1. Choose the correct option. (R/U)

a) Which of the following statements about the image formed by a plane mirror is correct?

A. the image is real   B. the image is laterally inverted
C. the image is smaller than the object   D. the image is upside down
Ans. B. the image is laterally inverted

b) The law of reflection of light is valid for:

A. only plane surfaces   B. only smooth and polish surfaces
C. only rough and irregular surfaces   D. all of the above
Ans. D. all of the above

c) The region of the retina which does not have sensory cells is called:

A. cornea   B. dark spot
C. blind spot   C. ciliary
Ans. C. blind spot

2. State whether the following statements are true or false. Correct the false statements. (R/U)

a) A convex lens is used to correct hypermetropia.
True.

b) The process of separation of light into its component colours is called refraction of light.
False.
The process of separation of light into its component colours is called dispersion of light.

c) The persistence of vision of a normal human eye is 1/16th of a second.
True.

3. Assertion and Reasoning (An)

In the following question, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the correct alternative (A), (B), (C) and (D) as given below.

(A)   Both A and R are true and R is the correct explanation of the assertion.
(B)   Both A and R are true but R is not the correct explanation of the assertion.
(C)   A is true but R is false.
(D)   A is false but R is true.

a) **Assertion:** Light separates into its component colours.

**Reason:** Light rays bounce back when they fall on an object.
Ans: (B) Both A and R are true but R is not the correct explanation of the assertion.

b) **Assertion:** Regular and irregular are types of refraction of light.
Reason: All kinds of surfaces reflect light.
Ans: A is false but R is true.

4. Draw the correct reflected ray of light for the given incident ray of light in the following diagram. **(Ap)**

Air

ray of light

Glass
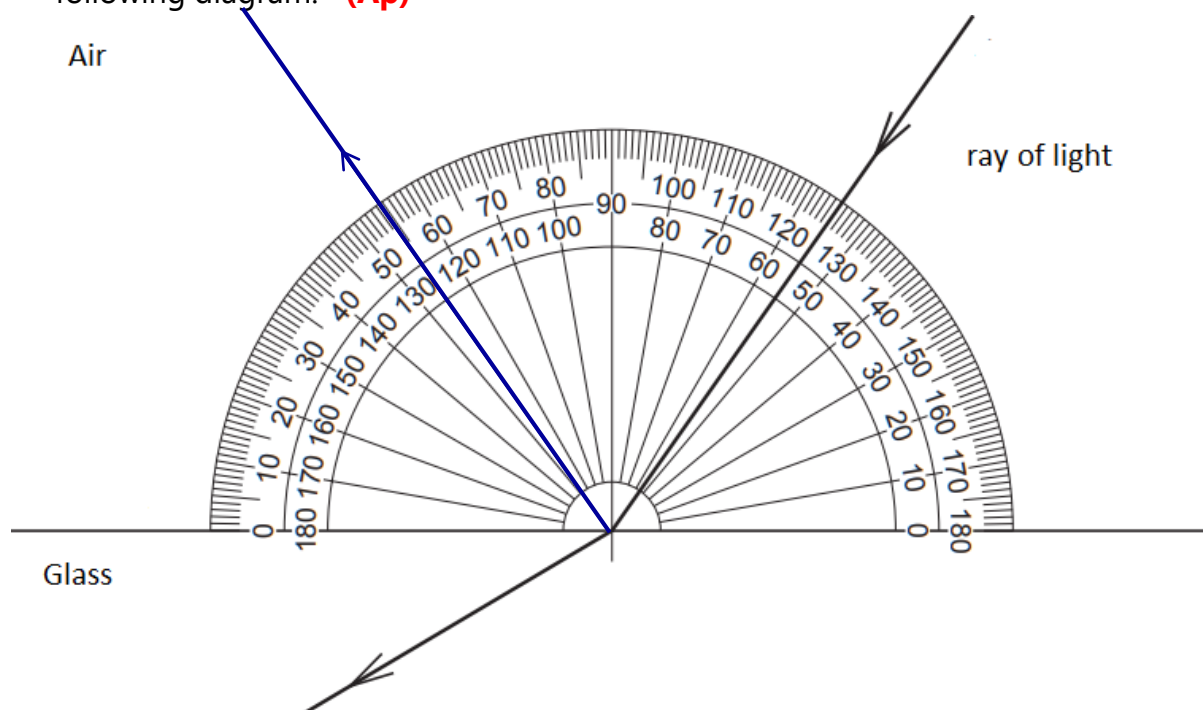
5. **Answer the following questions in brief. (Ap/U)**

a) Calculate the number of images formed of an object, placed between two parallel mirrors separated by 28 cm.
   i. **Infinite number of images of the object will be formed of an object placed between two parallel mirrors.**

b) What is cataract? How can it be cured?
   i. **Cataract is an eye disorder of blurred vision which causes the clouding of the eye's natural lens.**
   ii. **It can be cured by an eye surgery in which the artificial lens replaces the eye's natural lens.**

6. **Differentiate between the following. (Give any three points) (R/U)**
   a) Reflection and refraction of light

Reflection of light	Refraction of light
i. It is bouncing back of light from a surface into the same medium.	i. It is bending of light when it propagates from one medium to another.
ii. The angle of reflection is always equal to the angle of incidence.	ii. The angle of refraction is not equal to the angle of incidence.
ii. Here, light returns to the same medium.	iii. Here, light moves from one medium to another.

(Any three)

b) Regular reflection and Irregular reflection

Regular reflection	Irregular reflection
i. All the reflected rays are parallel to one another.	i. All the reflected rays are not parallel to one another
ii. All the rays are reflected in one direction	ii. Reflected rays of light are scattered in the various directions.
iii. It takes place due to the smooth surface	iii. It takes place due to the rough surface.
iv. The angle of incidence is always equal to the angle of reflection.	iv. The angle of incidence is not equal to the angle of reflection.

