WORKSHEET 2

CHAPTER 4 – REFRACTION OF LIGHT

A. Tick (✓) the correct option.

1. Which of the following factors do not change on refraction?
   a. Speed of light b. Wavelength of light c. Frequency of light d. None of these
2. The relationship between speed; frequency and wavelength of light is
   a. $c = f \times \lambda$. b. $c = f/\lambda$. c. $\lambda = cf$. d. none of these.
3. Speed of light is minimum in which medium among the following?
   a. Air b. Water c. Alcohol d. Ice
4. Speed of light in air is
   a. 2×10^8 m/s. b. 1.5×10^8 m/s. c. 5×10^8 m/s. d. 3×10^8 m/s.
5. If thickness of glass block is decreased, the lateral displacement will
   a. increase. b. decrease. c. remains constant. d. none of these.

B. Fill in the blanks.

1. The line of intersection of the two surfaces if called _____ of the prism.
2. For a given angle of incidence, angle of deviation is _____ proportional to the angle of prism.
3. A water pool of depth 5.6 appears to be of depth 4.2 m. The refractive index of water is _____
4. Sun appears _____ shaped at sunrise and sunset.
5. Critical angle _____ on increasing the temperature of the medium.

C. State whether the following statements are true or false.

1. Greater the refractive index, lesser will be the critical angle.
2. In binoculars, prism is used to deviate light through 90°.
3. Mirage is an optical illusion caused due to total internal reflection of light.
4. The stars seem higher than they actually are due to atmospheric refraction.
5. The legs of a person standing in a swimming pool appear shorter.

D. Match the following.

1. Prism deviates ray of light through 180°	optical fibre
2. Twinkling of starts	lateral displacement
3. Total internal reflection	periscope
4. Prism deviates ray of light through 90°	binoculars
5. Refraction through glass slab	atmospheric refraction

Name: ..... Teacher's signature: .....

Class: ..... X ..... Date: .....

E. Answer the following questions.

Very short answer questions

1. Define refraction of light.
1. What is an optically rarer medium?

Short answer questions

1. Define atmospheric refraction.
2. What is the relationship between refractive index of a medium, real depth and apparent depth?

Long answer questions

1. What are the factors an which the critical angle depends?
2. A coin is placed at a depth of 16 cm in breaker containing water. The refractive index of water is 4/3. Calculate the height through which the coin is raised.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. c 2. a 3. c 4. d 5. b

B. Fill in the blanks.

1. refractive edge 2. directly 3. 4/3 4. oval 5. increases

C. State whether the following statements are true or false.

1. T 2. F 3. T 4. T 5. T

D. Match the following.

1. Prism deviates ray of light through 180°	binoculars
2. Twinkling of stars	atmospheric refraction
3. Total internal reflection	optical fibre
4. Prism deviates ray of light through 90°	periscope
5. Refraction through glass slab	lateral displacement

E. Answer the following questions.

Very short answer questions

1. The bending of light when it passes obliquely from one transparent medium to another is called refraction of light.
2. A medium in which the speed of light is more is known as an optically rarer medium.

Short answer questions

1. When the light rays pass through the atmosphere having layers of different densities and refractive indices then refraction takes place. This is called atmospheric refraction.
2. $^{1}\mu_{2} = \dfrac{\text{Real depth}}{\text{Apparent depth}}$

Long answer questions

1. The critical angle for a given pair of media depends on
   i. colour (or wavelength) of light.
   ii. nature of the pair of media.
   iii. temperature.
2. $$\text{Real depth} = 16 \text{ cm}$$
$$\mu_{\text{water}} = \frac{4}{3}$$
$$\text{Apparent depth} = \frac{\text{Real depth}}{\mu_{\text{water}}} = \frac{16}{4/3} = \frac{16 \times 3}{4} = 12 \text{ cm}$$
$$\text{Height through which the coin is raised} = \text{Real depth} - \text{Apparent depth} = 16 - 12 = 4 \text{ cm}$$