

Lights and Sound

3. Light

1. Exercise

Multiple Choice Questions

1. Light is a form of energy produced by a
 - (a) luminous object
 - (b) non-luminous object
 - (c) transparent object
 - (d) opaque object
2. Planets are example of
 - (a) luminous object
 - (b) non-luminous object
 - (c) translucent object
 - (d) transparent object
3. Which of these conditions is/are essential for a shadows to be produced?
 - (a) A light source
 - (b) An opaque object
 - (c) A screen/surface
 - (d) All of the above
4. An artificial source of light is
 - (a) sun
 - (b) firefly
 - (c) jellyfish
 - (d) electric bulb
5. Which of these materials could produce a shadow?
 - (a) A clear glass slab
 - (b) A milky white plastic
 - (c) Clear water
 - (d) A piece of wood
6. A..... image can be obtained on a screen.
 - (a) real
 - (b) virtual
 - (c) erect
 - (d) inverted
7. When a person sees himself in a mirror, what do his eyes observe?
 - (a) A virtual image whose rays originate at the person.
 - (b) A virtual image formed from light that originate behind the mirror.
 - (c) Areal image whose rays appear to originate at the person.
 - (d) A real image whose rays originate behind the mirror.
8. The objects that cast shadow are
 - (a) transparent
 - (b) translucent
 - (c) opaque
 - (d) luminous
9. What happen to light rays when they strike an uneven surface from same direction?
 - (a) They are reflected in the same direction
 - (b) They are reflected in many directions
 - (c) They are absorbed by the surface
 - (d) They pass through the surface and are diffracted
10. If a student stand 3 m in front of a mirror, what is the distance between he and his image?
 - (a) 1.5m
 - (b) 3m
 - (c) 6m
 - (d) 7.5m
11. Which of the following is/are the example(s) of a light reflector?
 - (1) Fluorescent tube
 - (2) A mirror
 - (3) The moon
 - (a) (1)only
 - (b) (3) only
 - (c) (1) and (2) only
 - (d) (2) and (3) only
12. Select the one that is a natural source of light.
 - (a) Lighted fluorescent tube
 - (b) Red hot iron bar
 - (c) Sun
 - (d) Trees
13. Which of the following is a non-luminous body?
 - (a) Sun
 - (b) Moon
 - (c) Stars
 - (d) All of these
14. To see a non-luminous object we need
 - (a) light
 - (b) eyes
 - (c) Both of these
 - (d) None of these
15. Which of the following is a transparent substance?
 - (a) Wooden blackboard
 - (b) Mirror
 - (c) A sheet of glass
 - (d) None of these
16. Which of the following is translucent?
 - (a) Oily paper
 - (b) Aluminium sheet
 - (c) Glass
 - (d) None of these
17. "Speed of light is the same, no matter how it is measured" was first contemplated by
 - (a) A.A. Michelson
 - (b) John Dalton
 - (c) Albert Einstein
 - (d) None of these
18. If an object placed in the path of light allowed almost the whole of the light falling on it to pass through it, then the object is classified as
 - (a) transparent
 - (b) translucent

