



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

OPTICS

Textual Solved Problems

1. Light rays travel from vacuum into glass whose refractive index is 1.5 If the angle of incidence is 30° calculate the angle of refraction inside the glass.



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2. A beam of light passing through a diverging lens of focal length 0.3 m appear to be focused at a distance 0.2 m behind the lens. Find the position of the object.

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3. A person with myopia can see objects placed at a distance of 4 m. if he wants to see objects at a distance of 20 m, what should be the focal length and power of the concave lens he must wear?

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4. For a person with hypermetropia, the near point has moved to 1.5 m. calculate the focal length of the correction

lens in order to make his eyes normal.



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Textual Evaluation | Choose The Correct Answer

1. The refractive index of four substance A,B, C and D are 1.31, 1.43 , 1.33 , 2.4 respectively . The speed of light is maximum in

A. A

B. B

C. C

D. D

Answer: A



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2. Where should an object be placed so that a real and inverted image of same size is obtained by a convex lens.

A. f

B. $2f$

C. infinity

D. between f and $2f$

Answer: B



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3. A small bulb is placed at the principal focus of a convex lens. When the bulb is switched on, the lens will produce.

- A. a convergent beam of light
- B. a divergent beam of light
- C. a parallel beam of light
- D. a coloured beam of light

Answer: C



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4. Magnification of a convex lens is

- A. positive
- B. negative
- C. either positive or negative
- D. zero

Answer: B



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5. A convex lens forms a real, diminished point sized image on focus. Then the position of the object is at

A. focus

B. infinity

C. at f

D. between f and $2f$

Answer: B



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6. Power of a lens is $-4D$, then its focal length is

A. $4m$

B. $-40m$

C. $-0.25m$

D. $-2.5m$

Answer: C



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7. In a myopic eye, the image of the object is formed

A. behind the retina

B. on the retina

C. in front of the retina

D. on the blind spot

Answer: C



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8. The eye defect 'presbyopia ' can be corrected by

A. convex lens

B. concave lens

C. convex mirror

D. bi focal lenses

Answer: D



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9. Which of the following lens would you prefer to use while reading small letters found in a dictionary?

- A. A convex lens of focal length 5cm
- B. A concave lens of focal length 5 cm
- C. A convex lens of focal length 10 cm
- D. A concave lens of focal length 10 cm

Answer: C



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10. If V_B, V_G, V_R be the velocity of blue, green and red light respectively in a glass prism, then which of the following

statement gives, the correct relation ?

A. $V_B = V_G = V_R$

B. $V_B > V_G > V_R$

C. $V_B < V_G < V_R$

D. $V_B < V_G > V_R$

Answer: C



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Textual Evaluation li Fill In The Blanks

1. The path of the light is called as _____.



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2. The refractive index of a transparent medium is always greater than _____.

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3. If the energy of incident beam and the scattered beam are same, then the scattering of light is called as _____.

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4. According to Rayleigh's law, the amount of scattering of light is inversely proportional to the fourth power of its _____.

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5. Amount of light entering into the eye is controlled by _____.

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Textual Evaluation iii True Or False If False Correct It

1. Velocity of light is greater in denser medium than in rarer medium.

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2. The power of lens depends on the focal length of the lens

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3. Increase in the converging power of eye lens cause 'hypermetropia'.



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4. The convex lens always gives small virtual image.



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Textual Evaluation Iv Match The Following

1. Match the following

- | | | |
|--------------------|---|----------------------------|
| 1. Retina | — | (a) Path way of light |
| 2. Pupil | — | (b) Far point comes closer |
| 3. Ciliary muscles | — | (c) Near point moves away |
| 4. Myopia | — | (d) Screen of the eye |
| 5. Hypermetropia | — | (f) Power of accommodation |



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Textual Evaluation V Assertion And Reasoning Type

1. Assertion : If the refractive index of the medium is high (denser medium) the velocity of the light. In that medium will be small.

Reason : Refractive index of the medium is inversely proportional to the velocity of the light.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. Assertion is true but reason is false.

D. Assertion is false but reason is true.

Answer: A

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2. Assertion : Myopia is due to the increase in the converging power of eye lens.

Reason : Myopia can be correct with the help of concave lens.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false.

D. Assertion is false but reason is true.

Answer:

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Textual Evaluation Vi Answer Briefly

1. What is refractive index ?

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2. State Snell's law.

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3. Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and $2F$.

