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PHYSICS

BOOKS - CHETAN PHYSICS (TAMIL ENGLISH)

LENSES

Fill In The Blancks

1. The focal length of .....lens is positive.

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2. In hypermetropia, the image is formed ..... the retina.

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3. The power of myopic eye is .....

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4. The defect of myopia can be corrected by using _____ .

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5. The ..... is the distance between optical centre and principal focus.

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6. The ability of a lens to converge and diverge is called as its _____ .

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7. The power of convex lens with focal length 40 cm is .....

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8. The lens with ..... power is used to correct farsightedness.

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9. The least distance of distinct vision is _____ .

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10. Impression of an image lasts on the retina for $\frac{1}{10}$ the of a second.

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11. The light enter the eye through .....

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12. An optical device used by watch repairers is .....

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13. The focal length of a healthy eye in relaxed position is .....

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14. The ..... cells are responsible for the perception of colours.

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15. The power of convex lens is 0.5D. Hence, its focal length is .....

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16. The image of the object at ..... is on the principal focus.

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17. The image formed by ..... is always virtual

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18. The tendency of pupil to adjust the opening for light is called .....

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19. The diameter of eyeball is _____.

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Find The Odd Word Out

1. Cornea, iris, pupil, cerebrum.

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2. Spectacle, microscope, torch, camera.

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3. Longsightedness, myopia, short sightedness, near sightedness.

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4. Presbyopia, night blindness, myopia, hypermetropia.

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5. Compound microscope, astronomical telescope, simple microscope, flood light.

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6. Convex lens : converging , real image :: Concave lens : _____

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7.

$\text{Object at } 2F_1 : \text{ Image at } 2F_2 : : \text{ Object at } F_1$

: .....

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8. Myopia : Concave lens :: Farsightedness :.....

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9. Concave lens : Negative focal length :: convex lens .....

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10. Convex lens : Positive power :: Concave lens .....

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11. Rod cells : Sensitive to dim light :: Cone cells: .....

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12. Near point : 25cm :: Far point:.....

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Match The Columns

1.

Column A	Column B
(1) Refraction	(a) With respect to vacuum
(2) Refractive index	(b) Change in direction of light
(3) Absolute refractive index	(c) Spectrum
(4) Dispersion	(d) $\frac{\sin i}{\sin r}$
	(e) Mirage

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2. 

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3. 

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4. 

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5. 

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6. Match the following

Column A	Column B
(1) Mass	(a) m/s
(2) Weight	(b) m/s^2
(3) Acceleration	(c) kg
(4) Velocity	(d) N

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True Of False

1. A lens is an opaque object.

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2. Cornea gives colour to the eye.

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3. The light is first and maximum refracted as it passes through eye lens

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4. The perception of colours is concerned with cone cells.

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5. Auditory nerve take he impulse from eye lo brain

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6. Impression of an image lasts on the retina for $\frac{1}{10}$ the of a second.

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7. The focal length of i1 convex lens is positive.

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8. In the compound microscope, two concave lenses are used.

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Answer The Following In One Sentence

1. If the object is at infinity from a convex lens, what would be its size?

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2. Write the lens Formula.

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3. Explain the types of Telescope.

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4. Hypermeteropia is corrected by _____ lens.

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5. The defect of myopia can be corrected by using _____ .

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6. By which lens the matchstick can catch fire in the sunlight?

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7. What is persistence of vision?

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8. What is principal focus?

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9. What is focal length ?

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10. What is the distance of distinct vision?

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11. What do you mean by power of accommodation?

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12. Why do we have to bring a small object near the eyes in order to see it clearly.

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Choose And Write The Correct Option

1. What is the distance of distinct vision?

A. 15 cm

B. 20 cm

C. 25 m

D. 25 cm

Answer:

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2. The power of a convex lens of focal length 50 cm is .....

A. 2 D

B. 0.2 D

C. S0 D

D. 0.5 D

Answer:

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3. The focal length of a concave lens with power $-4D$ is .....