- (c) opaque (d) None of these
- 19.** A shining star is
 (a) a natural source of light
 (b) an artificial source of light
 (c) a luminous body
 (d) Both (a) and (c)
- 20.** A translucent substance
 (a) allows most of light to pass through it
 (b) allows a part of light to pass through it
 (c) does not allow light to pass through it
 (d) None of the above is correct
- 21.** An image is formed on a screen when
 (a) a transparent object is placed between the screen and the source of light
 (b) an opaque object is placed between the screen and the source of light
 (c) Both the above are correct
 (d) None of the above is correct
- 22.** In a pinhole camera, the image formed is
 (a) erect (b) inverted
 (c) smaller (d) larger
- 23.** Moon is a
 (a) luminous body
 (b) non-luminous body
 (c) neither luminous nor non-luminous
 (d) None of the above is correct
- 24.** Which of the following are needed for formation of a shadow?
 (a) Source of light (b) An opaque object
 (c) Screen (d) All of these
- 25.** Does the shadow of an object always provide us correct information about the shape of the object?
 (a) Yes (b) No
 (c) Can't say (d) All are incorrect
- 26.** Which of the following will form a shadow similar to that formed by a thin note-book?
 (a) A rectangular box (b) A circular box
 (c) Both the above (d) None of these
- 27.** Thick black paper is
 (a) transparent (b) translucent
 (c) opaque (d) None of these
- 28.** Following are some sources of light. Which of them is natural?
 (a) Moon (b) Flame of candle
 (c) Bulb (d) Sun
- 29.** Which tiny particles can be observed in a ray of light entering from a small gap of a window?
 (a) Oxygen (b) Nitrogen
 (c) Dust (d) Water Vapours
- 30.** Which of the following materials is most suitable for a solar electrical cell?
 (a) Iron (b) Silicon
 (c) Steel (d) Aluminium
- 31.** A solar cell converts _____
 (a) chemical Energy to light energy
 (b) light energy to electrical energy
 (c) electrical energy to light energy
 (d) light energy to chemical energy
- 32.** Tube light glass: Semi-transparent:: Mirror glass:

 (a) Non Luminous (b) Transparent
 (c) Reflector (d) Opaque
- 33.** Which of the following statement(s) is/are correct?
 (a) An oily paper is translucent
 (b) The shadow formed by a coloured object will be coloured
 (c) Black thick paper is transparent
 (d) None of the above is correct
- 34.** Which of the following statement(s) is/are correct?
 (a) Light travels in straight lines
 (b) Luminous objects emit their own light
 (c) Both the above
 (d) None of above
- 35.** Which of the following statement(s) is/are correct?
 (a) The image formed in a pin hole camera is erect
 (b) The image formed in a pin hole camera is not erect
 (c) If we place a transparent object in the path of light the shadow formed will be much clearer
 (d) None of these is correct
- 36.** For the formation of shadow, essential condition is
 (a) There should be a source of light
 (b) There should be a screen
 (c) An opaque substance should be placed between the source of light and screen
 (d) All of the above
- 37.** An object that emits light of its own is
 (a) a luminous object
 (b) a non-luminous object

- (c) a source of light
- (d) Both (a) and (c)

38. Luminous objects
- (a) emit light during night time
 - (b) emit light during day time
 - (c) emit light of their own during day and night
 - (d) None of the above is correct.

Match the Column

39.

Column I	Column II
(a) Lunar eclipse	(p) Has colour of the object
(b) Solar eclipse	(q) Always black
(c) Image	(r) Moon between sun and earth
(d) Shadow	(s) Earth between sun and moon.

- (a) $A \rightarrow (s); B \rightarrow (p); C \rightarrow (r); D \rightarrow (q)$
- (b) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$
- (c) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (q); D \rightarrow (p)$
- (d) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (p); D \rightarrow (q)$

40.

Column-I	Column-II
(a) Transparent substance	(p) It allows the light to pass through it almost completely
(b) Opaque substance	(q) It emits light of its own
(c) Luminous object	(r) It does not emit light of its own
(d) Non-luminous object	(s) It does not allow light to pass through it

- (a) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$
- (b) $A \rightarrow (q); B \rightarrow (p); C \rightarrow (s); D \rightarrow (r)$
- (c) $A \rightarrow (p); B \rightarrow (r); C \rightarrow (q); D \rightarrow (s)$
- (d) $A \rightarrow (p); B \rightarrow (s); C \rightarrow (q); D \rightarrow (r)$

Passage Based Questions

DIRECTIONS (Qs.41-46): Read the passage (s) given below and answer the questions that follow.

Passage-1

Luminous objects give off their own light, such as the sun and stars. Fireflies and glow-worms are luminous. Non-luminous object do not give off light or glow.

41. Sun is a
- (a) non-luminous object
 - (b) luminous object
 - (c) transparent object
 - (d) opaque object
42. Fireflies is
- (a) a glowing object
 - (b) a deep sea fish
 - (c) both (a) and (b)
 - (d) neither (a) nor (b)
43. Non-luminous objects
- (a) have their own light
 - (b) are visible when they reflect the light fall on them from luminous objects
 - (c) do not give off light
 - (d) both (b) and (c)

Passage-2

Take a comb in your right hand and bring it to your hair and look at yourself in mirror. You can see your own face in the mirror. This is your mirror image.

