

## Light

### Exercise - 1

#### Multiple Choice Questions

**DIRECTIONS:** The following questions has four choices (a), (b), (c) and (d) out of which only one is correct. You have to choose the correct alternative.

1. Surfaces used in study of reflection of light are  
(a) Polished (b) rough  
(c) Black painted (d) none of these
2. Normally a plane mirror forms  
(a) a real image only  
(b) a virtual image only  
(c) Both real as well as virtual image  
(d) Neither real nor virtual image
3. A parallel beam of rays falling on a concave lens  
(a) are scattered (b) remain parallel  
(c) are diverged (d) are converged
4. Shaving mirrors are  
(a) convex mirrors (b) plane mirrors  
(c) concave mirrors (d) None of the above
5. White light breaks up into seven colours due to  
(a) reflection (b) refraction  
(c) dispersion (d) None of these
6. Which of the following is used as side view mirror in vehicles?  
(a) Plane mirror (b) Concave mirror  
(c) Convex mirror (d) None of these
7. The type of lens, which is thicker in the middle and thinner at the edges and is used as magnifying glass, is called  
(a) convex lens (b) concave lens  
(c) diverging lens (d) None of these
8. Lens  
(a) refers to a magnifying glass  
(b) is a piece of transparent medium bounded by at least one spherical surface.  
(c) Both the above are correct.  
(d) None of these.
9. What kind of mirror provides images of large areas and is used for security?  
(a) A plane mirror (b) A concave mirror  
(c) A convex mirror (d) All of the above
10. If the angle between the incident ray and the normal to the plane of the mirror is  $40^\circ$ , the angle between the incident ray and the reflected ray will be  
(a)  $40^\circ$  (b)  $90^\circ$   
(c)  $80^\circ$  (d)  $60^\circ$
11. Which of the following can form real images?  
(a) A plane mirror (b) A convex mirror  
(c) A convex lens (d) A concave lens
12. Which of the following would you prefer to use while reading small letters found in a dictionary?  
(a) A concave mirror (b) A concave lens  
(c) A convex mirror (d) A convex lens
13. Which of the following materials cannot be used to make a lens?  
(a) Water (b) Glass  
(c) Plastic (d) Clay
14. Light is  
(a) an electromagnetic radiation  
(b) a transverse wave  
(c) mass less  
(d) All of the above
15. The speed of light is  
(a) 330m/s (b) 300,000,000 m/s  
(c) 30,000 m/s (d) 300,000,000km/s
16. Rectilinear propagation is  
(a) mode of travelling in curved lines  
(b) mode of travelling in straight lines  
(c) ability to bend around obstacles  
(d) displaying the phenomenon of diffraction
17. Which of the following is a reflector of light?  
(a) Sun (b) Moon  
(c) Star (d) Filament
18. We can see the objects only when  
(a) reflected light reaches our eyes  
(b) the objects absorb all the light  
(c) the objects allow all the light to pass through them  
(d) None of the above
19. The surfaces which cannot produce clear images are called  
(a) rough surfaces (b) ideal surfaces

