

Class 10 - Human Eye and the colourful world important mcqs- cbsephysics.com

[Answers are highlighted as bold]

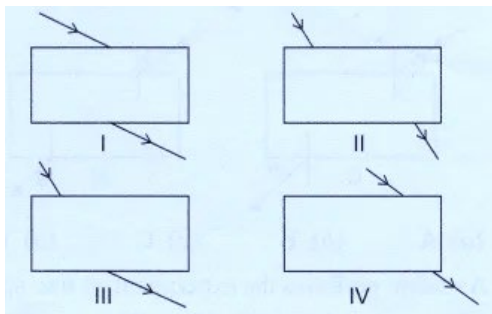
Q1. The clear sky appears blue because-

- A. Violet and blue lights get scattered more than lights of all other colours by the atmosphere
- B. Ultraviolet radiations are absorbed in the atmosphere
- C. Blue light gets absorbed in the atmosphere
- D. Light of all other colours is scattered more than the violet and blue colour lights by the atmosphere

Q2. Which of the following statements is correct regarding the propagation of light of different colours of white light in a dispersive medium?

- A. Red light moves fastest
- B. Yellow light moves with the mean speed as that of the red and the violet light
- C. All the colours of the white light move at the same speed
- D. Blue light moves faster than green light

Q3. Four students showed the following traces of the path of a ray of light passing through a rectangular glass slab.



The trace most likely to be correct is that of student:

Answer: IV

Q4. Twinkling of stars is due to atmospheric -

- (a) refraction of light by different layers of varying refractive indices
- (b) dispersion of light by water droplets
- (c) internal reflection of light by clouds
- (d) scattering of light by dust particles

Q.5 In an experiment to trace the path of a ray of light passing through a rectangular glass slab, four students tabulated their observations as given below:

Students	A	B	C	D
$\angle i$	30°	30°	30° ,	30° ,
$\angle r$	18°	20°	17°	21.5°
$\angle e$	32°	32.5°	30°	34.5°

Which student performed the experiment correctly?

Answer: C

Q6. Assertion: Sun appears reddish in the morning. It will not be observed on moon.

Reason: It is because the moon does not have an atmosphere. Therefore, the light will not scatter.

Q7. Assertion: The molecules of air and fine particles of atmosphere have size smaller than wavelength of visible light.

Reason: Blue light is scattered more than red light because red light has 1-8 times higher wavelength than blue light.

Q8. When white light enters a prism, it gets split into its constituent colours. This is due to

- (a) prism material having high density.
- (b) each colours have the same velocity in the prism.
- (c) different refractive index for the different wavelengths of each colour.
- (d) Scattering of light

Q9. Morning sun is not so hot as the mid-day sun because -

- (a) Sun is cooler in the morning
- (b) Heat rays travel slowly in the morning
- (c) Sun rays incident obliquely in the morning.
- (d) The sun's rays travel a longer distance through the atmosphere in the morning.

Q10. Which of these is true about the prism?

- (A) It transmits light.
- (B) It refracts the light passing through it.
- (C) B and D option is correct
- (D) It splits the light passing through it.

Q11. What happens when white light is passed through a hollow prism?

- (A) Deviation but not dispersion.
- (B) Dispersion but no deviation.
- (C) Both dispersion and deviation.
- (D) None of these.

Q12. Which colour will deviate maximum in the spectrum of white light?

- (A) Red (B) Green
(C) Yellow (D) Violet

Q13. The optical center is -

- (A) Imaginary line joining two centers of curvature.
(B) Centres of two imaginary spheres of which lens is a part.
(C) **Centre point of a lens.**
(D) Any point in the principal axis.

Q14. The colour of scattered light depends on -

- (A) Size of scattering particles
(C) Tyndall Effect
(B) **Wavelength of light**
(D) None of these

Q15. How is a spherical mirror made?