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4. Define dispersion of light.

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5. What is meant by Rayleigh scattering.

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6. Differentiate convex lens and concave lens.

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7. What is power of accommodation of eye?



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8. What are the causes of Myopia?



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9. Why does sky appear blue?



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10. Why are traffic signals red in colour?

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Textual Evaluation Vii Give The Answer In Detail

1. List any five properties of light.

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2. Explain the rules for obtaining images formed by a convex lens with the help of ray diagram.

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3. Differentiate the eye defects : Myopia and Hypermetropia .

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4. Explain the construction and working of a 'Compound Microscope'.

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Textual Evaluation Viii Numerical Problems

1. An object is placed at a distance 20 cm from a convex lens of focal length 10 cm . Find the image distance and nature of the image .

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2. An object of height 3 cm is placed at 10 cm from a concave lens of focal length 15 cm. find the size of the image.

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Textual Evaluation Ix Higher Order Thinking Hot Questions

1. While doing an experiment for the determination of focal length of a convex lens, Raja Suddenly dropped the lens. It got broken into two halves along the axis. If he continues his experiment with the same lens,

(a) can he get the image?

(b) is there any change in the focal length?

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2. The eye of the nocturnal birds like owl are having a large cornea and a large pupil. How does it help them ?



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Additional Questions I Choose The Correct Answer

1. The speed of light in vaccum is _____ ms^{-1} .

A. $3 \times 10^{-8}ms^{-1}$

B. $3 \times 10^8ms^{-1}$

C. $3 \times 10^8ms^{-1}s$

D. $3 \times 10^{-18}ms^{-1}$

Answer: B



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2. Mie scattering is responsible for the Apperance of the clouds.

A. red

B. blue

C. colourless

D. white

Answer: D



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3. Which is the following is not an axample of colloid

- A. milk
- B. ice - cream
- C. pure water
- D. smoke

Answer: C



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4. The band of colours is termed as _____ .

- A. monochromatic source
- B. composite light
- C. spectrum
- D. dispersion of light

Answer: C



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5. The refractive index of a medium is dependent on the

_____ .

A. wavelength

B. strength

C. density

D. refraction

Answer: A



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6. scattering takes place when the diameter of the scatterer is similar to or larger than the wavelength of the incident light.

A. Rayleigh

B. Tyndall

C. Mie

D. Raman

Answer: C



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7. The colour of the sun is red at sunrise and sunset . This occurs due to

A. Rayleigh

B. Mie

C. Tyndall

D. Raman

Answer: A



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8. The energy of incident and scattered beam of light are not same, that scattering is called ____.

A. elastic

B. raman

C. inelastic

D. mie

Answer: C



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9. If one of the focus of a bi-convex lens is plane, it is known as a _____ .

- A. convex lens
- B. plano - convex lens
- C. concave lens
- D. plano - convex lens

Answer: B



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10. The spectral lines having frequency equal to the incident ray frequency is called _____ .

- A. Spectral lines
- B. Raman lines
- C. Colour lines
- D. Rayleigh lines

Answer: D



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11. The object is always placed on _____ side of the lens.

A. left

B. right

C. top

D. bottom

Answer: A



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12. Magnification of a convex lens is

A. positive

B. negative

C. either positive negative

D. zero

Answer: B



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13. Where should an object be placed so that a real and inverted image of same size is obtained by a convex lens.

A. $2F$

B. O

C. F

D. $> 2F$

Answer: C



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14. All the distances are measured from the Of the lens.

A. center of curvature

B. optical centre

C. principak focus

D. infinty

Answer: B



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15. Lens formula is

A. $m = \frac{h}{h}$

B. $m = \frac{v}{u}$

C. $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

D.

Answer: D



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16. Power of a lens is numerically defined as the reciprocal of its _____ .

A. wavelength

B. frequency

C. focal length

D. refractive index

Answer: C



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17. Eye lens is _____ in nature.

A. convex

B. concave

C. transparent glass

D. plano - concave

Answer: A



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18. Astigmatism is corrected using

A. convex

B. concave

C. cylindrical

D. bifocal

Answer: C



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19. The least distance of distinct vision is _____ .

A. 30 cm

B. 25 cm

C. 35 cm

D. infinty

Answer: B



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20. _____ is the centre part of the iris.

A. pupil

B. retina

C. pupil

D. eye lens

Answer: C



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1. The interacting particles of the medium is called as _____.