44. In your mirror image you appear to be holding the comb in your
- (a) left hand
 - (b) right hand
 - (c) comb is not visible
 - (d) None of these is correct
45. The images of an object formed in a pin hole camera and that in a mirror are
- (a) quite similar
 - (b) quite different
 - (c) can't say
 - (d) All are incorrect
46. The image formed in a mirror is due to
- (a) reflection of light
 - (b) bending of light
 - (c) Both the above
 - (d) None of these

Assertion/Reason Based Questions

DIRECTIONS: The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R ". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

- 47. Assertion (A):** Shadow forms when light fall on a wooden block.
Reason: Light is reflected when it bounces off a surface.
- 48. Assertion (A):** Solar and lunar eclipses are results of shadow formation.
Reason: Sun is essential for shadow formation.
- 49. Assertion (A):** Shadow is formed when an opaque object comes in the path of light.
Reason (R): An opaque body does not allow any light to pass through it.
- 50. Assertion (A):** When we look into the mirror, we see our own face inside the mirror.
Reason (R): Mirror is made of a transparent substance that allows the light to pass through it.
- 51. Assertion (A):** When the light from a source falls on a mirror it gets reflected.
Reason (R): On being reflected there is no change in the direction of light.
- 52. Assertion (A):** Mirror reflection gives clear images.
Reason (R): Images are quite similar to shadows.

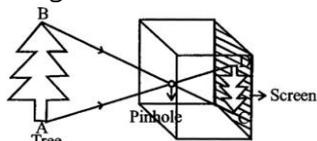
Statement Based Questions

DIRECTIONS: Read the following two statements carefully and choose the correct options.

- (a) Statement (1) is correct while statement (2) is incorrect.
 (b) Statement (2) is correct while statement (1) is incorrect.
 (c) Both statements are correct
 (d) Both statements are incorrect.
- 53. Statement-1:** Light travels in a straight line.
Statement-2: Light requires a medium to travel.

Figure Based Questions

- 54.** The image formed by pinhole camera on the screen in the figure is

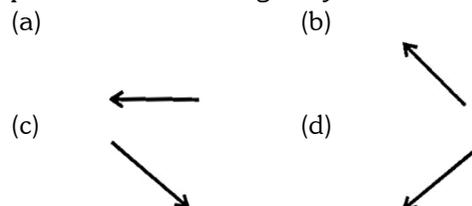


- (a) erect and enlarged
 (b) inverted and enlarged
 (c) erect and diminished
 (d) inverted and diminished

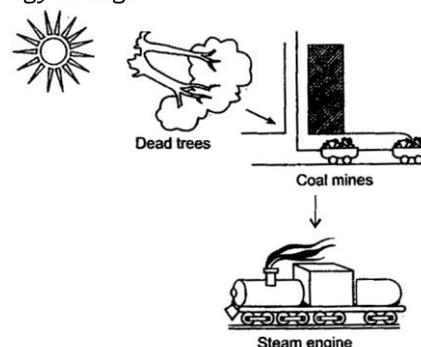
- 55.** The figure shows a light ray moving towards a smooth surface.



Which of the following arrow represents the possible direction of light ray after reflection?



- 56.** Observe the diagram and choose the sequence of energy changes.



- (a) Light Energy → Chemical Energy → Potential Energy
 (b) Potential Energy → Chemical Energy → Kinetic Energy
 (c) Solar Energy → Chemical Energy → Kinetic Energy
 (d) Heat Energy → Electrical Energy → Mechanical Energy

2. Exercise

Multiple Choice Questions

- 1.** What happens to a light beam when it passes through a translucent material such as waxed paper?
 (a) Most of the light passes through
 (b) Light is reflected in its incident path
 (c) Most of the light is absorbed and very little is reflected
 (d) Light is not allowed to pass through
- 2.** A boy of length 10 m, to see his own complete image, requires a plane mirror at least equal to:

