# WORKSHEET 1

## CHAPTER 5 – REFRACTION OF LIGHT

### A. Tick (✓) the correct option.

1. The bending of light when it passes from one medium to another is called
   a. reflection  b. refraction  c. diffusion  d. none of these.
2. When light travels from rarer medium to denser, it bends
   a. towards normal  b. away from normal  c. goes along same path  d. none of these.
3. The speed of light is highest in
   a. glass  b. kerosene  c. vacuum  d. oil.
4. Which lens is thicker in the middle and thinner at the edge.
   a. plane concave  b. concave  c. convex – concave  d. convex.
5. Focal length of a convex lens is
   a. positive  b. negative  c. zero  d. none of these.

### B. Fill in the blanks.

1. The ratio of sine of the angle of incidence to sine of the angle of refraction is _____ for a given pair of media.
2. The refractive index of a medium defined with respect to vacuum is called the _____ refraction index.
3. The refractive index of diamond is _____
4. When light passes from rarer medium to denser medium, its wavelength _____
5. Refraction of light is essentially a _____ phenomenon.

### C. State whether the given statements are true or false.

1. During refraction, frequency of light changes.
2. The speed of light of all colours is same in air.
3. The focal length of a convex lens is positive.
4. The image formed by a convex lens is always real and inverted.
5. Magnification is defined as the ratio of height of the image to the height of the object.

### D. Match the following.

| | |
|---|---|
| 1. Positive focal length | concave lens |
| 2. Negative focal length | $\frac{v}{u}$ |
| 3. Magnification | $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ |
| 4. Lens formula | optical centre |
| 5. Geometrical centre of lens | convex lens |

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## E. Answer the following questions.

### Very Short Answer Questions

1. Define refraction.
2. What is the speed of light in vacuum?

### Short Answer Questions

1. State Snell's law.
2. Define absolute refractive index.

### Long Answer Questions

1. A concave lens has focal length of 40 cm. At what distance must the object be placed to obtain the image at 30 cm?
2. A thin lens has a focal length –50 cm. Find the power of the lens.

# ANSWERS

## WORKSHEET 1

### A. Tick (✓) the correct option.

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

### B. Fill in the blanks.

1. constant
2. absolute
3. 2.42
4. decreases
5. surface

### C. State whether the given statements are true or false.

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

### D. Match the following.

1. Positive focal length — convex lens
2. Negative focal length — concave lens
3. Magnification — $\frac{v}{u}$
4. Lens formula — $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$
5. Geometrical centre of lens — optical centre

### E. Answer the following questions.

**Very Short Answer Questions**

1. The change in direction of light when it possess obliquely from one transparent medium to another at the boundary separating the two media is called refraction.
2. $3 \times 10^8$ m/s

**Short Answer Questions**

1. According to Snell's law, the ratio of sine of the angle of incidence to sine of the angle of refraction is constant for the light of a given colour and for a given pair of media.
2. If the incident ray is travelling through vacuum or air and is then refracted in a medium, then the value of refractive index is called absolute refractive index of that medium.

**Long Answer Questions**

1. $f = -40$ cm

   $v = -30$ cm

   $u = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{-40} = \frac{1}{-30} - \frac{1}{u}$$

$$\frac{1}{u} = \frac{-1}{30} + \frac{1}{40} = \frac{-4+3}{120} = \frac{-1}{120}$$

$$u = -120 \text{ cm}$$

2. $f = -50$ cm

$= \frac{-50}{100} = \frac{-1}{2}$ cm

$\text{Power} = \frac{1}{\text{focal length}}$

$= \frac{1}{-1/2}$

$= -2$ D