- (c) smooth surfaces      (d) curved surfaces
- 20.** In order to be used as mirrors, glasses are coated with  
 (a) silver                      (b) copper  
 (c) aluminium              (d) platinum
- 21.** A spherical mirror is a  
 (a) reflecting elliptical surface  
 (b) reflecting spherical surface  
 (c) reflecting parabolic surface  
 (d) flat reflecting surface
- 22.** The distance between the focus and the pole of the mirror is called  
 (a) focal length  
 (b) radius of curvature  
 (c) principal axis  
 (d) diameter of curvature
- 23.** A ray of light is incident on a plane mirror at an angle of incidence of  $30^\circ$ . The deviation produced by the mirror is  
 (a)  $30^\circ$                       (b)  $60^\circ$   
 (c)  $90^\circ$                       (d)  $120^\circ$
- 24.** The object or image distance is taken as positive  
 (a) if the length is measured opposite to the direction of the incident ray  
 (b) if the length is measured in the direction of the incident ray  
 (c) if the length is measured opposite to the direction of the refracted ray  
 (d) none of these
- 25.** A ray of light is incident on a plane mirror and the angle of incidence is  $25^\circ$ . What is the angle of reflection?  
 (a)  $0^\circ$                       (b)  $50^\circ$   
 (c)  $90^\circ$                       (d)  $25^\circ$
- 26.** An ideal mirror  
 (a) absorbs all the amount of light incident on it  
 (b) refracts all the light  
 (c) reflects all the light  
 (d) none of the above
- 27.** The point where the rays from a point object meet after refraction through a lens is called the  
 (a) focus  
 (b) centre of curvature  
 (c) optical centre  
 (d) image point
- 28.** According to the laws of reflection  
 (a) angle  $i$  = angle  $r$   
 (b)  $\sin i = \sin r$   
 (c)  $\sin i / \sin r = \text{constant}$   
 (d) All of these
- 29.** Dispersion of light is defined as  
 (a) splitting of white light into seven colours  
 (b) splitting of white light into five colours  
 (c) splitting of white light into six colours  
 (d) splitting of white light into any number of colours
- 30.** On the basis of following features identify the correct option.  
 (I) it is also known as diverging lens.  
 (II) This lens diverges rays of light.  
 (a) Convex lens  
 (b) Concave lens  
 (c) Both (a) and (b)  
 (d) Neither (a) nor (b)
- 31.** The band of seven colours formed on a screen when the white light suffers dispersion is called  
 (a) solar colored band      (b) spectrum  
 (c) sonar                      (d) none of the above
- 32.** Red, orange, \_\_\_\_, \_\_\_\_, \_\_\_\_, indigo and violet is the order of colours in spectrum. The order of missing colours is:  
 (a) blue, green and yellow  
 (b) yellow, blue and green  
 (c) green, blue and yellow  
 (d) yellow, green and blue
- 33.** The colour that deviates least during the dispersion of white light is :  
 (a) violet                      (b) green  
 (c) red                      (d) orange
- 34.** What is the angle between the incident and reflected rays when a ray of light is incident normally on a plane mirror?  
 (a)  $90^\circ$                       (b)  $45^\circ$   
 (c)  $180^\circ$                       (d)  $0^\circ$
- 35.** Spherical mirror  
 (a) refers to any curved mirror  
 (b) refers to a mirror that is part of a sphere.  
 (c) both the above are correct.  
 (d) none of these is correct.
- 36.** A concave mirror

- (a) is a type of spherical mirror whose reflecting surface is concave.  
 (b) is a type of curved mirror whose reflecting surface is convex.  
 (c) both the above are correct.  
 (d) none of these is correct.

- 37.** When seen from a close distance in a plane mirror, the face image  
 (a) has same size (b) is enlarged  
 (c) is diminished (d) is blurred
- 38.** When seen from a close distance in a convex mirror, the face image  
 (a) has same size (b) is enlarged  
 (c) is diminished (d) is blurred
- 39.** A convex lens is thick  
 (a) At the edge  
 (b) In the middle  
 (c) Same every where  
 (d) No definite shape
- 40.** The image which can be obtained on a screen is called  
 (a) erect (b) real  
 (c) virtual (d) inverted

### Match the Column

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

**41.**

Column-I	Column-II
(a) Plane mirror	(p) Forms real image
(b) Convex mirror	(q) Forms image of the same size as that of the object
(c) Concave mirror	(r) Always forms virtual images.
(d) Concave lens	(s) Always forms images that are virtual, erect and smaller than the object.

- (a) (a) → (p), (b) → (q), (c) → (r), (d) → (s)  
 (b) (a) → (q), (b) → (r), (c) → (s), (d) → (p)  
 (c) (a) → (q), (b) → (r), (c) → (p), (d) → (s)  
 (d) (a) → (p), (b) → (s), (c) → (q), (d) → (r)

**42.**

Column-I	Column-II
(a) Objects that have their own light	(p) Non- Luminous
(b) Object that do not have their own light	(q) Luminous

(c) Light ray falling on rough surface	(r) Irregular reflection
(d) Image formation in a mirror	(s) Regular reflection

- (a) (a) → (p), (b) → (s), (c) → (q), (d) → (r)  
 (b) (a) → (r), (b) → (c), (c) → (q), (d) → (s)  
 (c) (a) → (p), (b) → (q), (c) → (r), (d) → (s)  
 (d) (a) → (q), (b) → (p), (c) → (r), (d) → (s)

### Passage Based Question

**DIRECTIONS:** Read the passage given below and answer the questions that/allow.

#### Passage – 1

One way to change the path of light is to allow it to fall on a shiny surface. A mirror can change the path of light that falls on it. The change of direction by a mirror is called reflection of light.

