St. Andrews Scots Sr. Sec. School

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Session: 2025-2026 – Answer Key

Class: VIII **Subject: Science** **Chapter: Light**

CHECK POINT 1

1.plane 2. a straight line 3. giving their own light 4. equal 5. falling of rays of light on a rough and uneven surface.

CHECK POINT 2

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

CHECK POINT 3

1.Cornea 2. Ciliary muscles 3. Retina 4. 25 cm 5. Owl 6. Braille

PRACTICE TIME

A. Tick (✓) the correct answer:

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

B. Assertion-Reason Type Questions:

1. (a) 2. (b) 3. (d) 4. (a)

C. Say True or False:

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

D. Very Short Answer Type Questions:

1. Diffused reflection

2. Periscope

3. No, Braille script

4. Plane mirror

5. Optic nerve

6. Lateral inversion

E. Short Answer Type Questions:

1. The objects which shine by giving their own light are called luminous objects. The examples of luminous objects are the sun, stars, fire, candle flame, bulb, tube light, etc.

The objects which shine by reflecting the light falling on them are called illuminated objects. For example, the moon shines due to reflecting the light falling from the sun.

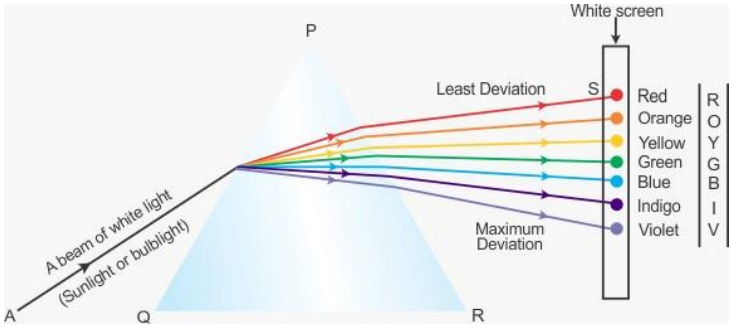
2. (a) 40° because the angle of incidence is equal to the angle of reflection.

(b) The incident ray, the reflected ray and the normal always lie in the same plane.

3.

Regular Reflection	Irregular Reflection
1. When a beam of light falls on a smooth and highly polished surface, almost entire light gets reflected in the same medium in a definite direction. This kind of reflection is called regular reflection.	1. When a beam of light falls on a rough and uneven surface, the light gets reflected in different directions, i.e., light rays do not follow uniformity of direction. This kind of reflection is known as irregular or diffused reflection.
2. We can see our image formed by a mirror due to the phenomenon of regular reflection.	2. In case of diffused reflection from rough surfaces, either there is no image formed or a blurred (hazy) image is formed.
3. Regular reflection creates glare and we cannot see the things clearly and comfortably.	3. We are able to see things comfortably because of irregular reflection.

4. When light passes through a thick glass piece, it gets splitted into its constituent seven colours which are seen as a rainbow. The splitting of light into its seven colours after passing through a glass piece is called dispersion of light.



Dispersion of Light

5. She is suffering from hypermetropia. It can be corrected by using spectacles with suitable convex lenses.

F. Long Answer Type Questions:

1. The characteristics of light are:

(a) Light is a form of energy.

(b) Light is one of the fastest travelling forms of energy. It travels with a speed of 3,00,000 kilometres per second in vacuum and almost with the same speed in air.

(c) Light needs no medium to travel, i.e., it can travel in vacuum also.

(d) Light travels in a straight line.

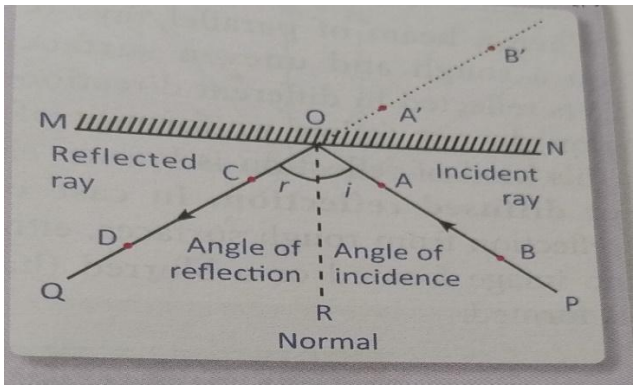
(e) Light, as it comes from the sun, consists of seven different colours, namely, Violet, Indigo, Blue, Green, Yellow, Orange and Red. The sequence of this colour band is known as VIBGYOR.

