11 Light: Shadows and Reflections

FILL IN THE BLANKS

1. Objects that emit their own light are called _____ objects.
2. The Moon is a _____ object.
3. Light travels in a _____ line.
4. Cardboard is an _____ material.
5. Tracing paper is a _____ material.
6. A shadow is formed when light is _____ .
7. Reflection occurs on a _____ surface.
8. The image in a plane mirror is _____ .
9. Left-right reversal in a mirror is called _____ .
10. A pinhole camera forms an _____ image.

MULTIPLE CHOICE QUESTIONS

Q1. Which is a luminous object?
A. Moon B. Mirror C. Sun D. Book

Q2. Which material allows partial passage of light?
A. Glass B. Cardboard C. Wood D. Tracing paper

Q3. Which object forms the darkest shadow?
A. Glass B. Plastic sheet C. Cardboard D. Water

Q4. Image in a plane mirror is
A. Inverted B. Smaller C. Erect D. Coloured

Q5. Which device forms an inverted image?
A. Mirror B. Periscope C. Kaleidoscope D. Pinhole camera

Q6. Reflection occurs when light strikes a
A. Rough surface B. Shiny surface C. Transparent sheet D. Cloth

Q7. Shadow colour depends on
A. Object colour B. Light colour C. Screen colour D. None of these

Q8. Which is non-luminous?
A. Star B. Firefly C. Sun D. Venus

Q9. Lateral inversion means
A. Upside-down image B. Bigger image
C. Left-right reversal D. Blurred image

Q10. Shadow size increases when object moves

A. Towards screen B. Towards light source C. Sideways D. Downwards

ASSERTION – REASON

Q1. A: Light travels in a straight line.
R: Light cannot bend around corners.

Q2. A: Plane mirror images are laterally inverted.
R: Left appears right in mirror images.

Q3. A: Transparent objects do not form shadows.
R: Light passes completely through them.

Q4. A: Pinhole camera forms inverted images.
R: Light travels in straight lines.

Q5. A: Opaque objects form dark shadows.
R: They block light completely.

SHORT ANSWER QUESTIONS

Q1. What is a luminous object?
Ans: _____
_____
_____

Q2. Why is the Moon called a non-luminous object?
Ans: _____
_____
_____

Q3. How can you show that light travels in a straight line?
Ans: _____
_____
_____

Q4. What is reflection of light?
Ans: _____
_____
_____

Q5. What is lateral inversion?
Ans: _____
_____
_____

Q6. What type of image is formed by a plane mirror?
Ans: _____

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Q7. What kind of image is formed by a pinhole camera?
Ans: _____

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LONG ANSWER QUESTIONS

Q1. Differentiate between transparent, translucent, and opaque materials.
Ans: _____

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Q2. Explain how shadows are formed. What factors affect the size and shape of a shadow?
Ans: _____

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Q3. Describe the characteristics of images formed by a plane mirror.
Ans: _____

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Q4. Explain how a periscope works.
Ans: _____

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Answers

FILL IN THE BLANKS

1. luminous
2. non-luminous
3. straight
4. opaque
5. translucent
6. blocked
7. shiny
8. erect
9. lateral inversion
10. inverted

MULTIPLE CHOICE QUESTIONS

1. C. Sun
2. D. Tracing paper
3. C. Cardboard
4. C. Erect
5. D. Pinhole camera
6. B. Shiny surface
7. D. None of these
8. D. Venus
9. C. Left-right reversal
10. B. Towards light source

ASSERTION – REASON

Q1. Both A and R are true and R explains A.
Q2. Both true, R explains A.
Q3. A false, R true.
Q4. Both true, R explains A.
Q5. Both true.

SHORT ANSWER QUESTIONS

Q1. Ans. A luminous object is an object that produces or emits its own light. Such objects do not need any other source of light to be seen. They are the original sources of light.
Examples of luminous objects include the Sun, stars, burning candle, electric bulb, fire, and fireflies. The Sun is the main natural source of light on the Earth and helps us see all other objects around us.

Q2. Ans. The Moon is called a non-luminous object because it does not produce its own light. It appears bright at night because it reflects the light of the Sun that falls on its surface. Since the Moon only reflects light and does not emit light on its own, it is classified as a non-luminous object.

Q3. Ans. Light travels in a straight line, and this can be shown using a simple experiment.
If three matchboxes with holes are placed in a straight line and a torch is kept at one end, light passes through all the holes and reaches a screen. When one matchbox is moved slightly, the light does not reach the screen.
This shows that light cannot bend around obstacles and always travels in a straight path.

Q4. Ans. Reflection of light is the phenomenon in which light changes its direction after striking a shiny or polished surface, such as a mirror or a smooth metal plate.

When light falls on a mirror, it bounces back instead of passing through the mirror. This change in direction of light is called reflection and helps us see images in mirrors.

Q5. Ans. Lateral inversion is the effect in which the left side of an object appears as the right side in its image formed by a plane mirror, and the right side appears as the left.
For example, when we raise our left hand, the image in the mirror appears to raise its right hand. This left-right reversal happens only in mirror images.

Q6. Ans. A plane mirror forms an image that is:

Erect (upright)
Same size as the object
Virtual, meaning it cannot be obtained on a screen

Laterally inverted
The image appears to be at the same distance behind the mirror as the object is in front of it.

Q7. Ans. A pinhole camera forms a real and inverted image of an object on a screen.
The image can be seen clearly on the screen and shows the colours of the object. The image is formed because light travels in straight lines and passes through a tiny hole in the camera.

LONG ANSWER QUESTIONS
Q1. Ans.
Materials are classified into three types based on how much light they allow to pass through them.
Transparent materials allow light to pass almost completely through them. Objects can be seen clearly through these materials. Examples: Clear glass, clean water, air.

Translucent materials allow light to pass partially through them. Objects cannot be seen clearly; they appear blurred. Examples: Tracing paper, frosted glass, thin cloth.

Opaque materials do not allow light to pass through them at all. Objects behind them cannot be seen. Examples: Wood, cardboard, metal, stone.

Thus, the amount of light passing through a material determines whether it is transparent, translucent, or opaque.

Q2. Ans.
A shadow is formed when light is blocked by an object.
Formation of a shadow:
When light from a source travels in a straight line and an opaque object comes in its path, the object blocks the light. As a result, a dark region is formed on a surface behind the object where light does not reach. This dark region is called a shadow.
Requirements for shadow formation:
- A source of light
- An opaque object
- A screen (wall, floor, or ground)

Factors affecting size and shape of shadow:
- Distance between the light source and the object
- Distance between the object and the screen
- Position and shape of the object

If the object is closer to the light source, the shadow is larger. If it is closer to the screen, the shadow is smaller. The colour of the object does not affect the shadow.

Q3. Ans.
Images formed by a plane mirror have the following characteristics:
The image is erect (upright).
The image is of the same size as the object.
The image cannot be obtained on a screen, so it is a virtual image.
The image shows lateral inversion, meaning left appears right and right appears left.
The image appears to be at the same distance behind the mirror as the object is in front of it.
These properties are observed when we see our reflection in a mirror.

Q4. Ans.
A periscope is an optical device used to see objects that are not directly visible.
Construction and working:
A periscope consists of a tube with two plane mirrors fixed inside it at an angle of 45°. Light from the object strikes the upper mirror, gets reflected to the lower mirror, and then reaches the observer's eyes.
Uses:
Used in submarines to see objects above water
Used by soldiers in bunkers
Used to see over obstacles
The periscope works on the principle of multiple reflection of light.