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Illumination is the study of light and its proper use in daily life and engineering. It helps us design lighting for homes, streets, factories, and offices. This chapter explains basic terms like **luminous flux**, **lumen**, **candela**, **lux**, and **illumination** in simple language. Understanding these concepts is important for exams like SSC JE, GATE, Polytechnic, B.Tech, etc. This short guide will help you learn the key ideas of lighting systems in a clear and easy way.

What is Illumination or illuminance?

When light falls on a surface, the phenomenon is called illumination.

Or, it is defined as the amount of luminous flux falling on a surface per unit area.

$E = F/A$ Where, E = Illumination, F = luminous flux on a surface, A = Area

Unit of Illumination - lumen/m² or, lux(lx) or, Metre-Candle

What is Luminous Flux?

It is defined as the total amount of light energy emitted per second by a luminous body.

It is denoted by symbol F or ϕ

Unit of luminous flux - lumen or cd-sr (Candle-steradian)



What is Light?

Light is defined as the radiant energy emitted by a hot body that produces a visual sensation on the human eye.

Unit of light energy- lumen-hours

It is usually denoted by Q.

What is Luminous Intensity?

Luminous intensity in any given direction is the luminous flux emitted by a source per unit solid angle in that direction.

It is denoted by I

Unit of Luminous Intensity- candela(cd) or lumens per steradians

$$I = \frac{F}{\omega}$$

What is Lumen?

The lumen is the unit of luminous flux. It is defined as the amount of light emitted in a unit solid angle (1 steradian) by a point source having a luminous intensity of one candela (candle power) in all directions.

$$1 \text{ lumen(lm)} = 1 \text{ candle power (CP)} \times 1 \text{ steradian(sd)}$$

$$1 \text{ candel power} = 1 \text{ candela (Approximately)}$$

What is Candela?

Candela is the luminous intensity of a source that emits monochromatic light of frequency 540×10^{12} Hz and has a radiant intensity of 1/683 watt per steradian.

What is Lux?

It is the unit of illumination and is defined as the luminous flux falling per square



metre on a surface placed perpendicular to the rays of light from a source of one candle power, placed one metre away.

What is Brightness or Luminance?

Brightness or luminance is defined as the luminous intensity per unit projected area of a surface source of light or a reflecting surface.

It is denoted by L .

Unit of Brightness - candela/m² or nits

What is Contrast?

Contrast in illumination refers to the difference in brightness (luminance) between two adjacent areas or surfaces.

Or simple way, Contrast is the ratio between the brightness of the object and the brightness of its background.