19. Periscope, a device used in U-boats, makes use of
 (a) reflection of light
 (b) refraction of light
 (c) shadow formation by opaque objects
 (d) None of these
20. What happens when lightning occurs?
 (a) Light comes from sun to cloud
 (b) Light comes from cloud to earth
 (c) Electric current flows in atmosphere
 (d) Electric current flows from sun to cloud
21. Which of the following statement(s) is/are correct?
 (a) Shadows are formed on the same side as the light source
 (b) Shadows are formed on the opposite side to the light source
 (c) Shadows give us an exact idea of the shape of the object
 (d) None of these is correct
22. Which of the following statement(s) is/are correct?
 (a) A shadow is formed when an opaque object comes in the path of light
 (b) For the formation of shadow we need an opaque object and a source of light only
 (c) The colour of shadow of an object will be different when seen in light coming from different sources
 (d) All the above are correct.
23. An object that does not emit light of its own but is visible due to the light from a source of light falling on it, is
 (a) luminous object
 (b) non-luminous object
 (c) either luminous or non-luminous
 (d) None of these
24. Moon is considered a non-luminous object as
 (a) it emits light only during night
 (b) it does not emit its own light
 (c) it is visible during night only
 (d) All the above are correct
25. Translucent body is one that
 (a) allows almost whole of light to pass through it
 (b) allows light to pass through it only partly
 (c) through which we can see objects clearly
 (d) None of the above is correct
26. The image formed by a pinhole camera is inverted because

- (a) light travels in straight lines
 (b) on passing through a pin hole camera there occurs a lateral inversion in the rays of light
 (c) light rays get reflected in a pin hole camera
 (d) None of the above is correct

27. For making a periscope, the number of mirrors needed is
 (a) 1 (b) 2
 (c) 3 (d) 4
28. A handicapped person has three fingers and has no thumb in his left hand but his right hand has four fingers as also the thumb. He holds a mirror in his right hand and looks at this own image in a mirror. In the mirror image he will appear as holding his comb with
 (a) three fingers
 (b) four fingers
 (c) none of these
 (d) can't say

Match the Column

DIRECTION: Match Column-I with Column-II and select the correct answer using the code given below the columns.

29.

Column I	Column II
(a) Pin-hole camera	(p) Forms an inverted image
(b) Mirror	(q) Forms a lateral image
(c) Periscope	(r) Used in U-boats
(d) Kaleidoscope	(s) Makes use of reflection of light

- (a) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$
 (b) $A \rightarrow (p); B \rightarrow (r); C \rightarrow (s); D \rightarrow (q)$
 (c) $A \rightarrow (q); B \rightarrow (p); C \rightarrow (r); D \rightarrow (s)$
 (d) $A \rightarrow (s); B \rightarrow (p); C \rightarrow (q); D \rightarrow (r)$

30.

Column I	Column II
(a) Light	(p) Shows that light travels in straight lines
(b) Luminous object	(q) An agent that produces a sensation of sight in us.
(c) Shadow formation	(r) Non-luminous object
(d) A pair of shoes	(s) An object that gives out light of its own

- (a) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$
 (b) $A \rightarrow (q); B \rightarrow (r); C \rightarrow (s); D \rightarrow (p)$

- (c) $A \rightarrow (q); B \rightarrow (s); C \rightarrow (p); D \rightarrow (r)$
 (d) $A \rightarrow (r); B \rightarrow (p); C \rightarrow (q); D \rightarrow (s)$

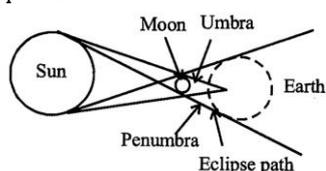
- (a) Kaleidoscope (b) Periscope
 (c) Both of the above (d) None of these

Passage Based Questions

DIRECTIONS (Qs.31-36): Read the passage (s) given below and answer the questions that follow.

Passage -1

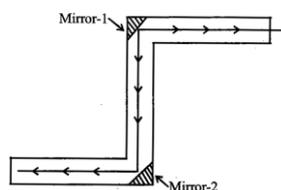
On the basis of the given diagram answer the following questions.