- (A) From cut portion of a sphere of metal
(C) From cut portion of a sphere of glass
(B) From cut portion of a sphere of plastic
(D) **From cut portion of hollow sphere of glass.**

Q16. The focal length of a plane mirror is -

- (A) Infinite (B) Zero (C) + 25 (D) -25.

Q17. Arrange air, glass and water in terms of descending order of the refractive index.

- (A) Air > Water > Glass (B) **Glas > Water > Air**
(C) Water > Air > Glass (D) Glass > Air > Water

Q18. The focal length of a concave mirror with radius of curvature 12 cm is -

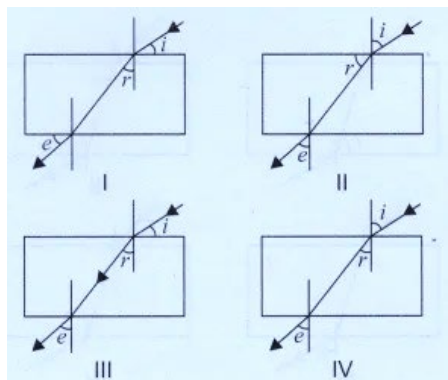
- (A) 6 cm (B) **- 6 cm**

Q19. A student performs the experiment on tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. He measures the angle of incidence $\angle i$, angle of refraction $\angle r$, and angle of emergence $\angle e$ for all his observations. He would find that in all cases

- (a) $\angle i$ is more than $\angle r$ but (nearly) equal to $\angle e$
(b) $\angle i$ is less than $\angle r$ but (nearly) equal to $\angle e$

- (c) $\angle i$ is more than $\angle e$ but (nearly) equal to $\angle r$
- (d) $\angle i$ is less than $\angle e$ but (nearly) equal to $\angle r$

Q19. The path of a ray of light passing through a rectangular glass slab was traced and angled measured. Which one out of the following is the correct representation of an angle of incidence (i), angle of refraction (r), and angle of emergence (e) as shown in the diagrams:



The trace most likely to be correct is that of student:

- (a) I (b) II (c) III (d) IV

Q20. An experiment to trace the path of a ray of light through a glass was performed by four students A, B, C and D. They reported the following measurements of angle of incidence i , angle of refraction r , and angle of emergence e .

Student	$\angle i$	$\angle r$	$\angle e$
A	40°	40°	20°
B	41°	50°	41°
C	40°	30°	48°
D	40°	30°	40°

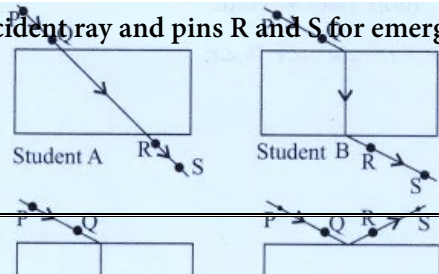
Which student experimented correctly?

- (a) A (b) B (c) C (d) D

Q21. A ray of light enters air from water and experiences refraction, then

- (a) $\angle i = \angle r$ (b) $\angle i < \angle r$
- (c) $\angle i > \angle r$ (d) $\angle i = \angle r = 0^\circ$.

Q22. Four students A, B, C and D, traced the paths of the incident ray and the emergent ray by fixing pins P and Q for incident ray and pins R and S for emergent ray for a ray of light passing through a glass slab.



Which student traced the correct emergent ray:

- (a) A (b) **B** (c) C (d) D

Q23. Choose the correct answer from the following.

Coin placed in a bowl when seen from a place just disappears. When water is poured into the bowl without disturbing the coin, the coin

- (a) Will not be seen
(b) It appears above the water surface
(c) It appears very much deep inside the water
(d) **Becomes visible again**

Q24. The nature of the image formed by a convex mirror is -

- (a) Real, inverted, diminished
(b) Real, inverted, enlarged
(c) **Virtual, erect, diminished**
(d) Virtual, erect, enlarged