- 43.** If you look at the surface of water taken in a plastic trough, your image will be formed which will be  
 (a) larger in size  
 (b) smaller in size  
 (c) of the same size  
 (d) none of these
- 44.** An image formed by a plane mirror is  
 (a) erect  
 (b) of the same size as object  
 (c) both (a) and (b)  
 (d) none of these

#### Passage – 2

A light ray makes an angle of reflection  $60^\circ$ , when it reflects from a plane reflecting sheet.

- 45.** The glancing angle of reflection will be  
 (a)  $60^\circ$  (b)  $30^\circ$   
 (c)  $45^\circ$  (d)  $90^\circ$
- 46.** The angle of incidence will be  
 (a)  $60^\circ$  (b)  $30^\circ$   
 (c)  $45^\circ$  (d)  $90^\circ$
- 47.** The angle of deviation will be  
 (a)  $60^\circ$  (b)  $30^\circ$   
 (c)  $45^\circ$  (d)  $90^\circ$

### 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.

**48. Assertion (A):** The white light of sun is composed of seven colours.  
**Reason (R):** When white light passes through a glass prism it splits the white light into seven colours.

**49. Assertion (A):** The air bubble shines in water.  
**Reason (R):** Air bubble in water shines due to refraction of light.

**50. Assertion (A):** Ladies use concave mirrors for doing make up.  
**Reason (R):** Concave mirror makes a real and diminished image of an object.

**51. Assertion (A):** In the side mirror of a car, the images of all objects appear smaller than the objects.  
**Reason (R):** Side mirrors are convex mirrors.

**52. Assertion (A):** The lenses are transparent and light can pass through them.  
**Reason (R):** The surface of bell on your cycle acts as a convex lens.

### 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:** Virtual object can't be seen by human eye.  
**Statement 2:** Virtual object is formed by diverging rays.

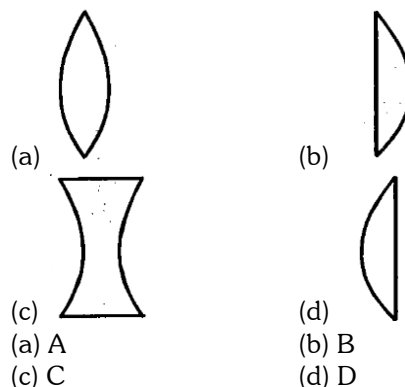
**54. Statement 1:** A ray incident along normal to the mirror retraces its path.

**Statement 2:** In reflection, angle of incidence is always equal to angle of reflection.

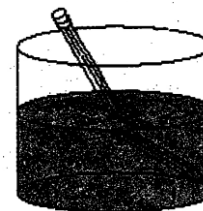
### Figure Based Questions

**DIRECTIONS:** On the basis of following diagram/ picture answer the questions given below:

**55.** Which one of the following pictures shows a diverging lens?

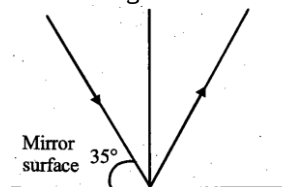


**56.** Which statement best describes the property of light waves illustrated in the diagram below?



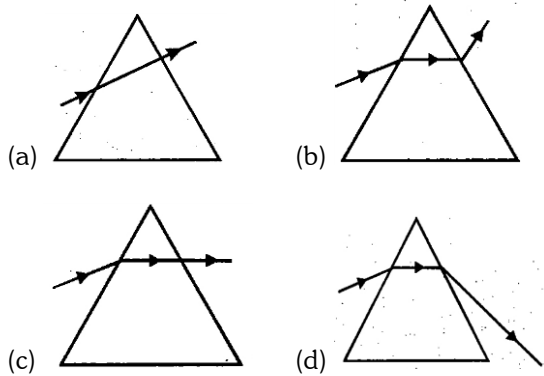
- (a) Some materials absorb light waves.
- (b) Some materials reflect light waves.
- (c) Light waves are refracted by some materials.
- (d) Light waves are emitted by some materials.

