CLASS VIII

NOTES ON LIGHT

Light : is a form of energy which help us to see other objects

Importance of light: Eyes alone cannot see any object. When light from an object enters our eyes we see the object. The light may be emitted by the object, or may be reflected by it
A ray: means a narrow beam of light.
Incident Ray: The light ray, which strikes any reflecting surface,(mirror) is called the **incident ray**.
Reflected Ray: The ray that comes back from the surface (mirror) after reflection is known as the r**eflected ray**.
Normal Ray: A line drawn at an an angle of 90º to the line representing the mirror at the point where the incident ray strikes the mirror. This line is known as the **normal** to the reflecting surface at that point.

Point of incidence: The point where the light ray strikes the reflecting surface (mirror) .
(figure 16.3)
Angle of Incidence: The angle between the normal and incident ray is called the **angle of incidence (< *i*)**.
Angle of reflection: The angle between the normal and the reflected ray is known as the **angle of reflection (< *r*).**
Laws of Reflection: (1)Angle of incidence is always equal to the angle of reflection.
(2)The incident ray, the normal at the point of incidence and the reflected ray all lie in the same plane.
Characteristics of image formed by a plane mirror: Erect, Virtual , same size of the object, distance between object and the mirror is equal to the distance between the mirror and image, Laterally inverted.
Lataral inversion: in an image formed by a mirror the left of the object appears on the right and the right appears on the left. This is known as **lateral inversion**.
Image formation by a plane mirror. (Fig.16.5. p 202)

Irregular Reflection: When all the parallel rays reflected from a plane surface are not parallel, the reflection is known as **diffused** or **irregular** reflection (fig 16.6, 16.7)
Regular reflection: reflection from a smooth surface like that of a mirror is called **regular reflection (Fig. 16.8)**
Luminous objects : The objects which emit their own light are known as luminous objects.
Illuminated Objects: The objects which shine in the light of other objects are called illuminated objects.
Periscope: The periscope makes use of two plane mirrors. Light reflected by first mirror is falling on the second mirror, which reflects the light towards the observer's eye. It shows that light reflected can be reflected again.
Use: Periscopes are used in submarines, tanks and also by soldiers in bunkers to see things outside.
Kaleidoscope: When two mirrors are kept at an angle or parallel , the number of images are formed are many. This idea of number of images formed by mirrors placed at an angle to one another is used in a kaleidoscope to make numerous beautiful patterns.
Construction of Kaleidoscope.
Interesting feature of a kaleidoscope is that you will never see the same pattern again.

Use of Kaleidoscope: Designers of wallpapers and fabrics and artists use kaleidoscopes to get ideas for new patterns.

Dispersion: Splitting of white light(sunlight) into its seven component colours is known as **dispersion** of light

Structure of human eye: (HW)

Shape: Roughly spherical shape.

Cornea: Outer coat of the eye is white. It is tough so that it can protect the interior of the eye from accidents. Its transparent front part is called **cornea.**

Iris: Behind the cornea, there is a dark muscular structure called **iris**

Pupil: The small opening in the iris is called the pupil.

Function of Iris:

1) The iris controls the amount of light entering into the eye.

2) The size of the **pupil** is controlled by the iris.

3) The iris is the part of that eye which gives it its distinctive colour.

Eye lens: Behind the pupil of the eye is a lens which is thicker in the centre.It is a convex lens.

Retina: The lens focuses light on the back of the eye, on a layer called **retina.**

Cells of the retina:Retina contains several nerve cells. Sensations felt by the nerve cells are then transmitted to the brain through the optic nerve.

There are two kinds of cells

(i) cones, which are sensitive to bright light and

(ii) rods, which are sensitive to dim light.

Blind spot:At the junction of the optic nerve and the retina, there are no sensory cells, so no vision is possible at that spot. This is called the **blind spot**

Persistence of vision:The impression of an image does not vanish immediately from the retina. It persists there for about 1/16th of a second. This is called persistence of vision.

Principle of motion pictures/ Cinema: So, if still images of a moving object are flashed on the eye at a rate faster than 16 per second, then the eye perceives this object as moving.

The movies that we see are actually a number of separate pictures in proper sequence. They are made to move across the eye usually at the rate of 24 pictures per second (faster than 16 per second). So, we see a moving picture.

Minimum distance to see near by objects: The minimum distance at which the eye can see objects distinctly by a normal eye is about 25 cm.(LDDV- Least Distance of Distinct vision)

Power of accommodation: Human eye can adjust its power to see far away objects as well as near by objects.

Defects of vision: There are mainly two common defects of vision. These are (i) near-sightedness (myopia), (ii) or far sightedness (,Hypermetropia)

Near-sightedness:. A person with near sightednes can see nearby objects clearly but cannot see distant objects distinctly.

Far sightedness: A person with far sightedness can see distant objects clearly but cannot see nearby objects distinctly.

These defects of the eye can be corrected with suitable corrective lenses

Cataract: Sometimes, during old age, eyesight becomes foggy. It is due to the eye lens becoming cloudy and there will be a loss of vision. This condition is called cataract.

. The opaque lens is removed and a new artificial lens is inserted(cataract surgery)

Eye Care:

1. If advised, use suitable spectacles.

_2. Too little or too much light is bad for eyes. Insufficient light causes eyestrain and headaches. Too much light, (like that of the sun, a powerful lamp or a laser torch) can injure the retina.

3. Do not look at the sun or a powerful light directly.

4. Never rub your eyes. If particles of dust go into your eyes, wash your eyes with clean water. If there is no improvement go to a doctor.

_ 5. Wash your eyes frequently with clean water.

_6. Always read at the normal distance for vision. Do not read by bringing your book too close to your eyes or keeping it too far.

Night blindness: Lack of vitamin A in foodstuff is responsible for night blindness.
One should, therefore, include in the diet components which have vitamin A. Raw carrots, broccoli and green vegetables (such as spinach) and cod liver oil are rich in vitamin A. Eggs, milk, curd, cheese, butter and fruits such as papaya and mango are also rich in vitamin A.

(HW)Resources for visually challenged people can be of two types : Non-optical aids and optical aids.
Optical Aids: Optical aids include bifocal lenses, contact lenses, tinted lenses, magnifiers and telescopic aids. While the lens combinations are used to rectify visual limitations, telescopic aids are available to view chalkboard and class demonstrations.
Non-optical aids include visual aids, tactual aids (using the sense of touch), auditory aids (using the sense of hearing) and electronic aids.
Visual aids, can magnify words, can provide suitable intensity of light and material at proper distances
Tactual aids, including **Braille** writer slate and stylus, help the visually challenged persons in taking notes, reading and writing.
Auditory aids include cassettes, tape recorders, talking books and other such devices
Electronic aids, such as talking calculators, are also available for performing many computational Tasks
Braille System: The Braille system is most popular resource for visually challenged persons .Visually challenged people learn the Braille system by beginning with letters, then special characters and letter combinations. Methods depend upon recognition by touching. Each character has to be memorised. Braille texts can be produced by hand or by machine. Type writer - like devices and printing machines have now been developed.
Compound Eye: made up of thousands of little eyes (seen in insects , butterfly, crab)
Eyes of night birds: A night bird (owl) can see very well in the night but not during the day.They have a large cornea and a large pupil to allow more light in its eye. Rretina in these birds have a large number of rods and only a few cones.
Eyes of day light Birds. day light birds (kite, eagle) can see well during the day but not in the night The day birds on the other hand, have more cones and fewer rods.