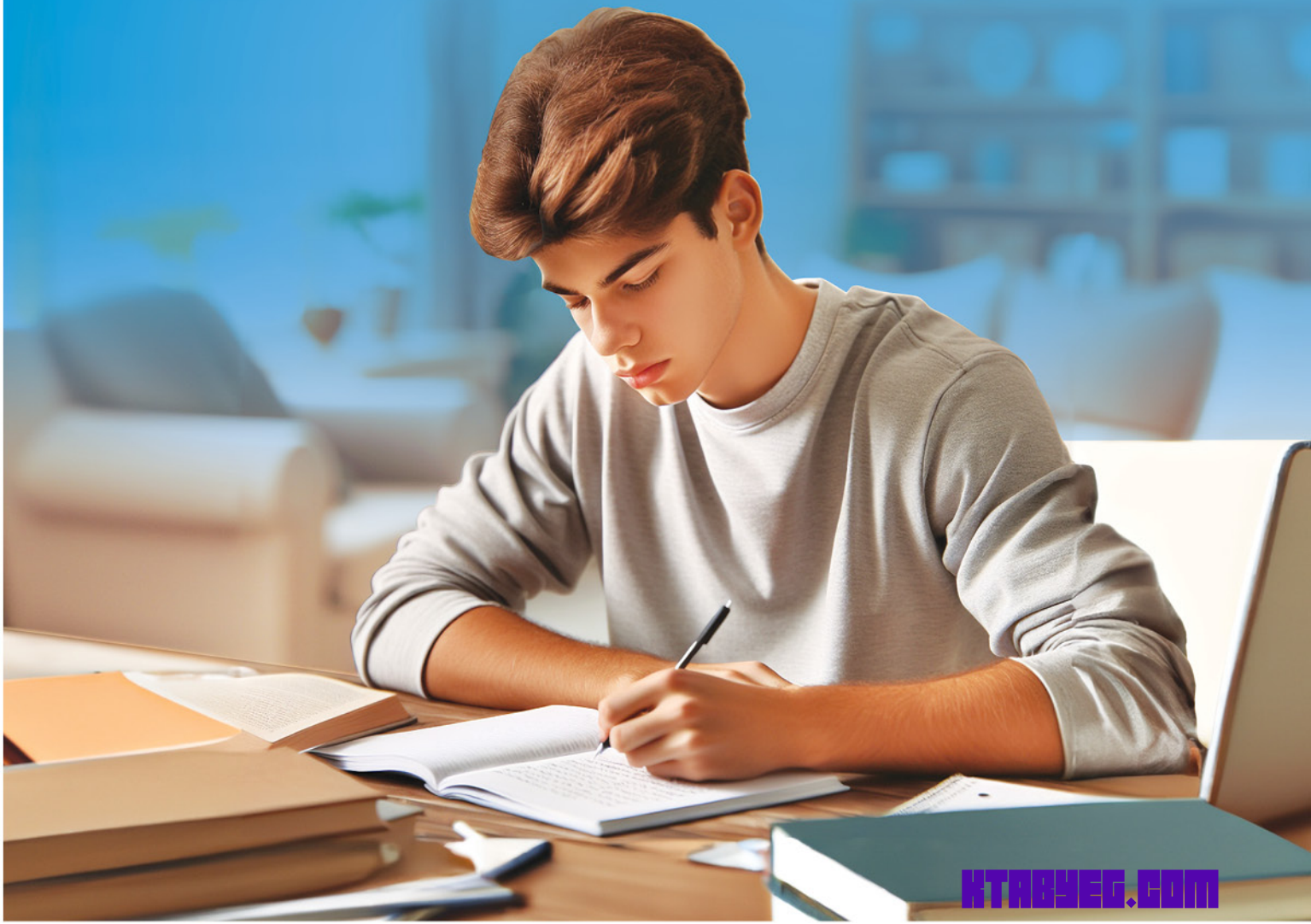


PHYSICS

2nd SEC.
2025
FIRST TERM

November Tests ?