31. 'Region of full shadow' is called
 (a) umbra (b) penumbra
 (c) source (d) curved path
32. 'Region of partial shadow' is called
 (a) umbra (b) penumbra
 (c) source (d) curved path
33. In solar eclipse, sun's light blocks out on the surface of
 (a) Moon (b) Sun
 (c) Earth (d) All of these

Passage -2

You can make a simple periscope by placing two mirrors in a 'Z' shaped box as shown in figure below.



34. Periscope is a device
 (a) used in U-boats
 (b) that makes use of reflection of light
 (c) Both the above
 (d) None of these
35. Periscope is a device
 (a) that uses reflections to see around corners
 (b) that uses the property of light that light travels in straight lines
 (c) Both the above
 (d) None of these
36. Which of the following device makes use of reflection of light?

Assertion/ Reason Based Questions

DIRECTIONS: The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason Rare individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.
37. **Assertion (A):** Shadow is always black.
Reason (R): A shadow only shows the outline of an object.
38. **Assertion (A):** Image has the colour of the object.
Reason (R): Image gives only the outline of the object.
39. **Assertion (A):** In cars the windshields made of glass are used.
Reason (R): Those substances through which things can be seen clearly are called transparent substances.

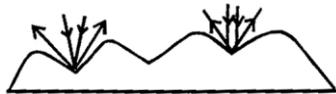
Figure Based Questions'

DIRECTIONS: Read the following three statements carefully and choose the correct option.

- (a) Statement (1) and (3) are incorrect while statement (2) is correct.
 (b) Statement (1) and (2) are incorrect while (3) is correct.
 (c) All the statements are correct.
 (d) All the statements are incorrect.
40. **Statement-1:** The length of shadow formed by sunlight remains constant with time.
Statement-2: The speed of light in air is 3×10^8 m/s..
Statement-3: Speed of light remains same in all medium.

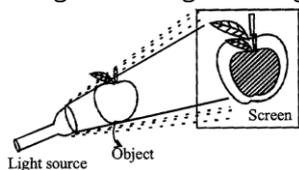
Figure Based Questions

41. When parallel rays of light are incident on an irregular surface as shown in the figure, which phenomenon of light occurs?



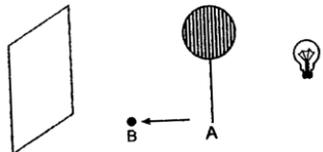
- (a) Regular reflection (b) Diffuse reflection
(c) Dispersion (d) Refraction

42. The less dark region in the given image is called



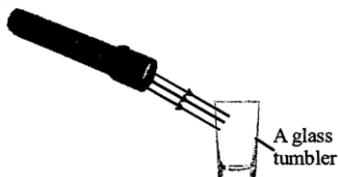
- (a) umbra (b) penumbra
(c) dark region (d) None of these

43. A lamp, a ball and a paper are kept as shown in the figure below. What will be the change in the shadow, if the ball is moved from A to B?



- (a) Become large (b) Remain same
(c) Become small (d) Get distorted

44. Look at the picture and answer the question given below :



Why is a dark shadow not formed by glass tumbler?

- (a) The source of light is not a strong source
(b) It is not night time
(c) The tumbler is made of transparent material
(d) All the above are correct

Hints & Solutions

Exercise-I

Multiple Choice Questions

1. (a) Luminous objects produce their own light.
2. (b) Planet reflects sun's light that falls on them and shines.
3. (d)
4. (d)
5. (d) An opaque object is required to produce a shadow.
6. (a) Virtual image is always erect and it cannot be taken on screen. Image formed on screen is always real and inverted.
7. (d) Real and inverted image is formed on the retina.
8. (c) Objects that reflect the light falls on them can cast shadow.
9. (b) The reflection will be irregular reflection.
10. (c) Distance between object and image becomes double the distance between object and mirror.
11. Fluorescent tube is an artificial light source.
12. (c)
13. (b) Moon is non-luminous. It becomes visible when light from sun falls on it.
14. (c) We need both light and eyes to see objects.
15. (c)
16. (a)
17. (c)
18. (a)
19. (d)
20. (b)
21. (b)
22. (b)
23. (b) Moon reflects the sunlight falling on it.
24. (d)
25. (b) Sometimes a shadow can mislead us
26. (a)
27. (c) Black thick paper is opaque.