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2. When white light pass through transparent medium, it is split into colours is called dispersion.



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3. The speed of light in a medium is high if the refractive index of the medium is



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4. The spectral lines which are having frequencies other than the incident ray frequency are called _____ .



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5. lenses are used to correct the defect of vision called hypermeteropia.



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6. _____ lenses are used as eye lens of 'Galilean Telescope'



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7. By convention , the power of a convex lens is taken as
whereas the power of a concave lens is taken as

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8. The diameter of eye ball in our eye is _____.

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9. Is achieved by changing the focal length of the lens
with the help of ciliary muscles.

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10. _____ is the coloured portion of the eye.



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11. is used to observe parts of flower , insects and finger prints in the field of forensic science.



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12. A _____ microscope works based on the principle of vernier.



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13. An Telescope is used to view heavenly bodies like strars , planets galaxies and satellites

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14. _____ is an optical instrument used to see distant objects.

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15. Is the most sensitive part of human eye.

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16. A convex lens is in the middle than at edges



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17. Lens produces mostly real images.



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18. Unit of power is _____ .



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19. The amount of scattering of light is inversely proportional to the _____ power of its wavelength.



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20. The refractive index of a medium is dependent on the
----- .

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Additional Questions Iii True Or False If False Correct It

1. Light is a form of energy and it travels in a straight line.

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2. The incident ray , the refracted ray of light and the normal
to the refracting surface all lie in the different plane .



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3. The angle of refraction is same for different colours.



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4. The scattering of light rays by the colloidal solution is called Tyndall effect.



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5. Convex lens is also called as _____ lens.



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6. Convex lenses are used in making microscope , telescope and slide projectors.



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7. The distances measured against the direction of incident light are taken as negative .



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8. _____ lenses are used as wide angle spy hole in doors.



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9. If the magnification is less than 1 , then we get a diminished image .

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10. Compound microscope has 50 to 200 times more magnification power than simple microscope.

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[Additional Questions Iv Match The Following](#)

1. Match the following

- | | | |
|------------------------|---|---|
| 1. Snell's law | – | (a) 25cm |
| 2. Rayleigh scattering | – | (b) Diverging lens |
| 3. Mie scattering | – | (c) converging lens |
| 4. Bi - Convex lens | – | (d) Front surface of an eye ball |
| 5. Bi - concave lens | – | (f) Infinity |
| 6. Cornea | – | (g) The sky to appear in blue colour |
| 7. Near point of eye | – | (h) $\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$ |
| 8. Far point of eye | – | (i) White appearance of the clouds |
| 9. Presbyopia | – | (j) Torrid lenses |
| 10. Astigmatism | – | (k) Bifocal lenses |



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Additional Questions V Assertion And Reasoning Type

1. Assertion : The refractive index of the medium is different for different coloured lights.

Reason : The refractive index of a medium is dependent on the wavelength of the light.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false.
- D. Assertion is false but reason is true.

Answer: A



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2. Assertion : A parallel beam of light passing through the concave lens , is diverged or spread out

Reason : A convex lens is also called as diverging lens.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false.
- D. Assertion is false but reason is true.

Answer: C



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3. Assertion : Magnification power of microscopes can be decreased by increasing the focal length of the lens used.

Reason : Due to constructional limitations , the focal length of lens cannot be decreased beyond certain unit.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false.
- D. Assertion is false but reason is true.

Answer: D



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Additional Questions Vi Answer Briefly

1. Why do clouds appear white?

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2. Define Raman scattering.

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3. Differentiate stokes line and antistokes lines.

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4. What is meant by colloid ?



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5. What are the applications of convex lens ?



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6. Write the lens Formula.



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7. What are the applications of convace lens?



[Watch Video Solution](#)

8. Write the uses of simple microscope .



[Watch Video Solution](#)

9. Define power.



[Watch Video Solution](#)

10. Define Magnification of a lens.



[Watch Video Solution](#)

11. Write the lens Formula.



[Watch Video Solution](#)

12. Based on initial and final energy of the light beam , classify the scattering.

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13. Based on nature and size of the scatter. Classify the scattering.

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14. The colour of the sun is reddish during the sun rise and sunset. Explain why ?

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15. Write the disadvantage of telescope.



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Additional Questions Vii Give The Answer In Detail

1. State the laws of refraction



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2. Name and explain the type of scattering .



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3. Explain Mie Scattering.



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