ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SOLUTION TO WORK SHEET: 39.

Subject : PHYSICS

Date : 21.11.2020

CLASS : XII

Chapter: Refraction of light at plane surface

Topic: Prism and dispersion, angular dispersion and dispersive power.

1: A ray of light undergoes deviation of 30° when incident on an equilateral prism of refractive index $\sqrt{2}$. The angle made by the ray inside the prism with the base of the prism is

(a) 45^0 (b) 30^o (c) 0^o (d) 60^o

Ans. (c) 0^o

2: The refracting angle of a prism is A, and refractive index of the material of the prism is cot (A/2). The angle of minimum deviation is

(a) 180°-3A (b) 180° – 2A (c) 90°- A (d) 180° + 2A

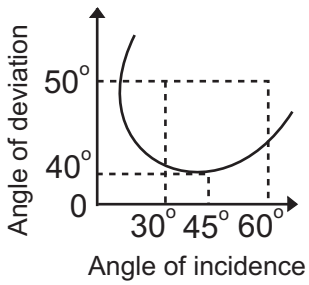
Ans. (b) 180° – 2A

3: A ray of light passes through an equilateral prism such that, the angle of incidence is equal to the angle of emergence and the latter is equal to 3/4 the angle of prism. The angle of deviation is

(a) 25° (b) 30^o (c) 45° (d) 35^o

Ans. (b) 30^o

4: A plot of angle of deviation D versus angle of incidence for a triangular prism is shown below.
The angle of incidence for which the light ray travels parallel to the base is



(a) 30° (b) 60^o (c) 45° (d) Data insufficient

Ans. (c) 45°

5: A prism of prism angle $\frac{\pi}{4}$ gives a deviation of $\frac{\pi}{4}$ If the velocity of light in vacuum is 3 x 10^8 ms^{-1} 1then find the velocity of light in material of the prism.

(a) 1.25 x 10^8 ms^{-1} (b) 1.33 x 10^8 ms^{-1} (c) 2.4 x 10^8 ms^{-1} (d) 1.62 x 10^8 ms^{-1}

Ans. (d) 1.62 x 10^8 ms^{-1}

6: A prism (μ =1.57) gives a deviation of 5.5^o. The prism angle is

(a) 9.64° (b) 7.74° (c) 5.5° (d) 8.50^o

Ans. (a) 9.64°

7:. The angle of incidence for a ray of light at a refracting surface of a prism is 45°. The angle of prism is 60°. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are

(a) 30°; $\sqrt{2}$ (b) 45°; $\sqrt{2}$ (c) 30°; $\frac{1}{\sqrt{2}}$ (d) 45° $\frac{1}{\sqrt{2}}$

Ans. (a) 30°;$\sqrt{2}$

→

8: In an experiment for determination of refractive index of glass of a prism by i-δ plot, it was found that a ray incident at an angle 35° suffers a deviation of 40° and that it emerges at an angle 79°. In that case, which of the following is closest to the maximum possible value of the refractive index?

(a) 1.5 (b) 1.6 (c) 1.7 (d) 1.8

Ans.(a) 1.5

9: The refractive indices of two prisms, for two rays of lights, are 1.66 and 1.64 respectively. The dispersive power of the prism is

(a) 0.02 (b) 0.012 (c) 0.010 (d) 0.03

Ans. (d) 0.03

10: The refractive index of the material of a prism, for violet and red In light, are 1.66 and 1.64 respectively. If refracting angle of the prism be 10°, then angular dispersion for these two colours are

(a) 0.20° (b) 0.10° (c) 0.40° (d) 1°

Ans. (a) 0.20°

11: The two colours of light for which angular dispersion is maximum are

(a) yellow and green (b) red and blue (c) green and red (d) blue and orange

Ans. (b) red and blue

12: Refractive index of a substance-for blue light 1.67, for yellow 1.65 and for red light 1.63. The dispersive power of the substance

(a) 0.031 (b) 1.60 (c) 0.0615 (d) 0.024

Ans. (c) 0.0615

13: Which one is not a dispersive medium ?

(a) water (b) glass (c) air (d) glycerine

Ans. (c) air

14: The limit of wavelength of a visible light

(a) 3000 μm to 0.4 μm (b) 0.7 μm to 1000 μm (c) 0.4 μm to 0.8 μm (d) 0.1cm to 30cm

Ans. (c) 0.4 μm to 0.8 μm

15: Focal length of a lens is

(a) same for all wavelengths

(b) maximum for red and minimum for violet

(c) zero for red and infinite for violet

(d) maximum for violet and minimum for red

Ans. (b) maximum for red and minimum for violet