Q24. The property of a mirror used in burning a paper is -

- (a) **Rays from an object placed at a large distance in a concave mirror after reflection forms the image at the Focus**
(b) Rays from an object placed at a large distance in a convex mirror after reflection forms the image at the Focus
(c) Rays from an object placed at Focus after reflection in a concave mirror forms the image at a very large distance.
(d) Rays from an object placed between F and 2F in a concave mirror after reflection forms the image beyond the Focus

Q25. The focal length of a concave mirror is 10cm. The position of the object that is useful for getting an enlarged image that can be caught on a screen is -

- (a) Placed at a distance of 5 cm. from the pole of the mirror
(b) **Placed at a distance of 15 cm from the pole of the mirror**
(c) Placed at a distance of 35 cm from the pole of the mirror
(d) Placed at a distance of 5 cm from the pole of the mirror

Q26. The power of a lens is -3.5D. The lens is

- (a) Convex
(b) **concave**

- (c) Plano-convex
- (d) Plano-concave

Q27. The formula to find the refractive index of a medium is =

- (a) $n = \text{speed of light in the medium} / \text{speed of light in air}$
- (b) $n = 1 / \text{speed of light in air}$
- (c) **$n = \text{speed of light in the air} / \text{speed of light in the medium}$**
- (d) $n = 1 / \text{speed of light in the medium}$

Q28. In case of refraction through a glass slab -

- (a) The incident ray is parallel to the refracted ray
- (b) The angle of incidence is equal to the angle of refraction
- (c) **The incident ray is parallel to the emergent ray**
- (d) The angle of refraction is equal to the angle of emergence

Q29. A mirror that can be chosen to view a tall building in a small mirror is

- (a) Plane mirror
- (b) **Convex mirror**
- (c) Concave mirror
- (d) Plano-Convex mirror

Q30. The mirror formula is-

- (a) $1/v - 1/u = 1/f$
- (b) $M = v/u$
- (c) **$1/v + 1/u = 1/f$**
- (d) $M = h/h'$

Q31. The mirror used by ENT specialists is -

- (a) Plane mirror
- (b) **Concave mirror**
- (c) Convex mirror
- (d) Plano-convex mirror

Q32. A student obtained a blurred image of an illuminated distant tower on a screen by using a convex lens. In order to obtain a sharp image of the tower on the screen; he must shift the lens -

- (a) **towards the screen**
- (b) away from the screen
- (c) away from the lens
- (d) either towards away or near the screen

Q33. An object AB is placed in front of a convex lens at its principal focus. The image will be formed at

- (a) focus

- (b) beyond C
- (c) Between F & C
- (d) infinity

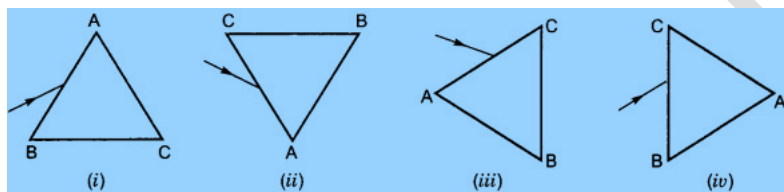
Q34. When an object moves closer to a concave lens, the image formed by it shifts

- (a) Away from the lens
- (b) Towards the lens
- (c) First away and then towards the lens
- (d) First towards and then away from the lens

Q35. When a ray of light passes from a denser medium to a relatively denser medium which angle is greater

- (a) angle of incidence
- (b) angle of refraction
- (c) none
- (d) both

Q36. A prism ABC (with BC as a base) is placed in different orientations. A narrow beam of white light is incident on the prism as shown in the Figures given below. In which of the following cases, after dispersion, the third colour from the top corresponds to the colour of the sky?



- (a) (i) (b) (ii) (c) (iii) (d) (iv)

Q37. At noon the sun appears white as

- (a) light is least scattered.
- (b) all the colours of the white light are scattered away.
- (c) the blue colour is scattered the most.
- (d) red colour is scattered the most.

Q38. The twinkling of stars is due to atmospheric

- (a) dispersion of light by water droplets
- (b) refraction of light by different layers of varying refractive indices
- (c) scattering of light by dust particles
- (d) internal reflection of light by clouds

Q39. The moon sky appears dark because -

- (a) blue light gets absorbed in the atmosphere.