**57.** Find the angle of incidence and angle of reflection from the diagram.

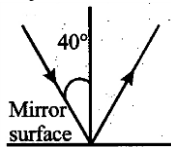


- (a)  $45^\circ$ ,  $40^\circ$
- (b)  $55^\circ$ ,  $55^\circ$
- (c)  $60^\circ$ ,  $60^\circ$
- (d)  $30^\circ$ ,  $30^\circ$

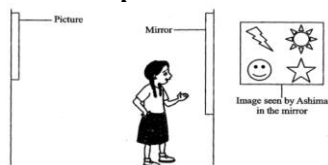
**58.** Which of the following figures correctly shows the bending of a ray of light inside the prism?



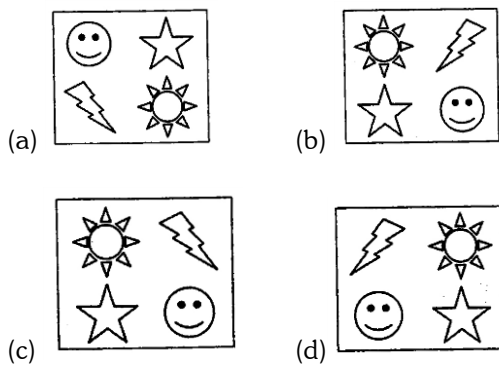
59. Find the angle between the incident ray and reflected ray.



- (a)  $60^\circ$  (b)  $90^\circ$   
(c)  $80^\circ$  (d)  $40^\circ$
60. "Ashima looks into the mirror and sees the reflection of the picture behind her.



Which of the following is the picture that is behind Ashima?



## Exercise – 2

### Multiple Choice Questions

**DIRECTIONS:** The following questions has four choices (a), (b), (c) and (d) out of which only one is correct. You have to choose the correct alternative.

1. Which of the following capital English letters does not show a lateral inversion?  
(a) A (b) B  
(c) C (d) D
2. The distance between a plane mirror and the image of an object placed in front of the mirror is 4 m. If now the object is moved  $m$  towards the mirror, then the distance between the object and its image in the mirror will be  
(a) 3m (b) 5m  
(c) 6m (d) 8m
3. The mirror image of "SMART" will be  
(a) **TЯAM2** (b) TAMSР  
(c) SMART (d) SMRAT
4. The image of the teeth seen by a dentist while examining your teeth is  
(a) erect and real (b) erect and virtual  
(c) inverted and virtual (d) inverted and real
5. Skiers often wear sunglasses while they are siding because snow  
(a) Radiates light (b) absorbs light  
(c) Conducts light (d) reflects light
6. Select the one that is not true about a rainbow.  
(a) Rainbow is always seen as a circle.  
(b) The colours in rainbow as seen by us from top to bottom are in the order, violet, indigo, blue, green, and yellow, orange, red.  
(c) The colours in rainbow as seen by us from top to bottom are in the order, red, orange, yellow, green, and blue, indigo, violet.  
(d) It can be either as in (b) or as in (c).
7. In this type of mirror the image is formed behind the mirror and the size of image is same as the size of object. It is a  
(a) convex mirror (b) concave mirror  
(c) plane mirror (d) None of these
8. Why do you see your smaller and erect image when you look at the shining surface of the bell of your bicycle?  
(a) It acts as a convex lens  
(b) It acts as a convex mirror  
(c) It acts as a concave lens  
(d) It acts as a concave mirror
9. The rear view mirror of a car is a plane mirror. A driver is reversing his car at a speed of 3 m/s and he sees in his rear view mirror a vehicle parked behind his car. The speed at which the image of vehicle appears to approach the driver will be  
(a) 2m/s (b) 3 m/s  
(c) 5 m/s (d) 6 m/s
10. The speed of light will be minimum while passing through  
(a) glass (b) air  
(c) water (d) vacuum
11. An air bubble in water will be act like a  
(a) convex mirror (b) concave mirror  
(c) convex lens (d) concave lens
12. A ball is cut into two halves. On the outer surface of one half of the ball, a shiny aluminum foil is pasted. A candle is now placed in front of this shiny surface. The image of the candle formed by the shiny surface is:  
(a) virtual and smaller in size  
(b) real and smaller in size  
(c) virtual and bigger in size  
(d) real and bigger in size
13. A beam of light is said to be divergent when:  
(a) all the rays travel parallel to each other  
(b) all the rays spread from a point source of light  
(c) all the rays converge together to a single point  
(d) it travels in an irregular pattern
14. The length of the shadow will be longest when the:  
(a) angle between the source of light and the object is  $45^\circ$   
(b) source of light and the object are parallel to each other  
(c) source of light and the object are perpendicular to each other  
(d) angle between the source of light and the object is  $60^\circ$ .
15. Which of the following is true regarding convex lens?