According to the Latest Modifications of
the Ministry of Education



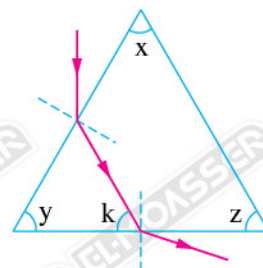
Test 1

on November Content



Choose the correct answer (1 : 12) :

- 1 An incident light ray on a triangular prism gets refracted inside the prism then gets emerged away from the normal as in the opposite figure, so the apex angle of the prism is



- (a) z (b) k
(c) y (d) x

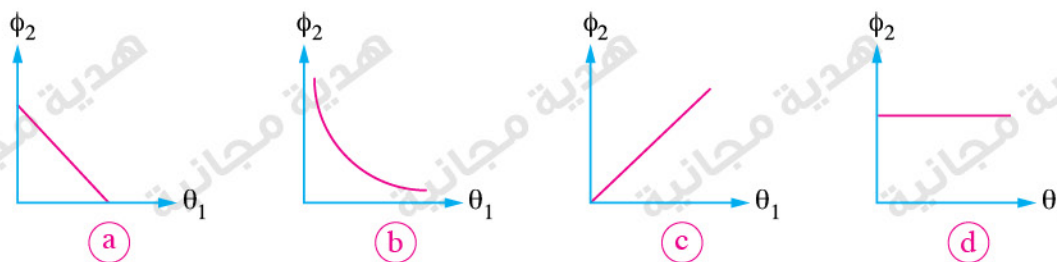
- 2 A light ray is incident on a fiber optic cable that is made of a flexible material of refractive index 1.66, so the maximum angle of incidence of the light ray on the internal surface to get out of the cable equals approximately

- (a) 37° (b) 45° (c) 63° (d) 90°

- 3 When a light wave passes through a slit that is narrow relative to the wavelength of light, the property that changes for the wave is

- (a) the speed (b) the wavelength
(c) the frequency (d) the direction of propagation

- 4 Which of the following graphs represents the relation between the second angle of incidence (ϕ_2) and the refraction angle (θ_1) for a light ray that gets incident on the face of a triangular prism with different angles of incidence?



- 5 A light ray gets incident perpendicularly on one of the faces of a triangular prism of apex angle 41.8° , so it gets emerged tangent to the opposite face, hence the refractive index of the prism material is

- (a) 1.3 (b) 1.5 (c) 1.7 (d) 1.9

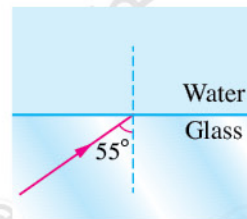
- 6 As the temperature difference between the layers of air which are close to the Earth surface and the upper layers increases, the chance of mirage occurrence
- (a) increases (b) decreases
(c) does not change (d) the answer is indeterminable
- 7 The contrast of light interference in Young's double-slit experiment decreases when
- (a) using a light of high intensity
(b) decreasing the distance between the two slits
(c) increasing the distance between the two slits
(d) increasing the wavelength of the used light
- 8 A light ray gets incident with an angle of 45° on one of the faces of a triangular prism of refractive index $\sqrt{2}$ and emerged from the opposite face by an angle of 45° , so the deviation angle of the ray equals
- (a) 30° (b) 45° (c) 60° (d) 90°
- 9 A light ray is incident on one of the faces of an equilateral triangular prism and emerges from its opposite face. If the first angle of refraction is double the second angle of incidence, then the first angle of refraction equals
- (a) 60° (b) 40° (c) 20° (d) 30°
- 10 To increase the efficiency of the reflecting prism it should be coated by a material of absolute refractive index the absolute refractive index of the material of the prism.
- (a) greater than (b) less than
(c) equals (d) the answer is indeterminable
- 11 When a light ray gets incident on one of the faces of a triangular prism, the minimum angle of deviation (α_0) in the prism increase by
- (a) increasing the angle of incidence on the prism
(b) decreasing the angle of incidence on the prism
(c) using a light of longer wavelength
(d) using a light of shorter wavelength

