ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SOLUTION TO WORK SHEET: 47.

Subject : PHYSICS

Date : 23.01. 2021

CLASS : XII

Chapter-Diffraction and polarization of light

Topic: Fraunhofer diffraction by single slit, condition for the formation of minima and Secondary maximum polarization of light, Brewster's law.

Multiple choice questions : **1 X 15 = 15**

1. A diffraction pattern is obtained using a beam of red light. What will happen if red light is replaced by blue light ?

   (a) no change b) diffraction bands become narrower and crowded together

   (c) bands become broader and further apart (d) bands disappear

   Ans. b) diffraction bands become narrower and crowded together

2. The penetration of light into the region of geometrical shadow is called

   (a) polarization (b) interference (c) diffraction (d) refraction

   Ans. (c) diffraction

3. Angular width θ of central maximum of a diffraction pattern of a single slit does not depend on

   (a) distance between slit and source (b) wavelength of light used

   (c) width of the slit (d) frequency of the light used.

   Ans. (a) distance between slit and source

4. Two point white dots are 1mm apart on a black paper. They are viewed by eye of pupil diameter 3 mm Approximately, what is the maximum distance at which these dots can be resolved by the eye ? [Take wavelength of light = 500 nm]

   (a) 3m (b) 6m (c) 1m (d) 5m

   Ans. (d) 5m

5. When a unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is

   (a) I_0 (b) zero (c) $\frac{1}{4} I_0$ (d) $\frac{1}{2} I_0$

   Ans. (d) $\frac{1}{2} I_0$

6. When the angle of incidence on a material is 60°, the reflected light is completely polarized. The velocity of the refracted ray inside the material in ms^{-1} is

   (a) 3×10^8 (b) $\frac{1}{4} \times 10^8$ (c) $\sqrt{3} \times 10^8$ (d) 0.5×0^8

   Ans. (c) $\sqrt{3} \times 10^8$

7. Which does not show polarization ?

   (a) longitudinal waves in gas (b) transverse waves in gas

   (c) both (a) and (b) (d) none of these

   Ans. (a) longitudinal waves in gas

8. Ordinary light incident on a glass slab at the polarizing angle, suffers a deviation of 22^{O} The value of the angle of refraction in glass in this case is

(a) 56^{0} (b) 68^{0} (c) 34° (d) 22°

Ans. (c) 34°

9. When a plane polarized light is passed through an analyser and the analyser is rotated through 90^{0}, the intensity of emerging light

(a) varies between maximum and minimum (b) becomes zero

(c) does not vary (d) varies between maximum and zero.

Ans. (d) varies between maximum and zero.

10. A ray of light strikes a glass plate at an angle of 60°. If the reflected and refracted rays are perpendicular to each other, then refractive index of glass is

(a) $\frac{1}{2}$ (b) $\sqrt{\frac{3}{2}}$ (c) $\frac{3}{2}$ (d) 1. 732

Ans. (d) 1. 732

11. Polaroid glass is used in sun glasses because

(a) it reduces the light intensity to half due to polarization (b) it is fashionable

(c) it has good colour (d) it is cheaper

Ans. (a) it reduces the light intensity to half due to polarization

12. What changes on polarization of light ?

(a) frequency (b) wavelength (c) phase (d) Intensity

Ans. (d) Intensity

13. The limit of resolution of eye is approximately

(a) 1° angle (b) l' angle (c) 1 mm (d) 1 cm

Ans. (b) l' angle

14. If the red light is replaced by blue light illuminating the object in a microscope, then resolving power of the microscope

(a) decreases (b) increases (c) gets halved (d) remains unchanged

Ans. (b) increases

15. In the polarization of light waves, the angle between the plane of vibration and plane of polarization is

(a) 80° (b) 45° (c) 90° (d) 0°

Ans. (c) 90°