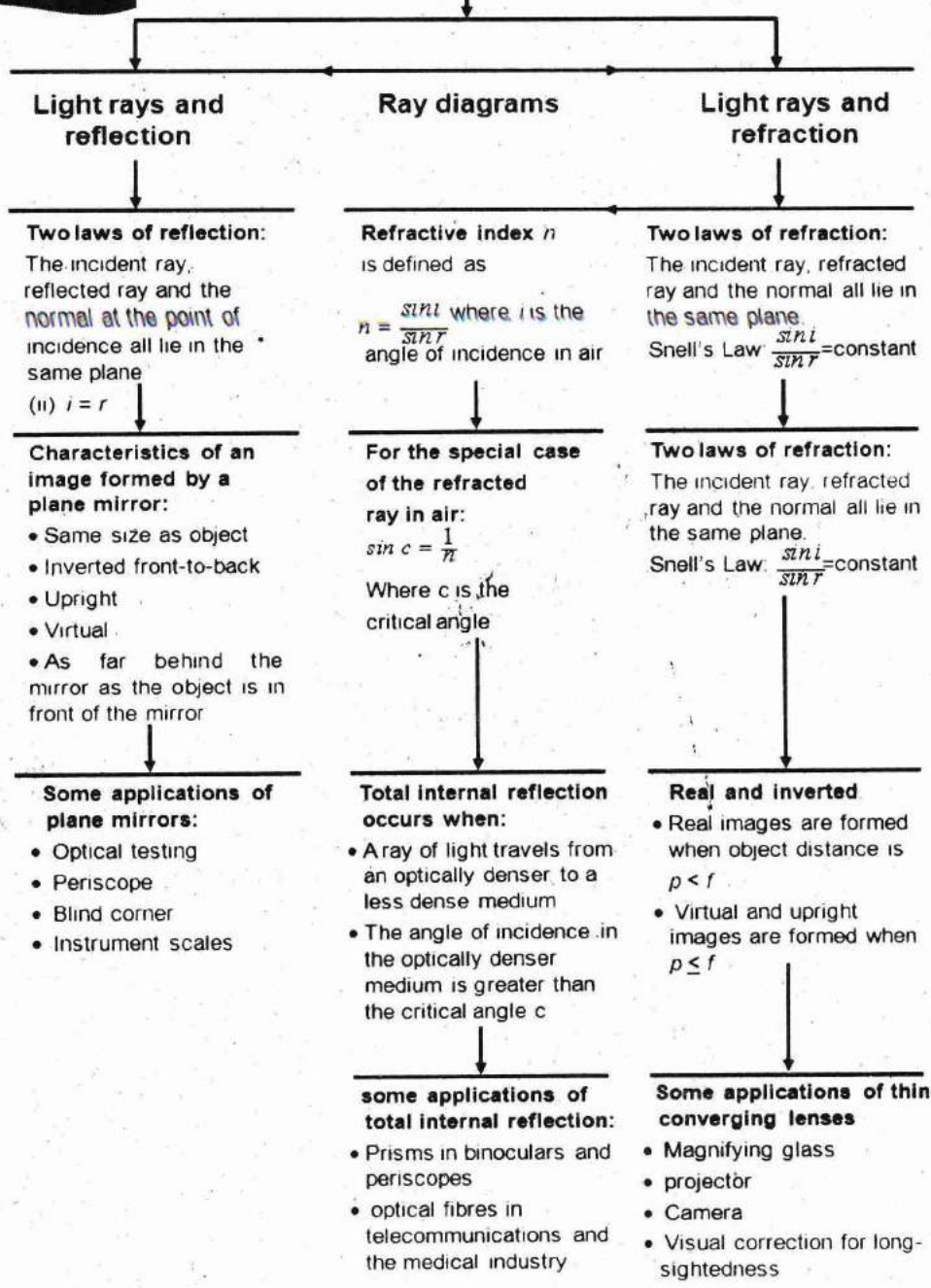


GEOMETRICAL OPTICS

CONCEPT MAP

LIGHT



Light rays and reflection

Two laws of reflection:
The incident ray, reflected ray and the normal at the point of incidence all lie in the same plane
(ii) $i = r$