- 12 In a Young's double-slit experiment, the separation distance between the two slits was 10^{-4} m and the distance between two consecutive fringes of the same type was found to be 3.75 mm when they appeared on an observation screen at a distance 0.75 m from the double-slit barrier, so the wavelength of the used light equals
- (a) 5000 Å (b) 5400 Å (c) 6000 Å (d) 6400 Å

Answer the following questions (13 : 15) :

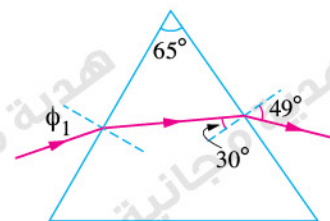
- 13 When a triangular prism is used in the dispersion of white light into its components, the red light has the minimum deviation. **Explain.**
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- 14 In the opposite figure, a light ray gets incident from the glass with an angle of incidence of 55° on the boundary surface with water, so if the absolute refractive index for each of glass and water are 1.58, 1.33 respectively, **does** the light ray get totally reflected in the glass or pass to the water? **And why?**



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- 15 The opposite figure shows the path of a light ray through a triangular prism, **calculate:**
- (1) The refractive index of the material of the prism.
- (2) The angle of deviation of the light ray.



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Test 2

on November Content



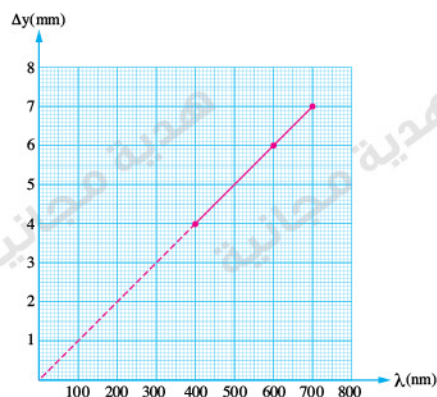
Choose the correct answer (1 : 12) :

1 When a light ray has got incident on one of the faces of a triangular prism and emerged perpendicular from the opposite face, the angle of incidence of the ray on the prism has to be the apex angle of the prism.

- (a) greater than (b) smaller than
(c) equal to (d) the answer is indeterminable

2 The opposite graph shows the variation of the distance between the center of the central bright fringe and the center of the first bright fringe (Δy) versus the wavelength (λ) of the used light in a Young's double-slit experiment, so if the distance between the observation screen and the double-slit barrier is 1 m, the distance between the two slits (d) equals

- (a) 10^4 m (b) 10^{-4} m
(c) 10^2 m (d) 10^{-2} m

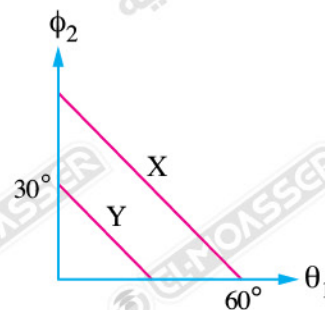


3 A light source is placed at the bottom of a water pond of depth 150 cm, so a bright circular spot is formed on the surface of water whose radius equals 1.71 m , then the refractive index of water is

- (a) 1.33 (b) 1.51 (c) 1.62 (d) 1.71

4 When the relation between the first angle of refraction (θ_1) and the second angle of incidence (ϕ_2) for two light rays passing through two prisms X, Y is represented graphically, we obtained the shown graph. Using the graph we find that the apex angles of the two prisms are

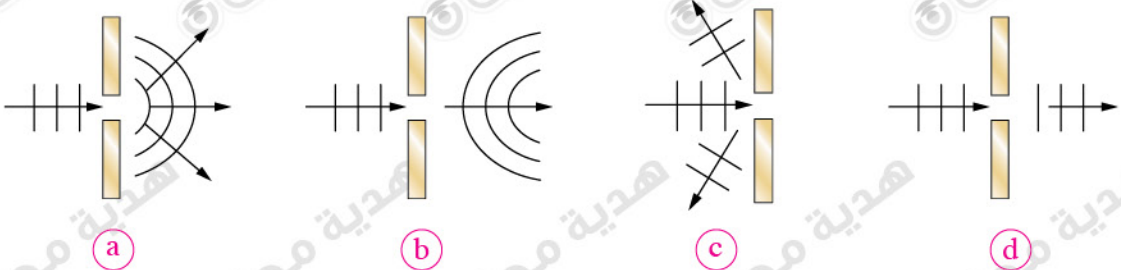
	Apex angle of prism X	Apex angle of prism Y
(a)	30°	60°
(b)	90°	30°
(c)	60°	90°
(d)	60°	30°