2. The laws of reflection can be verified as follows:

Procedure: Place a white sheet of paper on a drawing board. Take a plane mirror, put it vertically and draw a line MN along the margin of the mirror. Fix two pins A and B at a gap of a few cm apart. They should appear in one line in the mirror. Now, by looking at the reflection of these two pins, fix two pins C and D on the other side in such a way that images of all four pins appear in a straight line. Remove the pins and draw a straight line along the path of AB and CD. The point where these two lines meet, mark it as O. Draw a perpendicular OR. This is called normal. The angle formed by the incident ray (OP) and the normal is called angle of incidence (i) and angle formed by the normal and reflected ray (OQ) is called angle of reflection (r).

Conclusion: • The equal measures of the angle of incidence and angle of reflection verify the first law of reflection.

• The drawing of incident ray, normal and the reflected ray on the same sheet of paper, verifies the second law of reflection.

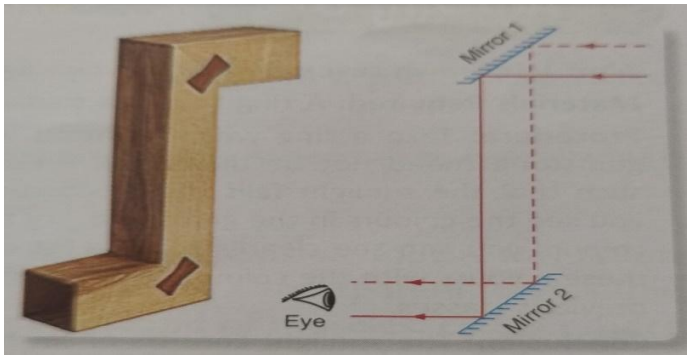


Verification of laws of reflection

3. A periscope is a rectangular tube, bent twice at an angle of 90° at its two ends. In it, two plane mirrors are fitted at an angle of 45°. The rays of light travelling from the object to be seen, fall on the first mirror, from where they are reflected and sent to the second mirror. The

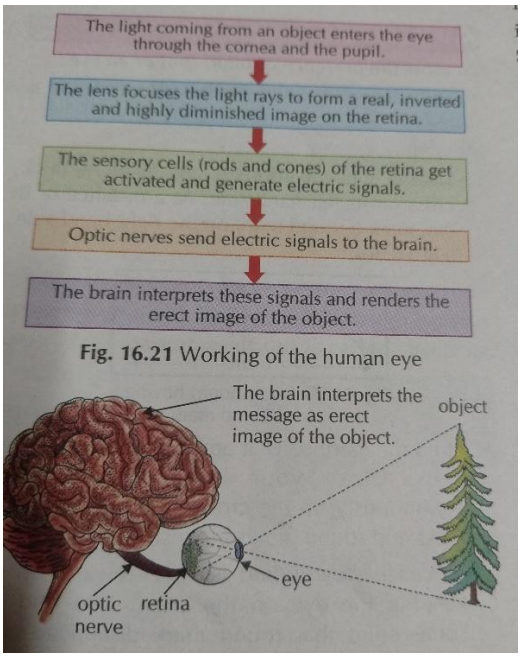
reflected light from the second mirror is received by the eyes of the observer, who is able to see the object.

A periscope is used to detect submarines or other objects at different heights from that of the viewer.



Periscope

4. Working of the Eye: The reflected light from an object enters the eye through cornea. Its amount is controlled by the iris and the pupil. This light passes through the aqueous humour, the eye lens and the vitreous humour in such a manner that an inverted image of the object is formed at the retina. The photoreceptors in the retina detect the brightness and the colours of the object. The message of the image formed at retina is picked up by the optic nerve and taken to the brain, so that we can actually see.



Working of human eye

5. Ways to take care of the eye.

(a) The eyes should be washed every day with fresh and clean water at normal temperature.
(b) Never rub the eyes.

(c) In case of dust particles get into the eyes, splash a lot of clean and cold water into the eyes so as to wash away the dust.

(d) If a foreign particle like a splinter or a metal particle got into the eyes, wash with clean and cold water immediately. If it does not come out with water, rush to the doctor.

(e) Never look at very bright sources of light like the sun or a welding spark directly.

(f) Do not read or write in dim or very bright light and also in a moving vehicle.

(g) While reading or writing, keep your books or notebooks at a distance of distinct vision (25 cm) from the eyes.

(h) Do not spend much time looking at computer screen or a television screen

6. (a) 1—Eye lens 2—Pupil, 3—Iris, 4—Retina, 5—Blind spot

(b) Lens

(c) Retina

(d) Pupil

(e) At this place, the optic nerve is connected to the retina, so it lacks photoreceptors and hence, the image formed at this point is not sensed by the eye. Therefore, it is called blind spot.