- (a) It forms a magnified image wherever the object is place  
 (b) It forms a magnified image only when the object is very close  
 (c) It always forms diminished and erect images  
 (d) It is not made of a transparent material
- 16.** Plane mirrors are arranged parallel to each other to get:  
 (a) a single image  
 (b) two images  
 (c) a large number of reflected images  
 (d) no image
- 17.** A reflecting surface is curved inwards the mirror is:  
 (a) concave (b) convex  
 (c) plane (d) None of these
- 18.** Which of the following produces a virtual image?  
 (a) A convex lens  
 (b) Pinhole camera  
 (c) A concave mirror when the object is placed at its centre of curvature  
 (d) Convex mirror
- 19.** A prism is a piece of glass having:  
 (a) two rectangular and 3 triangular surfaces  
 (b) two triangular and 3 rectangular surfaces  
 (c) three triangular and 3 rectangular surfaces  
 (d) none of the above
- 20.** The sun is seen before the actual sun rise because of  
 (a) reflection  
 (b) refraction  
 (c) scattering of light  
 (d) rectilinear propagation of light
- 21.** If you can't quite see all your face in a pocket mirror, to do so you'll need to  
 (a) hold it closer  
 (b) hold it farther away  
 (c) get a bigger mirror  
 (d) none of these
- 22.** An inverted image can be seen in a convex mirror,  
 (a) under no circumstances  
 (b) when the object is very far from the mirror  
 (c) when the object is at a distance equal to the radius of curvature of the mirror  
 (d) when the distance of the object from the mirror is equal to the focal length of the mirror
- 23.** Dispersion of light by a glass prism takes place because of  
 (a) difference in wavelengths of the constituents of light  
 (b) difference in speeds of various constituents of white light.  
 (c) scattering of light by the surface of the glass prism  
 (d) only b and a are correct
- 24.** The shape of the triangular prism  
 (a) Makes the emergent ray bend at angle to the direction of the incident ray  
 (b) Angle of deviation is the angle between the incident ray produced and the emergent ray produced  
 (c) Both (a) and (b)  
 (d) Neither (a) nor (b)
- 25.** On the basis of following features identify the correct option.  
 (I) Image formed is virtual and erect  
 (II) Size of image formed is equal to size of object  
 (III) The right side of the object appears as the left of its image and vice-versa.  
 (a) Concave mirror (b) Convex mirror  
 (c) Plane mirror (d) Both (a) and (b)
- 26.** Which is not the property of a concave lens?  
 (a) It is thicker at the edges and tapering in the middle  
 (b) It forms virtual and erect image  
 (c) It forms enlarged image  
 (d) It forms diminished image
- 27.** In nature, rainbow is formed due to the dispersion of sunlight. The optical aid responsible for it is/are:  
 (a) molecules of carbon dioxide  
 (b) tiny droplets of water  
 (c) molecules of nitrogen dioxide  
 (d) none of the above
- 28.** Which of the following letters will be seen without any change in a plane mirror?  
 (a) S (b) T  
 (c) L (d) P
- 29.** Plane mirrors are used in the construction of:  
 (a) periscope (b) kaleidoscope  
 (c) Telescope (d) thermo scope

30. We use convex mirrors as side mirrors of vehicles, because  
 (a) they produce magnified images of the objects.  
 (b) they produce erect images of the objects.  
 (c) they can spread the images over a large area  
 (d) all of the above
31. Why is a convex lens called a converging lens?  
 (a) It bends inwards the light generally falling on it.  
 (b) It converges the light generally falling on it  
 (c) both the above are correct  
 (d) none of these is correct

### Match the column

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

32.