A. $-0.5m$

B. $0.5m$

C. $-0.25m$

D. $0.25m$

Answer:

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4. If the incident ray passes through focus, then the reflected ray is ..... to the principal axis.

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5. The image is formed on the .....of the human eye.

A. Cornea

B. Retina

C. Pupil

D. Ciliary muscle

Answer:

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6. If an object is placed between F_1 and $2F_1$ of a convex lens, then nature of the image formed is .....

A. Real and inverted

B. Real and diminished

C. Virtual, erect

D. Virtual, inverted

Answer:

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7. When a person is myopia, he/she can clearly see _____ .

A. distant

B. nearby

C. small

D. big

Answer:

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8. Hypermeteropia is corrected by _____ lens.

A. cylindrical

B. concave

C. diverging

D. converging

Answer:

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9. Convex lens of power $+5$ D and concave lens with power -3 D are placed together, then the combined power is .....

A. 5 D

B. $+3$ D

C. 2 D

D. -2D

Answer:

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10. Simple microscope consists of

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11. The perception of dim light is concerned with ..... cells.

A. Rod

B. Cone

C. Amoeboid

D. Squamous

Answer:

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12. Impression of an image lasts on the retina for $\frac{1}{10}$ the of a second.

A. dispersion

B. refraction

C. persistence of vision

D. internal reflection

Answer:

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13. The second focal point is located at ..... of a human eye.

A. Retina

B. Optic nerve

C. Cornea

D. Pupil

Answer:

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14. For a Convex lens, if the incident ray is parallel to the principle axis, then the refracted ray passes through the.....

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15. Inside water, an air bubble behaves .....

A. like a flat plate

B. like a concave lens

C. like a convex lens

D. like a concave mirror

Answer:

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16. To obtain an image of the same size as the object with the help of a convex lens, the object should be placed .....

A. at infinity

B. beyond F_1

C. between F_1 and $2F_2$

D. at $2F_1$

Answer:

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17. At what distance should a watchmaker hold his lens from the watch?

A. At the focal length

B. At less than focal length

C. At more than the focal length

D. At zero distance

Answer:

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18. When we enter a dark room, pupil of our eye ..... .

A. contracts

B. expands

C. remains same

D. none of these

Answer:

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Solve The Following

1. Use the following ray diagrams and tips for solving the numericals.

Tips:

(1) If h_2 is negative, then image is Real and Inverted (2) If h_2 is positive, then image is Virtual and Erect (3) h_1 greater thanh_2 image is diminished (4) h_1 smaller than h_2 image is magnified (5) v is positive then image is on other side of lens v is negative then image is on same side of lens. (6) f is $+ve$, it is convex lens, corrects Hypermetropia or Farsightedness (7) f is$-ve$, it is concave lens, corrects Myopia or Near Sightedness.

Type : A problems based on the formulae,

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

v = image distance

u = object distance

f = focal length

(1) An object is placed at a distance of 15 cm from a convex lens. If the focal length of the lens is 60 cm, find the image distance.

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2. An object is placed at a distance of 10 cm from a convex lens of focal length 12 cm. Find the position and nature of the image.

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3. An object kept 60 cm from a lens gives a virtual image 20 cm in front of the lens. What is the focal length of the lens? Is it a converging lens or diverging lens?

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4. Use the following ray diagrams and tips for solving the numericals.

Tips:

(1) If h_2 is negative, then image is Real and Inverted (2) If h_2 is positive, then image is Virtual and Erect (3) h_1 greater thanh_2 image is diminished (4) h_1 smaller than h_2 image is magnified (5) v is positive then image is on other side of lens v is negative then image is on same

side of lens. (6) f is $+ve$, it is convex lens, corrects Hypermetropia or Farsightedness (7) f is $-ve$, it is concave lens, corrects Myopia or Near Sightedness.