G. HOTS Questions:

1. A rainbow cannot be seen after the rain if the sun does not shine because there would be no sunlight and hence splitting of light into seven colours will not take place.

2. An owl can see very well in complete darkness because it has a large number of rods and very few cones in its eyes. Besides this, it has a large cornea and a large pupil which allow more light to enter its eyes.

Passage/Case-based Questions

1. Lateral inversion property of mirror is used in this case. 2. The image formed by a plane mirror is erect, virtual and of same size as that of the object.

H. Science Quiz/ Puzzle

1. CATARACT 2. IRIS 3. PERISCOPE 4. LATERAL INVERSION 5. REAL 6. PARALLEL 7. NORMAL

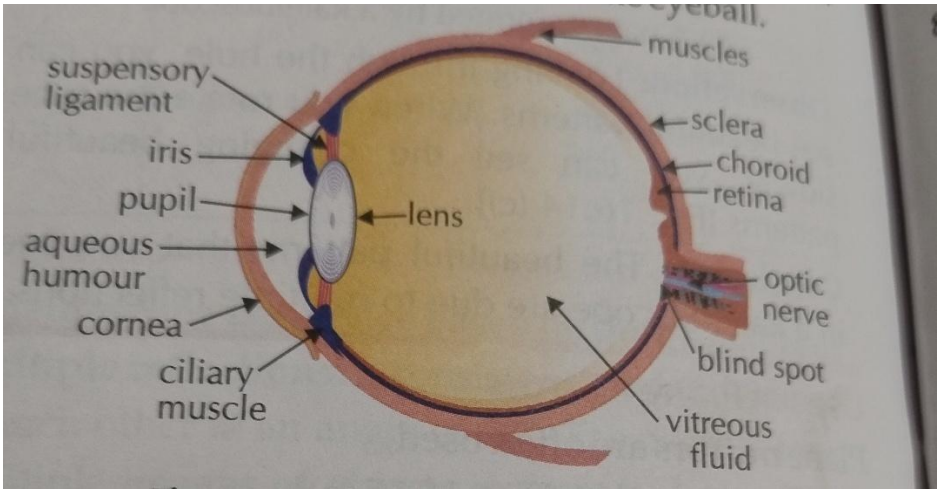
8. SIX

Extra Questions:

The structure of the human eye

- Eyes are sensory organs that allow us to see things present in the environment.

- The eyes absorb the light rays and form a visual image and transform this information of the image to the brain.
- The eye has a spherical structure which is called the eyeballs. The eyeballs are attached in the eye socket and various muscles are connected to them called the eye muscles. These are muscles allow the movement of the eyeballs.
- The eyes are protected with eyelids. They prevent an excess of light and dust to enter into the eyes and therefore save the eyes from any outer objects.



Internal structure of Human Eye

The parts of the human eye

- **Cornea** - It is a transparent covering present on the outer side of the eyes. It consists of 6 layers. Tear fluid covers cornea and protects the eye.
- **Iris** - It is a dark coloured muscular structure present in the centre of the cornea. The Iris consists of a small opening call Pupil through which the light enters into the eye. The Iris has colourful pigments like grey, blue, black, green, brown etc. The amount of light that enters the eye is controlled by the Iris. In other words, Iris controls the Pupil.
- **Lens** - It is like a sphere of liquid present inside the eye. The eye lens is located behind the Pupil which helps in the formation of an image in the eye.
- **Retina**- Retina is a layer located behind the lens at the back of the eye. The eye lens focuses the light that enters into the eye over the retina. The retina consists of different Nerve cells that perform different tasks. There are sensory cells that detect the light. They then transform that information into an electrical impulse. These electrical impulses are sent to the brain via the optic nerve. Two types of vision cells in the retina are:
  Rods - They get activated in darkness or dim-light and the responsible for light-dark vision.

Cones - they react to bright light and therefore sense colour in an object.

- **Vitreous Chamber** - The inner space of the eyeball called the transparent vitreous chamber consists of a gel-like substance. This substance maintains the right pressure in the eye and maintains the stability of the eyeball.
- **Blind spot** - There is a point in the eye located at the junction of the retina and the optic nerve where no sensory cells are present. This spot is therefore called the blind spot as it does not support any vision.

Persistence of image on the retina

- The image that is formed on the retina persists for 1/16th of a second.
- Therefore, if one tries to move 16 still images per second of a moving object in front of our eye it appears as if the object is moving. This is how animation films and movies work. They are a collection of separate pictures which are moved in a sequence.
- However, this movement is so fast, around 24 pictures in a second, that it appears as if they are moving.

