بسم الله الرحمن الرحيم

Physics inspire

Term 1

Chapter 1

Fundamental of Light

(2 Lesson)

Chapter (2)

Reflection and Refraction

(4 Lesson)

Chapter 1

Fundamental of Light

- Lesson 1
  - Illumination
- Lesson 2
  - The wave nature of light

Chapter 1

Lesson 1 : illumination

introduction

Light is electromagnetic radiation

travel in straight line

Ray model of Light

The ray still move in straight Line but its direction is changed by encountering (hit) boundary

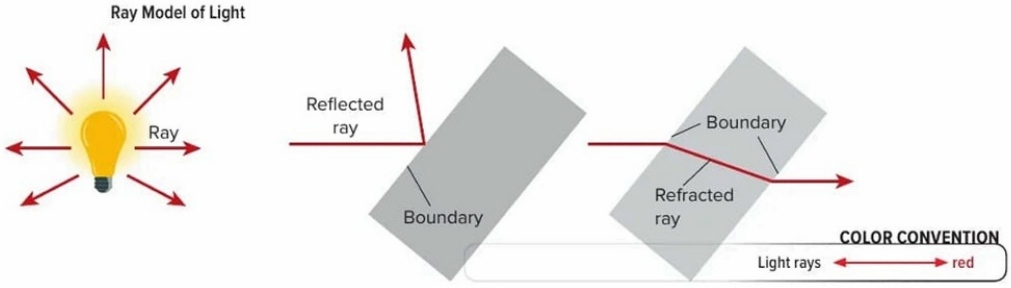
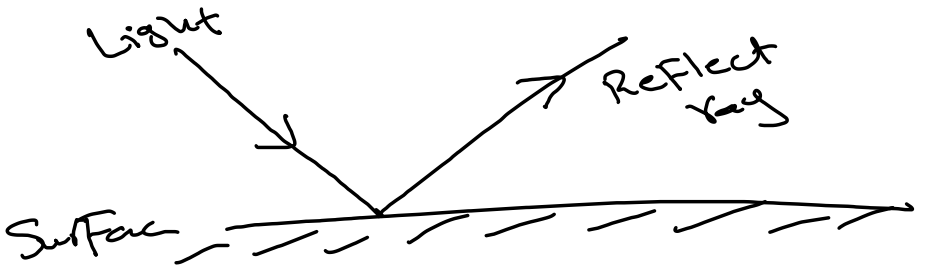
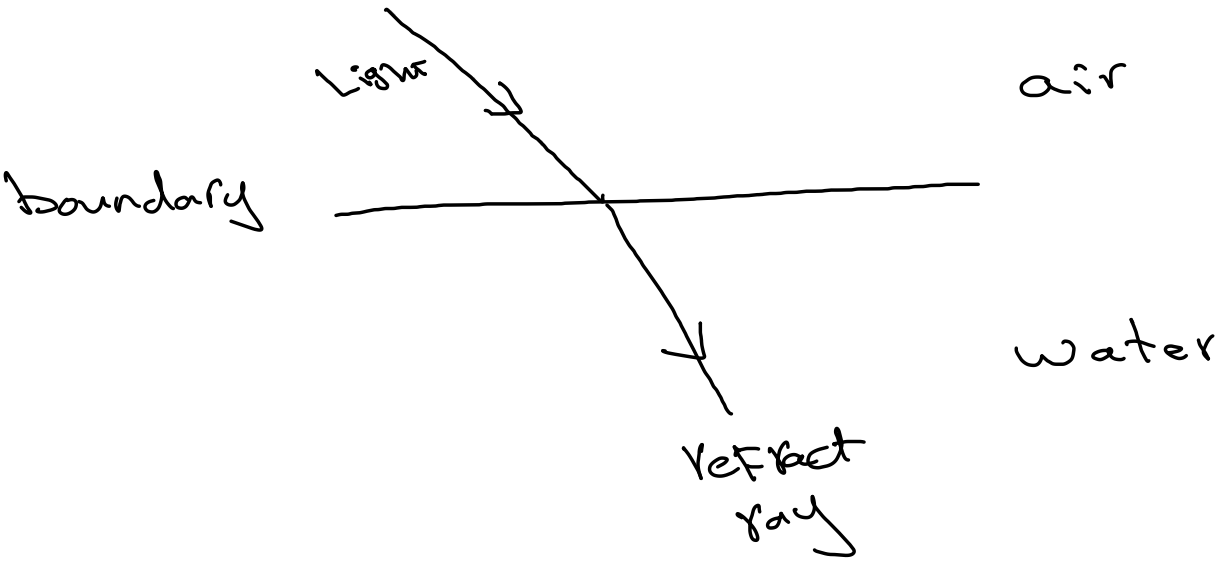


Figure 2 Light's straight-line path is demonstrated by the ray model. Light rays change direction when they are reflected or refracted by matter. In either case, light rays continue in a straight path.