- Characteristics of an image formed by a plane mirror:**
- Same size as object
 - Inverted front-to-back
 - Upright
 - Virtual
 - As far behind the mirror as the object is in front of the mirror

- Some applications of plane mirrors:**
- Optical testing
 - Periscope
 - Blind corner
 - Instrument scales

Ray diagrams

Refractive index n is defined as
 $n = \frac{\sin i}{\sin r}$ where i is the angle of incidence in air

For the special case of the refracted ray in air:
 $\sin c = \frac{1}{n}$
Where c is the critical angle

- Total internal reflection occurs when:**
- A ray of light travels from an optically denser to a less dense medium
 - The angle of incidence in the optically denser medium is greater than the critical angle c

- some applications of total internal reflection:**
- Prisms in binoculars and periscopes
 - optical fibres in telecommunications and the medical industry

Light rays and refraction

Two laws of refraction:
The incident ray, refracted ray and the normal all lie in the same plane.
Snell's Law: $\frac{\sin i}{\sin r} = \text{constant}$

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- Real and inverted**
- Real images are formed when object distance is $p < f$
 - Virtual and upright images are formed when $p \geq f$

- Some applications of thin converging lenses**
- Magnifying glass
 - projector
 - Camera
 - Visual correction for long-sightedness

TOPICAL MULTIPLE CHOICE QUESTIONS

12.1 Reflection:

- (1) **Plank suggested that light consists of small packets of energy called:**
(a) Electrons (b) Neutrons (c) Photons (d) Positrons
- (2) **The angle between incident ray and normal N is;**
(a) Angle of reflection (b) Angle of incidence (c) Angle of refraction (d) Normal angle
- (3) **Angle of incidence is represented by**
(a) i (b) e (c) R (d) p
- (4) **The angle between the normal and the reflected ray is called angle of**
(a) Reflection (b) Refraction (c) Incidence (d) Diffraction
- (5) **The incident ray, the normal, and the reflected ray at the point of incidence all lie in the**
(a) Opposite direction (b) Same plane (c) x and y axis (d) y & z - axis
- (6) **According to law of reflection**
(a) $i > r$ (b) $i < r$ (c) $r > i$ (d) $i = r$
- (7) **Regular reflection is reflection by the**
(a) Rough surface (b) Smooth surface
(c) Irregular surface (d) Smooth and rough surfaces
- (8) **The rough surfaces of object reflect the rays of light in many directions is called**
(a) Regular reflection (b) Irregular reflection (c) Refraction (d) Interference

12.2 Spherical Mirrors

- (9) **In concave mirror the surface is reflecting;**
(a) Outer surface (b) Outer curved (c) Inner curved surface (d) Side of the mirror
- (10) **Which statement is incorrect about concave mirror?**
(a) Size of image depends upon position of the object
(b) Both virtual and real images can form
(c) Inner surface of spherical mirror is reflecting
(d) Only virtual images are formed
- (11) **A spherical mirror whose outer curved surface is reflecting is called**
(a) concave mirror (b) convex mirror (c) Concave lens (d) Convex lens
- (12) **Which statement is correct about convex mirror?**
(a) Size of image is smaller than object (b) Only virtual erect image is formed
(c) Outer curved surface is reflecting (d) All of the given statements are true
- (13) **Vertex is the midpoint of the curved surface of spherical mirror is also called**
(a) Radius of curvature (b) Principal axis
(c) Pole (d) Principal focus
- (14) **A line joining centre of curvature and pole of the spherical mirror is**
(a) Principal axis (b) principal focus (c) Centre of curvature (d) Pole
- (15) **The distance from the pole to the principal focus measured along the principal axis is**
(a) Principal focus (b) Radius of curvature (c) Focal length (d) Diameter