(1) An object 6 cm tall is placed in front of a convex lens at a distance of 18 cm. If the image is formed at a distance of 9 cm on the other side of lens, find the height of the image.

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5. An object is placed vertically at a distance of 20 cm from a convex lens. If the height of the object is 5 cm and the focal length of the lens is 10 cm, what will be the position, size and nature of the image? How much bigger will the image be as compared to the object?

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6. A 5 cm high object is placed at a distance of 25 cm from a converging lens of focal length of 10 cm. Determine the position, size and type of the image.

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7. The focal length of a convex lens is 20 cm. What is the power?

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8. Doctor has prescribed a lens having power $+1.5$D . What will be the focal length of the lens? What is the type of the lens and what must be the defect of vision?

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9. Calculate the focal length of a corrective lens having power $+2.5$ D .

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10. Three lenses having power 2, 2.5 and 1.7 D are kept touching in a row. What is the total power of the lens combination?

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Define The Following

1. Centres of curvatures (C)

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2. Radii of curvatures (R)

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3. What is principal axis of the mirror?

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4. Define Optical centre (O).

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5. What is principal focus?

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6. The focal length (f) of a spherical mirror of radius of curvature R is

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7. Convex lens

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8. Concave lens

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9. Real image

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10. Virtual image

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11. Converging lens

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12. Diverging lens

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13. Lens

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14. Retina

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15. Adaptation of pupil .

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16. Explain the function of iris.

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17. Pupil

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18. What is power of accomodation of eye?

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19. What is the distance of distinct vision?

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Distinguish Between

1. Farsightedness and Nearsightedness.

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2. Concave lens and Convex lens.

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3. Real image and Virtual image.

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Give Scientific Reasons

1. Simple microscope is used for watch repairs.

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2. Why is a normal eye not able to see clearly the objects placed closer than 25 cm ?

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3. Why can't we see clearly through fog? Name the phenomenon responsible for it.

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4. One can sense colours only in bright light.

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5. Convex lens is also called as _____ lens.

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6. Concave lens is also called as _____lens.

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7. You can not enjoy watching a movie or television from a very short distance from the screen.

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8. A concave lens is used to correct the defect of _____

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9. Old people sometimes use bifocal glasses.

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10. Hypermeteropia is corrected by _____ lens.

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11. Why do we have to bring a small object near the eyes in order to see it clearly.

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Answer The Following Questions

1. Explain the types of lens .

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2. Define Magnification of a lens.

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3. What is the relation between h_1, h_2, u and v.

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4. What is power of a lens?

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5. What do you mean by combined focal length?

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6. What is the use of astronomical telescope?

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7. Explain the function of iris.

Watch Video Solution

8. Write the uses of concave lens.

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9. Write the uses of convex lens.

Watch Video Solution

10. What is persistence of vision?

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11. What is colour blindness?

Watch Video Solution

12. Explain the function of iris.

Watch Video Solution

13. How do we perceive different colours?

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14. What are real and virtual images? How will you find out whether an image is real or virtual? Can a virtual image be obtained on a screen?

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15. Indicate the following terms related to spherical mirrors in figure: Poles, centre of curvature, radius of curvature, principal focus.

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16. How are concave and convex mirrors constructed?

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Draw Well Labelled Diagrams For The Following

1. A ray diagram for object position at infinity for a convex lens or convergence of rays by convex lens.

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2. A ray diagram for object position beyond $2F_1$ for a convex lens.

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3. At which position will you keep an object in front of a convex lens so as to get a real image of the same size as that of the object? Draw a figure.

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4. A ray diagram for object position at $2F_1$ for a convex lens.

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5. 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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6. A ray diagram for object positioned at F_1 for a convex lens.

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7. A ray diagram for object position between F_1 and O for a convex lens.

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8. Divergence of rays by concave lens.

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9. Ray diagrams showing images obtained by concave lens.

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10. Draw and label the structure of a human ovum.