- (b) ultraviolet radiations are absorbed in the atmosphere.
- (c) violet and blue lights get scattered more than lights of all other colours by the atmosphere.
- (d) No scattering is happening in the moon.

Q40. Which of the following statements is correct regarding the propagation of light of different colours of white light in the air?

- (a) Red light moves fastest.
- (b) Blue light moves faster than green light.
- (c) All the colours of the white light move at the same speed.
- (d) Yellow light moves with the mean speed as that of the red and the violet light.

Q41. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because, among all other colours, the red light

- (a) is scattered the most by smoke or fog.
- (b) is scattered the least by smoke or fog.
- (c) is absorbed the most by smoke or fog.
- (d) moves fastest in air.

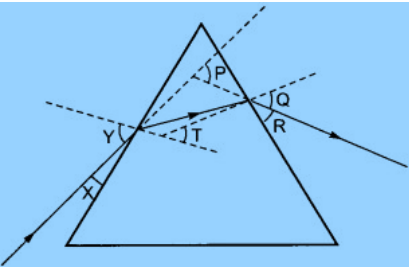
Q42. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset?

- (a) Dispersion of light
- (b) **Scattering of light**
- (c) Total internal reflection of light
- (d) Atmospheric refraction

Q43. A student traces the path of a ray through a glass prism for four different values of angle of incidence. On analyzing the diagrams, he is likely to conclude that the emergent ray -

- (a) is always parallel to the incident ray.
- (b) is always perpendicular to the incident ray.
- (c) is always parallel to the refracted ray.
- (d) always bends at an angle to the direction of the incident ray.

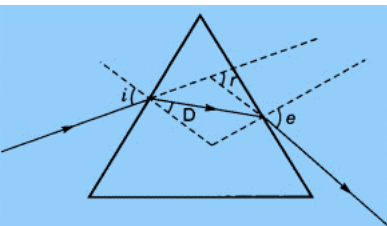
Q44. In the following diagram, the path of a ray of light passing through a glass prism is shown



In this diagram, the angle of incidence, the angle of emergence, and the angle of deviation, respectively, are (select the correct option):

- (a) X, R, and T
- (b) Y, Q, and T
- (c) X, Q, and P
- (d) Y, Q, and P

Q45. After tracing the path of a ray of light through a glass prism, a student marked the angle of incidence ($\angle i$), angle of refraction ($\angle r$), angle of emergence ($\angle e$), and the angle of deviation ($\angle D$) as shown in the diagram. The correctly marked angles are:



- (a) $\angle i$ and $\angle r$
- (b) $\angle i$ and $\angle e$
- (c) $\angle i$, $\angle e$ and $\angle D$
- (d) $\angle i$, $\angle r$ and $\angle e$

Q46. The Scattering of light by dust particles is called -

- (a) refraction
- (b) refraction
- (c) dispersion
- (d) Tyndall effect

Q47. When light passes through a diamond, it splits into different colours. This is an example of:

- (A) Reflection
- (B) Dispersion

(C) Refraction (D) Both B and C

Q48. The laws of reflection hold true for:

- (A) Plane mirrors only (B) Concave mirrors only
(C) Convex mirrors only (D) All reflecting surfaces

Q49. When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is:

- (A) Real and Inverted
(B) Virtual and inverted
(C) Virtual and erect
(D) None of the above

Q50. Which of the following statements is true?

- (A) A convex lens has 4 dioptre power having a focal length of 0.25 m
(B) A convex lens has - 4 dioptre power having a focal length of 0.25 m
(C) A concave lens has 4 dioptre power having a focal length of 0.25 m
(D) A concave lens has - 4 diopter power having a focal length of 0.25 m

Q51. In torches, searchlights, and headlights of vehicles, the bulb is placed -

- (A) Between the pole and the focus of the reflector.
(B) Very near to the focus of the reflector.
(C) Between the focus and centre of curvature of the reflector.
(D) At the centre of curvature of the reflector.