The vision may decrease with age

- Normally a person can see distant and nearby objects through the eyes.
- A person with normal eyes can read most comfortable at a distance of 25cm. However, this distance can decrease with age.
- Also sometimes people can see far objects clearly but not the objects that are nearby (farsightedness or hyperopia).
- Similarly, some people can see the nearby objects clearly but not the far objects (near sightedness or myopia). Hence they use suitable lenses to correct such defects.
- Sometimes with old age, the lens of the eye can become cloudy or foggy. This condition is called cataract with results in loss of vision.

However, this defect can be rectified by removing the old lens from the eye and inserting an artificial lens at that place.

Defect in Eye	Causes
1. Presbyopia	solidification of lens fluid
2. Cataract	protein structures of lens clubbed together
3. Glaucoma	abnormal pressure inside the eye
4. Myopia	due to a strong refractive index of the eye
5. Hypermetropia	due to a weak refractive index of the eye
6. Astigmatism	non-uniform curvature of the cornea

Night blindness

Night blindness also called nyctalopia is a defect in the vision in which people cannot view things properly in dim light or at night. It mainly occurs due to the lack of vitamin A in our body. Hence, we should always take foods that are rich in vitamin A such as broccoli, green vegetables, carrot, milk, eggs, curd, papaya, mango etc.

Visually impaired people

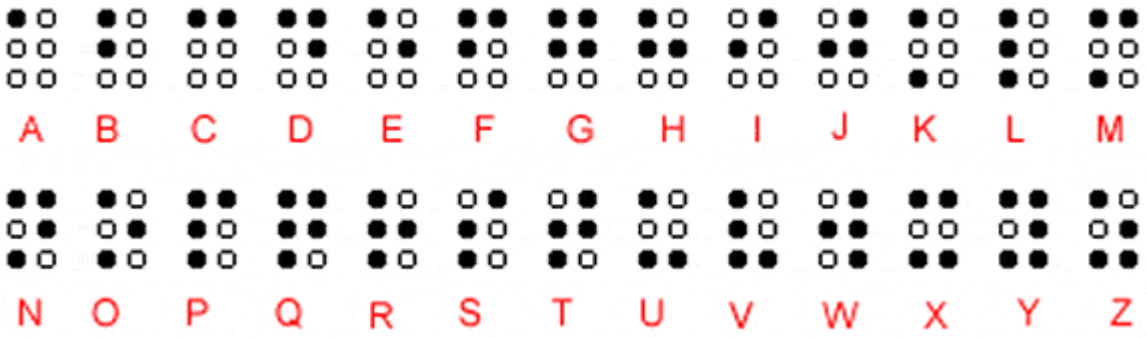
- Visual impairment is also known as vision loss.
- A person with vision loss cannot see at all.
- This loss of vision is up to a degree that cannot be corrected using usual means like using glasses or lenses.
- The people who have no eyesight at all develop the other senses of listening and touching sharply which allows them to do their day-to-day activities.
- However, there are certain resources that have been developed to help such people:

Non-Optical Aids	
Visual Aids	They are used to magnify words ensuring appropriate intensity of light falls upon the eyes so that the person can recognize the word.
Tactual Aids (using sense of touch)	They include Braille writer Slate and Stylus which allow a person to read and write.
Auditory Aids (using sense of listening)	They include devices like audio tapes, talking books etc
Electronic Aids	They include talking calculators and computers, closed circuit televisions, audio CDs, that can help visually challenged people in listening and writing.
Optical Aids	
Bifocal Lenses	They all are used to rectify the limitations of the eyes.
Contact Lenses	
Tinted Lenses	
Magnifiers	
Telescopic Aids	They are used to view the chalkboard and class demonstrations.

The Braille system

- Braille is a tactual aid for visually challenged people that allow them to read and write.

- It was developed by a visually challenged person called **Louis Braille**. This system was published by him in 1821 however the present Braille System was adopted in 1932.
- or many common languages including Hindi, Sanskrit, Tamil, Telugu, Mathematics and scientific notations a Braille code is present.
- In the Braille code, there are **63 Dots or 63 Characters**.
- These are arranged in a cell of two vertical rows having three dots each.
- The patterns are embossed on a **Braille Sheet** that allows a person to read by touching the pattern. Each character in the Braille system can represent:
    1. a letter
    2. a combination of letters or a word
    3. a grammatical sign



The Braille System for English Alphabets