(Any three)

7. Answer the following questions in detail. (U/R/A)

a) Find the angle of incidence, if the angle between the incident ray and the reflected ray is 100°.

  i. It is given that the angle between the incident ray and the reflected ray is 100°. Therefore,

$$\angle i + \angle r = 100°$$

  ii. According the laws of reflection, the angle of incidence and the angle of reflection are always equal, i.e.

$$\angle i = \angle r$$

  iii. Therefore, the first equation can be written as

$$2 \times \angle i = 100$$

  iv. $\angle i = 50°$. Thus the angle of incidence is 50°.

b) How does the pupil control the amount of light entering the eyes?

i. **The size of the pupil decreases in bright light whereas in darkness or less light, the size of the pupil increases.**
ii. **This is because when there is bright light, the pupil blocks too much light entering our eyes by decreasing its size.**
iii. **On the other hand, in darkness, its size increases so that it allows the maximum amount of light to enter our eyes.**

8. Observe the diagram and answer the questions that follow. **(Ap/R)**

a) Label the above given diagram.

Human eye
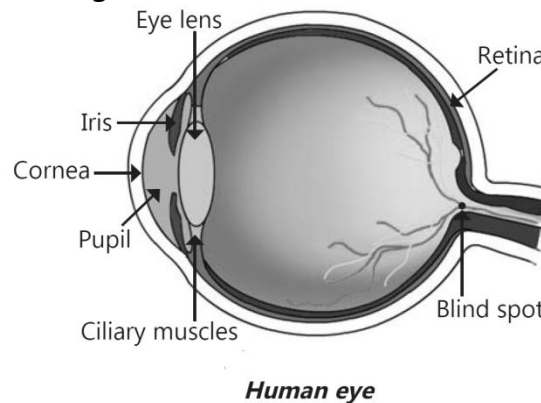
b) What are the functions of the ciliary muscles?
   The eye lens is held in position by muscles called ciliary muscles. The ciliary muscle relaxes and flattens the lens to adjust the vision of nearby and far away objects accordingly.

c) Write a short note on `Retina of the eye'
   i. **Retina is a light sensitive screen made up of light sensitive cells called rods and cones.**
   ii. **The light rays refracted by the eye lens form a real and inverted image of the object on the retina.**
   iii. **These light rays generate electrical signals which are carried by the optic nerve to the brain to be interpreted so that the objects may be seen.**

d) Draw a diagram of a `Hypermetropic eye'.

Shortening of the eyeball
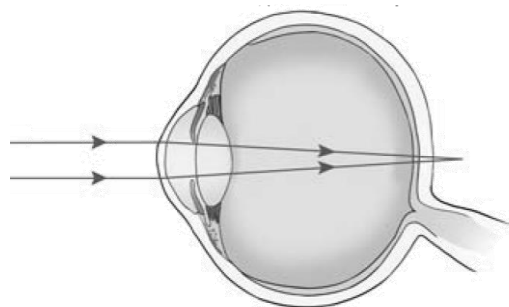
9. **Write down the observation and the conclusion for Figure A and Figure B given below.** **(An)**
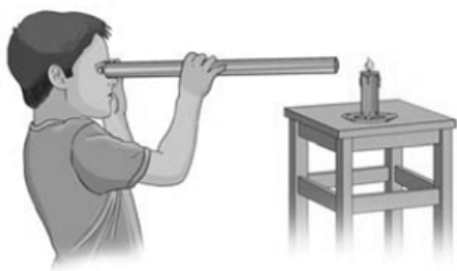

Figure A   Figure B

Figure A
Observation: The flame of a lighted candle is visible when it is observed through a straight tube.
Conclusion: Light travels through a straight line and hence it can be seen through the straight tube.

Figure B
Observation: The flame of the candle is not visible when it is observed through the bent tube.
Conclusion: Light travels in a straight line and hence the flame of the candle cannot be seen through the bent tube.
This experiment proves that light travels in a straight line/the rectilinear propagation of light.

10. **Four words related to the chapter are hidden in the word search given below. Find the words and give their meanings. (An/R)**

```
Y J R Y J K U Z E L Q Z D F R
U U A X H A O C R K Y D P H I
D N M B I X U D A B I P A Y S
M Y Z L R O D A G S L A C U R
E L I I P X R T A F Q C Z J C
J L L F B F Y B Y H M Q T O W
F A Z C R O I A Q H Z L A K V
L R E U Z L V L I A Z D X T O
I E V N I S X I X P O F K T I
I T A T R Z M M R Z O C L Z P
F A Y Q C O K R V I E Y Q X N
D L U M W F C O K N S V M X V
C X O R N D O V W X E H N J B
D T Q F U J H G B U P V B R N
```

O K G C B N I U M I H H D A J

Ans.:

LATERALLY: sideways

DISABILITY: a physical or mental condition that limits a person's movement, senses, or activities

CORNEA: The exposed surface of the eyeball that has a transparent covering

IRIS: Behind the cornea there is a coloured opaque muscular diaphragm having a small aperture at the centre.

11. **Higher Order Thinking Skills (HOTS)**

    Explain any natural phenomenon which is based on dispersion of light. **(An)**

    i.   **Rainbow is a beautiful natural phenomenon which is a combination of seven colours, i.e. violet, indigo, blue, green, yellow, orange and red.**

    ii. **It is commonly observed after a rainfall as water droplets are present in the atmosphere.**

    iii. **The water droplets act like prisms.**

    iv. **Light from the Sun enters the droplets and the different colours bend through different angles.**

    v.   **Thus, the seven colours emerge along different paths and get separated to form a spectrum of seven colours seen as the rainbow.**

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