Column-I	Column-II
(a) Convex lens	(p) Used by dentist to see enlarged image of teeth
(b) Convex mirror	(q) Used as a magnifying glass
(c) Concave mirror	(r) Can form image of the object spread over a large area.
(d) Curved mirror	(s) Common example of a spherical mirror

- (a) (a) → (p), (b) → (q), (c) → (r), (d) → (s)  
 (b) (a) → (q), (b) → (r), (c) → (p), (d) → (s)  
 (c) (a) → (r), (b) → (s), (c) → (q), (d) → (p)  
 (d) (a) → (s), (b) → (p), (c) → (r), (d) → (q)

33.

Column-I	Column-II
(a) Virtual image	(p) Band of seven constituent colors
(b) Headlight	(q) Dispersion
(c) Splitting of white light	(r) Real image
(d) Spectrum	(s) Concave mirror
(e) Image on retina	(t) convex mirror

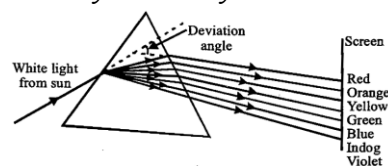
- (a) (a) → (s, t), (b) → (q), (c) → (s), (d) → (p), (e) → (r)  
 (b) (a) → (r), (b) → (p), (c) → (s), (d) → (q), (e) → (s, t)  
 (c) (a) → (s, t), (b) → (s), (c) → (q), (d) → (p), (e) → (r)  
 (d) (a) → (r), (b) → (p), (c) → (q), (d) → (s), (e) → (s, t)

### Passage Based Questions

**DIRECTIONS:** Read the passage (s) given below and answer the questions that follow.

#### Passage-1

When a narrow beam of white light (sunlight or torch light) is passed through a triangular glass prism, it splits into a band of seven colours. The seven colours are in order violet, indigo, blue, green, yellow, orange and red. The red colour is deviated the least while the violet colour is deviated the most. The colour sequence can be remembered by the acronym VIBGYOR-



Dispersion of white light into seven colours the phenomenon of splitting of white light into its component colours on passing through a refracting medium such as a glass prism is called dispersion of light. The pattern of the colored bands obtained on the screen is called spectrum.

34.

A spectrum is obtained by sending a beam of white light through a prism. A second prism exactly similar to the first one is placed in an inverted position with the sides parallel to the first. Now:

- (a) a new spectrum will be formed on the screen with double the number of colours present in the previous spectrum  
 (b) new spectrum will be obtained on the screen with only half the number of colours present in the previous spectrum  
 (c) previous spectrum will disappear and we will obtain a white light formed by the fusion of the colours  
 (d) a spectrum with same number of colours present in the previous spectrum will be formed but their wave lengths will be increased twice

35.

White light is made of:

- (a) 1 colour (b) 3 colours  
 (c) 5 colours (d) 7 colours

36.

Choose the correct statements :

- (a) The sunlight is white  
 (b) The sunlight consists of five colours  
 (c) The sunlight consists of seven colours  
 (d) Both (a) and (c)



### Passage - 2

Take a stainless steel spoon. Bring the outer surface of the spoon near your face and look into it. Observe your image. Now observe your image using the inner side of the spoon.

37. The image formed, when you were looking at the outer surface of the spoon by bringing this surface near your face, was  
(a) erect (b) virtual  
(c) smaller in size (d) all of these
38. The inner surface of spoon acts like a  
(a) concave mirror (b) convex mirror  
(c) plane mirror (d) none of these
39. When the object is placed very close to the concave mirror, the image formed is  
(a) virtual (b) upside down  
(c) smaller (d) all of these

### Assertion/Reason Based Questions

**DIRECTIONS:** The questions in this segment consists of two statements, one labeled as "Assertion A" and the other labeled 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.

40. **Assertion (A):** When we see an object, the image formed on the retina is real and inverted.  
**Reason (R):** If the magnification of a system is less than one, then the image formed is inverted.
41. **Assertion (A):** Rainbow is an example of the dispersion of sunlight by the water droplets.  
**Reason (R):** Light of shorter wavelength is scattered much more than light of larger wavelength.
42. **Assertion (A):** Red light travels faster in glass than green light.  
**Reason (R):** The refractive index of glass is less for red light than for green light.

43. **Assertion (A):** Convex mirror used in street lights.

**Reason (R):** Convex mirror diverges light over a small area than the plane mirror.

44. **Assertion (A):** A convex lens always forms real images for all the positions of an object.