Light
Reflect ray
Surface


Light
air
boundary
water
Refract ray

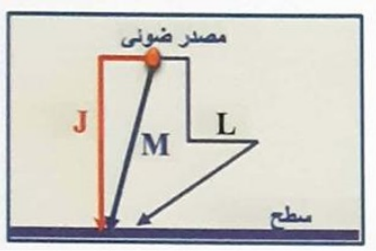
1) Which of the following path represent ray model of light ?

a) path J

b) path M

c) path M , J

d) path M , J , L



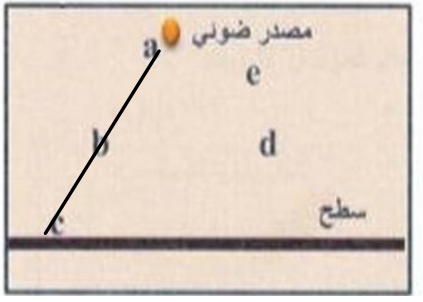
2) Which of the following path represent ray model of light ?

a) from a to b to c

b) from a to d to c

c) from a to e to c

d)from a to e to d to c



3) When does light no longer travel in a straight line?

A. When it loses power
B. When there is electrical interference
C. When it hits a boundary
D. When there is magnetic interference

Sources of light

- Luminous Source
- illuminated Sources

① Luminous Source : all Sources that emits it own light

Luminous Sources

- natural Sources
  - Sun , Flames
  - Fireflies
  - Stars
- human made Sources
  - Tv screen
  - Flashlight
  - Laser
  - bulb

② illuminated Sources

all Source That light Reflecting From them

Ex moon, body, Plant, ----

Light and matter

(1) transparent ماده

- are mediums that allows most of light to transmit through it

EX glass, air

- it give clear image

(2) translucent media شبه شفاف

are media transmit Some of light and reflect Some light So don't allow object to be Seen Clearly

Ex Frosted glass

(3) opaque media معتم

are media doesn't allow light to transmit through it but it reflect and absorb Light

Ex book , People

4) Windows in a home usually give a clear view of what is outside. Which term describes this type of window?

A. Opaque
B. Transparent
C. Translucent
D. Reflector

5) Which material allows most of the light to pass through so that objects can be seen clearly?

A. Opaque
B. Transparent
C. Translucent
D. Reflective

6) Which type of material not allows light to pass through but scatter it?

A. Transparent
B. Opaque
C. Translucent
D. Reflective

7) Which type of material provides privacy while still letting some light through?

A. Opaque
B. Transparent
✓ C. Translucent
d- Reflective

Revision

$$x = \frac{y}{z} \Rightarrow xz = y \qquad z \propto y$$

At Constant y $\quad x \propto \frac{1}{z}$

at Constant z $\quad x \propto y$

$$x = \frac{y}{z^2}$$

inversely $\quad x \propto \frac{1}{z^2} \Rightarrow \frac{x_1}{x_2} = \frac{z_2^2}{z_1^2}$

directely $\quad x \propto y \Rightarrow \frac{x_1}{x_2} = \frac{y_1}{y_2}$

Quantity of light

Factors affecting quantity of Light Source

1. Power of light source
2. Distance to light source
3. Angle at which light hits your eyes

We will study three Physical Quantity

1. Luminous Flux P
2. illuminance E
3. Luminous intensity I_v

① Luminous Flux P

The rate at which the Luminous Source" bulb "
Produce (emit) light energy

- unit of luminous Flux is Lumen Lm

Ex Fluorescent bulb of 26 w ⇒ 1750 Lm

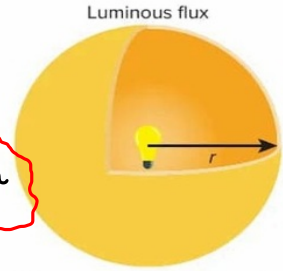


Figure 5 Luminous flux is the rate at which light rays are emitted from a luminous source.

② illuminance E

is the Luminous Flux P at given Surface are A

$$E = \frac{P}{A} = \frac{P}{4\pi r^2}$$

E ⟹ illuminance

Unit of illuminance Lux lx

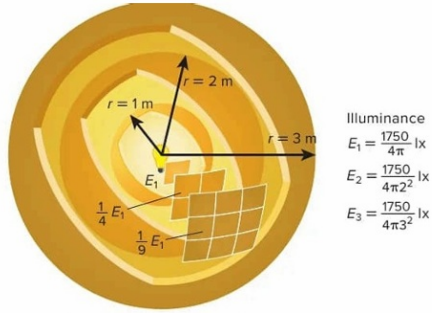


Figure 6 Illuminance (*E*) is the quantity of light that strikes a surface. As the distance from the luminous source (*r*) increases, *E* decreases. *E* depends on the inverse of *r* squared.

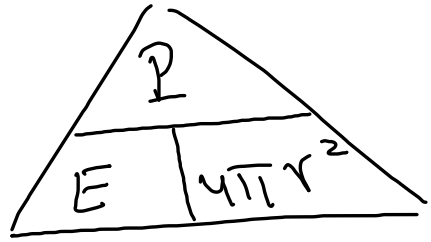
A ⟹ Sphere Surface Area m^2

$A = 4\pi r^2$ r ⟹ distance between light source and Surface

Note ① 1 lx ≡ Lm/m^2

Lm.m^{-2}

$$E = \frac{P}{4\pi r^2}$$



at Constant P

$$E \propto \frac{1}{r^2}$$

inverse-square relation

$$\frac{E_1}{E_2} = \frac{r_2^2}{r_1^2}$$

الكميات المقاسة

- Illuminance الإضاءة
- Luminous Intensity I_v شدة الإضاءة

شدة الإضاءة الكلية للمصباح

ساعة ١ ١/٢