5 If an optic fiber of two layers is designed such that the refractive index of its internal material is 1.6, the refractive index of its external layer is preferable to be

- (a) greater than 1.6
- (b) less than 1.6
- (c) equal to 1.6
- (d) the answer is indeterminable

6 Which of the following diagrams represents correctly the phenomenon of light diffraction when light falls on an aperture?

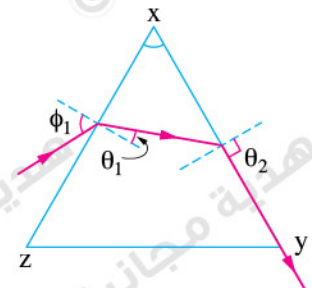


7 Suppose that a Young's double-slit experiment is conducted in water instead of air using the same apparatus with the same geometrical arrangement, so the interference fringes

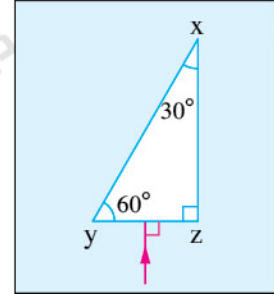
- (a) become fewer
- (b) become wider
- (c) become thinner
- (d) won't appear

8 In the opposite figure, a light ray passes through a triangular prism. When the angle of incidence of the light ray (ϕ_1) increases, then

	θ_2	θ_1
(a)	decreases	decreases
(b)	decreases	increases
(c)	increases	decreases
(d)	increases	increases

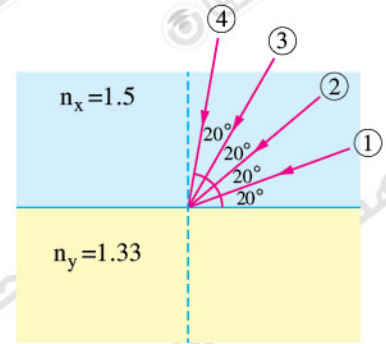


9 The opposite figure shows a light ray falling perpendicular to face yz of a right angle triangular prism of refractive index 1.6. The prism is submerged in a liquid of refractive index 1.3, then the angle of incidence of the ray on face xy will be



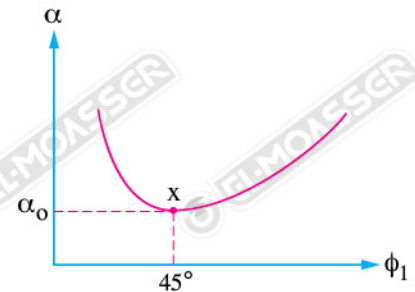
- (a) 90°
- (b) greater than the critical angle between the prism and the liquid
- (c) less than the critical angle between the prism and the liquid
- (d) equal to the critical angle between the prism and the liquid

10 When four light rays fall from medium x on the boundary surface with medium y as in the opposite figure, which of these rays **cannot** penetrate to medium y ?



- (a) Ray ①
- (b) Ray ②
- (c) Rays ③, ④
- (d) Rays ①, ②

11 The opposite graph represents the change of the angle of deviation (α) of a light ray through an equilateral triangular prism versus the angle of incidence of the ray (ϕ_1) on the prism, so the refractive index of the prism material equals



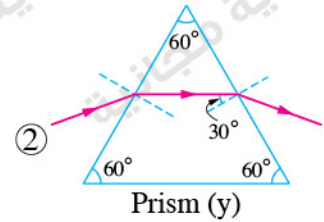
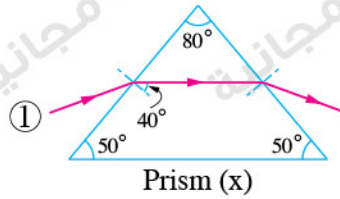
- (a) 1.3
- (b) 1.4
- (c) 1.5
- (d) 1.6

12 When a triangular prism is used in the dispersion of white light into its components, the violet light is the most deviated color because it has the greatest

- (a) speed inside the prism
- (b) speed in the air
- (c) wavelength
- (d) refractive index for the prism material

Answer the following questions (13 : 15):

- 13** Two monochromatic light rays ① and ② of the same color pass through two triangular prisms (x) and (y) of the same material, **show** which of the rays has a greater angle of deviation.