**Reason (R):** The convex lens converges the rays, and hence, forms real image.

45. **Assertion (A):** A plane mirror produces virtual, erect image for any position of the object.

**Reason (R):** Plane mirror has finite focal length.

### Statement 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.

46. **Statement 1:** When an object is placed between two plane parallel mirrors, then all the images found are of equal intensity. **Statement 2:** In case of plane parallel mirrors, only two images are possible.

**Statement 3:** A ray incident normal to the mirror does not retrace its path.

47. **Statement 1:** In an image formed by a mirror, the left side of the object is seen as the right side in the image.

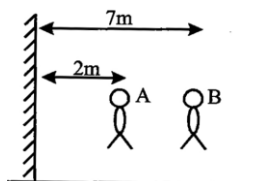
**Statement 2:** The capital English letter 'A' does not show a lateral inversion.

**Statement 3:** Side view mirrors of car are convex mirror.

### Figure Based Questions

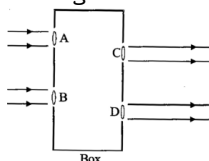
**DIRECTIONS:** On the basis of following diagram/picture answer the questions given below:

48. Two children are standing in front of a plane mirror as shown. When the child A looks into the mirror, how far away from it will the image of child B appear to be?



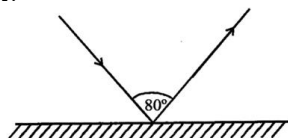
- (a) 9m  
(b) 18m  
(c) 11m  
(d) 16m

49. Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the figure. Which of the following could be inside the box?



- (a) A rectangular glass slab  
(b) A convex lens  
(c) A concave lens  
(d) A prism

50. The diagram shows a ray of light reflected by a plane mirror.

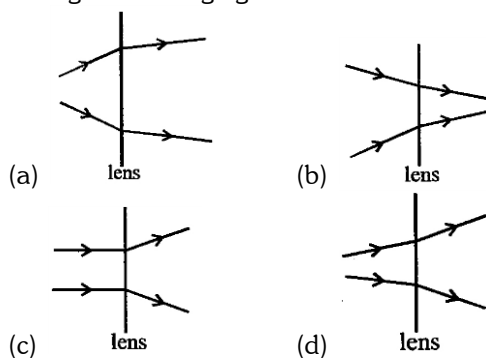


The angle between the incident ray and the reflected ray is 80°.

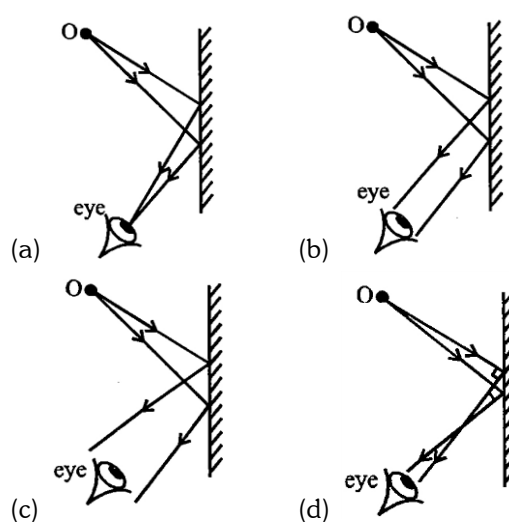
What is the angle of incidence?

- (a) 40°  
(b) 80°  
(c) 50°  
(d) 100°

51. Which diagram shows rays of light passing through a converging lens?



52. An eye views an object O by reflection in a plane mirror. Which is the correct ray diagram?



## HINTS & SOLUTIONS

### Exercise - 1

#### Multiple Choice Questions

1. (a) Polished surface reflects light.
  2. (b) It forms only a virtual image.
  3. (c) A concave lens is a diverging lens.
  4. (c)
  5. (c)
  6. (c) Convex mirror is used for this purpose.
  7. (a) It is a convex lens.
  8. (b)
  9. (c)
  10. (c)
  11. (c)
  12. (d) a convex lens
  13. (d)
  14. (d)
  15. (b)
  16. (b)
  17. (b) Moon does not have any light of its own; it reflects the light of the sun.
  18. (a)
  19. (a)
  20. (a)
  21. (b)
  22. (a)
  23. (d)
  24. (b)
  25. (d)
  26. (c)
  27. (a)
  28. (a) Angle of incidence is equal to the angle of reflection.
  29. (a)
  30. (b)
  31. (b)
  32. (d)
  33. (c)
  34. (d)
  35. (c)
  36. (a)
  37. (a) It has same size.
  38. (c) It is diminished.
  39. (b) A convex lens is thick in the middle.
  40. (b) It is called real image.
- #### Match the Column
41. (c)
  42. (d)
- #### Passage Based Questions
43. (c) The size of image is same as that of object.
  44. (c)
  45. (b) Glancing angle  
 $= 90^\circ - \angle r$   
 $= 90^\circ - 60^\circ = 30^\circ$
  46. (a)
  47. (c)