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11. The change in the shape of the lens while seeing distant and nearby objects.

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Answer The Following In Brief

1. Draw a figure explaining various terms related to a lens.

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2. Enlist the rules for drawing ray diagrams of convex lens.

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3. What is the Cartesian sign convention used for spherical mirrors?

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4. Explain the following with the help of a diagram:

Myopia or Nearsightedness

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5. Explain the following with the help of a diagram:

Hypermetropia or Farsightedness

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6. What is 'Presbyopia ' ?

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7. Explain the following with the help of a diagram:

Compound microscope

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8. Explain the working of an astronomical telescope using refraction of light.

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Application Based Questions

1. Answer the questions based on the following diagrams:

Give two reasons for this defect.

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2. Solve and fill in the blanks

Sr. No.	Velocity of light in the first medium v_1	Velocity of light in the second medium v_2	Refractive Index ${}_2n_1$	Refractive Index ${}_1n_2$
(1)	3×10^8 m/s	1.2×10^8 m/s	.....	.....
(2)	.....	2.25×10^8 m/s	$\frac{4}{3}$	.....
(3)	2×10^8 m/s	.....	.....	1.5

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3. Selwyn is 16 yr old and wears a spectacle having a power of +2 D. Answer the following questions:

Name the eye defect he has.

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4. Selwyn is 16 yr old and wears a spectacle having a power of +2 D. Answer the following questions:

State two reasons why this defect is caused?

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5. Selwyn is 16 yr old and wears a spectacle having a power of +2 D. Answer the following questions:

Compute the focal length of his lens.

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6. Selwyn is 16 yr old and wears a spectacle having a power of +2 D. Answer the following questions:

Which lens is used by selwyn?

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7. Vijay is 16 yr old and wears a spectacle having a power of -2D. Answer the following questions:

Name his eye defect.

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8. Vijay is 16 yr old and wears a spectacle having a power of -2D. Answer the following questions:

State two reasons why this defect is caused?

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9. Vijay is 16 yr old and wears a spectacle having a power of -2D. Answer the following questions:

Compute the focal length of his lens.

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10. Ankit developed an eye defect at the age of 65 yrs and had to wear a lens of power +3D. Answer the following questions:

(a) Name the eye defect.

(b) State two reasons why this defect is caused?

(c) Compute the focal length of his lens

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11. Ankit developed an eye defect at the age of 65 yrs and had to wear a lens of power +3D. Find the focal length of the lens

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12. Ankit developed an eye defect at the age of 65 yrs and had to wear a lens of power +3D. Find the focal length of the lens

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13. 

What changes in the position of the candle should be made to obtain a virtual and enlarged image?

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14. What is the nature of image formed by concave lens?

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15. State three difference between a real and virtual image.

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16. 

(i) Label A and B in the diagram.

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17. 

Explain the functions of A

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18. Name of the two lenses A and B

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Assignment

1. The defect of myopia can be corrected by using _____ .

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2. The tendency of pupil to adjust the opening for light is called .....

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3. In simple microscope ..... lens is used.

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4. Farsightedness can be corrected by using ..... lens.

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5. The perception of dim light is concerned with ..... cells.

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6. An object is placed at a distance of 15 cm from a convex lens. If the focal length of the lens is 60 cm, find the image distance.

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7. Why is a normal eye not able to see clearly the objects placed closer than 25 cm ?

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8. Distinguish between farsightedness and nearsightedness.

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9. Draw a neat and labelled diagram of human eye.

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10. A 5 cm high object is placed at a distance of 25 cm from a converging lens of focal length of 10 cm. Determine the position, size and type of the image.

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11. Draw a neat and labelled ray diagram for convex lens. When object is beyond $2F_1$

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12. Draw a neat and labelled ray diagram for convex lens. When object is at infinity

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13. Explain the working of an astronomical telescope using refraction of light.

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14. Differentiate the eye defects : Myopia and Hypermetropia .

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