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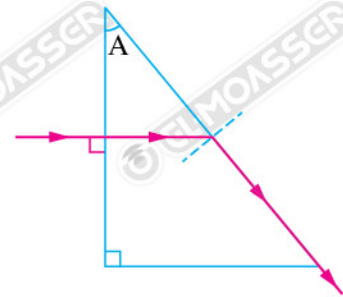
- 14** If the angle of minimum deviation of a light ray that falls on one of the faces of an equilateral triangular prism is 30° , **calculate** each of the angle of emergence of the light ray and the refractive index of the prism.

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- 15** In the opposite figure, a light ray passes through a triangular prism. If the wavelength of the light ray in air is 400 nm and in the prism material is 250 nm, **calculate** the apex angle of the prism (A).



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Answers



Answers of Test 1

- 1 (c) 2 (a) 3 (d) 4 (a) 5 (b) 6 (a)
7 (c) 8 (a) 9 (b) 10 (b) 11 (d) 12 (a)

13 Because it has the longest wavelength and since $(n \propto \frac{1}{\lambda})$, the refractive index of the prism material for the red light has the lowest value and hence the red light has the least deviation.

$$14 \sin \phi_c = \frac{n_{\text{water}}}{n_{\text{glass}}} = \frac{1.33}{1.58}$$

$$\phi_c = 57.3^\circ$$

\therefore The angle of incidence of the light ray on the boundary surface between the two media is less than the critical angle.

\therefore The ray passes to water and refracts away from the normal.

$$15 (1) n = \frac{\sin \theta_2}{\sin \phi_2} = \frac{\sin 49}{\sin 30} = 1.51$$

$$(2) A = \theta_1 + \phi_2, \quad \theta_1 = A - \phi_2 = 65 - 30 = 35^\circ$$

$$n = \frac{\sin \phi_1}{\sin \theta_1}, \quad 1.51 = \frac{\sin \phi_1}{\sin 35^\circ},$$

$$\phi_1 = 60^\circ$$

$$\alpha = \phi_1 + \theta_2 - A = 60 + 49 - 65 = 44^\circ$$

Answers of Test 2

- 1** (a) **2** (b) **3** (a) **4** (d) **5** (b) **6** (a)
7 (c) **8** (b) **9** (b) **10** (a) **11** (b) **12** (d)

- 13** From the figure, we can find that both prisms are in minimum deviation position, so the minimum angle of deviation (α_o) of ray ① in prism (x) will be greater because it increases as the apex angle of the prism (A) increases.

14 $\theta_2 = \phi_o = \frac{\alpha_o + A}{2} = \frac{30 + 60}{2} = 45^\circ$

$$n = \frac{\sin\left(\frac{\alpha_o + A}{2}\right)}{\sin\left(\frac{A}{2}\right)} = \frac{\sin\left(\frac{30 + 60}{2}\right)}{\sin\left(\frac{60}{2}\right)} = \sqrt{2}$$

15 $\therefore A = \theta_1 + \phi_2$, $\theta_1 = 0^\circ$

$\therefore A = \phi_2$ ①

\therefore The ray emerged tangent to the boundary surface.

$\therefore \phi_2 = \phi_c$ ②

From ①, ②:

$A = \phi_c$

$\therefore n = \frac{\lambda_{\text{air}}}{\lambda_{\text{prism}}}$, $n = \frac{1}{\sin \phi_c} = \frac{1}{\sin A}$

$\therefore \sin A = \frac{\lambda_{\text{prism}}}{\lambda_{\text{air}}} = \frac{250}{400} = \frac{5}{8}$

$\therefore A = 38.68^\circ$