### Assertion/Reason Based Questions

48. (b)
49. (a)
50. (c) Ladies use concave mirrors for doing make up because the image formed by concave mirror is enlarged when the object (say a face) is in between the pole and focus of the concave mirror.
51. (a) Images formed by convex mirrors are smaller than the objects.
52. (c) Assertion (A) is correct. Reason (R) is wrong. The cycle bell surface acts as a convex mirror.

### Statement Based Questions

53. (b)
54. (c)

### Figure Based Questions

55. (c) A concave lens is called a diverging lens. It is thinner in middle and thicker at edges.
56. (c)
57. (b)
58. (d)
59. (c)
60. (b)

## EXERCISE - 2

### Multiple Choice Questions

1. (a) A does not show lateral inversion.
2. (c) [Since the distance between image and mirror is 4 m so the object is placed at a distance of 4 m in from the mirror in front of it]  
( $\because$  distance of image = distance of object in case of a plane mirror i.e. image is formed as far behind the mirror as is the object is in front of it)  
Now when we move object 1 m towards the mirror the distance of object from mirror = 3m & distance of image from mirror = 3m

$\therefore$  Distance between object and image = (3+3) m or 6 m

3. (a)
4. (b) Dentist makes use of concave mirror. The image formed by a concave mirror is virtual, erect and magnified if the object is placed very close to the mirror.
5. (d) Snow reflects back sunlight which may cause problem for skiers
6. (c)
7. (c) In a plane mirror the image is formed as far behind the mirror as the object is in front of it. The size of image is same as that of the object.
8. (b) It acts as a convex mirror.
9. (d)
10. (a)
11. (d)
12. (a) Since the shiny aluminum foil is pasted on the outer surface of the ball, this behaves like a convex mirror.
13. (b)
14. (c)
15. (b)
16. (c)
17. (a)
18. (d)
19. (b)
20. (b)
21. (b)
22. (a)
23. (d) Different constituents of white light have different wavelengths. So, they travel with

different speeds after refraction, though they are traveling with the same speed in air.

- 24.** (c) The inclined surfaces of the triangular prism makes the emergent ray bend at angle to the direction of the incident ray. The angle between the incident ray produced and the emergent ray produced is called the angle of deviation.

**25.** (c)

**26.** (c)

**27.** (b)

**28.** (b)

**29.** (b)

**30.** (c)

**31.** (c)

#### Match the Column

**32.** (b)

**33.** (c)

#### Passage Based Questions

- 34.** (c) White light is composed of seven colours. The seven colours together join to form white light again.

**35.** (d) White light is made up of lights of seven colors-violets, indigo, blue, green, yellow, orange and red.

**36.** (d)

**37.** (d) The outer surface of spoon acts like a convex mirror.

**38.** (a) It acts like a concave mirror.

**39.** (a) It is virtual, erect and magnified.

#### Assertion/Reason Based Questions

**40.** (c)

**41.** (b)

**42.** (c)

**43.** (c) Convex mirror diverges light over a large area than by the plane mirror.

**44.** (d)

**45.** (d)

#### Statement Based Questions

**46.** (a)

**47.** (c)

#### Figure Based Questions

**48.** (c)

**49.** (a)

**50.** (a) By drawing a normal, we find that the angle of incidence  $= \frac{80^\circ}{2} = 40^\circ$

**51.** (a) A converging lens will cause rays of light to bend towards the principal axis after passing through the lens. Only A shows the rays of light bending inwards towards the principal axis.

**52.** (c) The rays of light should appear to be coming from the image, which is on the other side of the mirror. Drawing the image in the plane mirror will allow you to see the correct ray diagram.