Q52. Which of the following can make a parallel beam of light when light from a point source is incident on it?

- (A) Concave mirror as well as a convex lens
(B) Convex mirror as well as a concave lens
(C) Two plane mirrors placed at 90° to each other
(D) Concave mirror as well as a concave lens.

Q53. The refraction of light is not possible under which of these conditions -

- I. The angle of incidence is zero
II. two media have the same refractive index.

III. the refractive index is higher than 3.0.

Q54. The band of color formed from a light passing through a prism is called-

- (A) Space (B) Spectrum
(C) Reflection (D) Refraction

Q55. Which of the following statements is correct about white light constituents based on the above observations (Prism experiment) ?

- (A) White light consists of seven colours.
(B) Violet colour suffers minimum deviation
(C) Red light suffers maximum deviation.
(D) All the colors of the white light move at the same speed in the air.

Q56. What happens to a beam of white light when it gets refracted through a glass prism?

- (A) The white light splits into seven colours
(B) Different colours of white light bend through different angles
(C) Colours disappear, and again white light is obtained.
(D) Both (A) and (B)

Q57. Which term is used to refer the angle between two refracting surfaces of a prism?

- (A) Angle of Prism
(C) Deviation
(B) Emergence
(D) Incidence

Q58. The danger signals installed at the top of tall buildings are red in color. These can be easily seen from a distance because among all other colours, the red light -

- (A) Is scattered the most by smoke or fog.
(B) Is scattered the least by smoke or fog.
(C) Is absorbed the most by smoke or fog.
(D) Can move slower in air.

Q59. The bluish colour of water in deep sea is due to -

- (A) The presence of algae and other plants found in water.
(B) Reflection of sky in the water.

(C) Scattering of light.

(D) Absorption of light by the sea.

Q60. The light changes its path as its medium changes. Which of the following is an incorrect statement?

(A) Speed of light is different in different media.

(B) Light changes its path because light rays are deflected.

(C) Speed of light is dependent on the medium through which it is passing.

(D) The light chooses the path with minimum time as it changes its medium.

Q61. Given, the velocity of light in air is 3×10^8 m/s, and the velocity of light in a medium is 1.5×10^8 m/s. What is the refractive index of this medium?

(A) 2

(C) 5

(B) 3

(D) 0.5

Q62. A student focuses the image of a candle flame, placed at about 2 m from a convex lens of focal length 10 cm, on a screen. After that, he moves the flame gradually toward the lens, and each time focuses its image on the screen.

In which direction does he move the lens to focus the -flame on the screen?

(A) Away from the screen (B) Towards the screen

(C) Should not move the screen (D) Toward the candle

Q63. Suppose you have focussed the image of candle flame on a screen placed at the farthest end of the laboratory table using a convex lens. If your teacher suggests you focus the parallel ray of sun, reaching your laboratory table, on the same screen, what experiment will you do?:

(A) Lens slightly towards the screen (B) Lens slightly away from the screen

(C) Lens slightly towards the sun (D) Lens and screen both towards the sun

Q64. In nature, which phenomenon is caused by dispersion of light -

(A) Formation of a rainbow. (B) twinkling of stars

(C) Blue colour of sky (D) Advance sunrise

Q65. The focal length of a convex lens is not affected by -

- (A) Refractive index of the material for making the lens
- (B) Material of the lens
- (C) Object distance**
- (D) Thickness of the lens

Q66. At noon the sun appears white as -

- (A) Light is least scattered.**
- (B) All the colors of the white light are scattered away.
- (C) Blue colour is scattered the most.
- (D) Red colour is scattered the least.

Q67. The twinkling of stars is due to atmospheric -

- (A) Dispersion of light by water droplets
- (B) Refraction of light by different layers of varying refractive indices**
- (C) scattering of light by dust particles
- (D) Internal reflection of light by clouds

Q68. Light travel fastest in -

- (A) Air
- (B) Vacuum**
- (D) diamond
- (C) Glass

Q69. Which of the following phenomena of light are involved in the formation of a rainbow?