28. (d)
29. (c)
30. (b)
31. (b) **Explanation:** Solar cell produces electricity from sunlight. In other words it converts light energy into electrical energy.
32. (d) **Explanation:** The question is based on relationship between the entities. The semi-transparent property of the tube light glass is used as the basis of relationship (that is material and its property). If mirror glass is the material, then the relevant property will be opaque.
33. (a)
34. (c)
35. (b) In pinhole camera, the image formed is upside down and not erect.
36. (c)
37. A luminous object can act as a source of light.
38. (c)

Match the Column

39. (d) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (p); D \rightarrow (q)$
40. (d) $A \rightarrow (p); B \rightarrow (s); C \rightarrow (q); D \rightarrow (r)$

Passage Based Questions

Passage-1

41. (b) Because sun has its own light.
42. (c)
43. (d)

Passage-2

44. (a)
45. In a pinhole camera it is inverted (i.e., upside down) and in a mirror it is turned right to left.
46. (a)

Assertion/ Reason Based Questions

47. (a) Both (A) and (R) are correct and (R) is the correct explanation of (A).

48. (c) (A) is true but (R) is false.
49. (a) Both A and R are correct, Reason R is correct explanation of Assertion A.
50. (c) A is correct, R is false.
51. (c) A is correct, R is false.
[The direction of reflected ray is not the same as that of light ray falling on mirror.]
52. (c) A is correct, R is false.
[Images are quite different from shadows.]

Statement Based Questions

53. (a)

Figure Based Questions

54. (d) The image formed by pinhole camera is inverted and diminished.
55. (d)
56. (c)

Exercise-2

Multiple Choice Questions

- (a) Translucent object are those through which light can pass partially not completely.
- (b) A person requires the plane mirror to be at least half his/her height for the entire body to be visible. Hence, the answer would be $10/2$ m, i.e., 5m.
- For a plane mirror, the object velocity is equal and opposite to the image velocity.
- Hence, if the mirror is moving with velocity v , then velocity between two is $2v$, which is in this case $2 \times 10 = 20 \text{ cm/sec}$.
Since size of earth is bigger than that of moon, so the region of total darkness (umbral) is more than the region of partial darkness (penumbral). This kind of eclipse is called total lunar eclipse.
- (b)
- (a)
- Because the image formed by mirror is laterally inverted.

8. (a)
9. (b)
10. (a) The moon revolves around the earth and when it comes in between the Sun and the Earth, shadow of moon falls on the Earth and Solar eclipse occur.
11. (d) All these make use of reflection of light
12. (c)
13. (b) In the mirror image left appears as right and right appears as left.
14. (a)
15. (a)
16. (a)
17. We can see through it but not clearly.
18. (c)
19. It makes use of reflection of light.
20. (c)
21. (b)
22. (a) For formation of shadow we also need a screen. The colour of shadow is same in all cases.
23. (b)
24. (b) Moon reflects the sunlight falling on it and does not emit its own light.
25. (b)
26. (a)
27. (b) We need 2 mirrors.
28. (b)

Match the Column

29. (a) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$
30. (c) $A \rightarrow (q); B \rightarrow (s); C \rightarrow (p); D \rightarrow (r)$

Passage Based Questions

Passage -1

31. (a) Umbra is darker region.
32. (b) Penumbra is lighter region.
33. In solar eclipse, sun's light block out on the surface of earth.

Passage -2

34. (c)
35. (c)
36. (c)

Assertion/Reason Based Questions

37. (a) Both (A) and (R) are correct and (R) is correct explanation of (A).
38. (c) (A) is true but (R) is false.
39. (b)
40. (a)
41. (b)
42. (b) The region of partial darkness is called penumbra.
43. (a) **Explanation:** In the given figure the ball is larger than the lamp. When the ball is moved from A to B it is brought near to the screen. The shadow will become larger as the ball is moved towards the screen. Try this experiment yourself by using a torch.
44. (c) Glass is transparent