- (A) Reflection, refraction, and dispersion
- (B) Refraction, dispersion, and total internal reflection
- (C) Refraction, dispersion, and internal reflection**
- (D) Dispersion, Scattering and total internal reflection

Q70. In the case of a virtual and erect image, the magnification of a mirror is -

- (A) positive
- (B) negative
- (C) None of the above
- (D) infinity

Q71. Which of these is the unit of magnification?

- (A) m
- (C) m-1
- (B) m²
- (D) no unit

Q72. Which of the following statement is false for the formation of images by the convex lens ?

- (A) It forms real, inverted, and diminished images.
- (B) It forms a virtual erect and enlarged image.
- (C) It forms a virtual, erect, and diminished image.
- (D) It forms a real, inverted and enlarged image.

Q73. The twinkling of stars on a clear night is due to:

- (A) Reflection of light
- (B) Atmospheric refraction
- (C) Scattering of Light
- (D) Both (A) and (B)

Q74. Rays from the sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed, so that size of its image is equal to the size of the object ?

- (A) 15 cm in front of the mirror
- (B) 30 cm in front of the mirror
- (C) Between 15 cm and 30 cm in front of the mirror
- (D) More than 30cm in front of the mirror

Q75. Assertion: There is no dispersion of light refracted through a rectangular glass slab.

Reason: Dispersion of light is the phenomenon of splitting a beam of white light into its constituent colours.

Answer: B - Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion

Q76. A virtual image formed by a concave mirror is:

- (A) Erect and enlarged
- (C) inverted and diminished
- (B) Erect and diminished
- (D) Inverted and enlarged.

Q77. The factors on which the deviation angle produced by the prism depends on:

- I. Angle of incidence

11. Material of prism

III. Angle of prism

IV. Colour of light

- (A) I and II only
- (B) I, II, and IV only
- (B) I, II and III only
- (D) All of these

Q78. Which property of light is related to its wavelength?

- (A) Colour of light
- (B) Speed of Light
- (C) Frequency of light
- (D) None of these

Q79. A mirror has a focal length of +15 cm. What is the type of mirror?

- (A) Convex mirror
- (B) Plane mirror
- (C) Concave mirror
- (D) None of these

Q80. When a convergent beam of light is incident on a plane mirror, then the image formed is -

- (A) Upright and real
- (B) Upright and virtual
- (C) Inverted and virtual
- (D) Inverted and real

Q81. Which of these quantities remains constant during the refraction of light?

- (A) Wavelength
- (B) Speed
- (C) Frequency
- (D) Velocity

Q82. In the case of a concave mirror, the distance between a real object and its real image when the object is placed at the centre of curvature is :

- (A) f
- (C) infinity
- (B) $2f$
- (D) zero

Q83. When an object of size 10 cm is placed at a distance of 15 cm from a concave mirror of focal length 10 cm, the position, nature and size of the image formed will be

- (A) On the left side, 30 cm, real, inverted and magnified
- (B) On the left side, 20 cm, virtual, upright and diminished
- (C) On the right side, 30 cm, real, inverted and magnified
- (D) On the right side, 20 cm, virtual, upright and diminished

Q84. choose the correct statement regarding the propagation of light of different colours of white light in the air?

- (A) Red light moves fastest
- (B) Blue light moves faster than green light
- (C) All the colours of the white light move at the same speed
- (D) None of the above

Q85. In which of these cases is a real image equal in size to the object?

- (A) When an object is placed at the centre of curvature in front of a concave mirror.
- (B) When an object is placed at the centre of curvature in front of a plane mirror.
- (C) When an object is placed at the centre of curvature in front of a convex mirror
- (D) None of these

Q86. Choose the incorrect statement.

- (A) A concave mirror can give a virtual image
- (B) A convex mirror can give a virtual image
- (C) A convex lens can give a virtual image.
- (D) All of these