



## PHYSICS

### BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

#### LIGHT

#### Exercise I Choose The Correct Answer

1. A ray of light passes from one medium to another medium. Refraction takes place when angle of incidence is .....

A.  $0^\circ$

B.  $45^\circ$

C.  $90^\circ$

D.

**Answer: B**



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## Exercise I Choose The Correct Answer

1. .... is used as reflectors in torchlight.

- A. Concave mirror
- B. Plane mirror
- C. Convex mirror
- D.

**Answer: A**



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2. We can create enlarged, virtual images with ..... .. .

- A. Concave mirror

B. Plane mirror

C. Convex mirror

D.

**Answer: A**



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3. When the reflecting surface is curved outwards the mirror formed will be .....

A. Concave mirror

B. Plane mirror

C. Convex mirror

D.

**Answer: B**



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4. When a beam of white light passes through a prism it gets .....

- A. reflected
- B. only deviated
- C. deviated and dispersed
- D.

**Answer: A**



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5. The velocity of light is maximum in

- A. vacuum
- B. glass
- C. diamond
- D.

**Answer: A**



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## Exercise II True Or False If False Give The Correct Answer

1. The angle of deviation depends on the refractive index of the glass.



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2. If a ray of light passes obliquely from one medium to another, it does not suffer any deviation.



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3. The convex mirror always produces a virtual, diminished and erect image of the object.



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4. When an object is at the centre of curvature of concave mirror the image formed will be virtual and erect.

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5. The reason for brilliance of diamonds is total internal reflection of light.

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### Exercise iii Fill In The Blanks

1. When light travels from rarer to denser medium, the refracted ray is \_\_\_\_\_ the normal.

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2. The mirror used in search light is .....

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3. The angle of deviation of light ray in a prism depends on the angle of .....

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4. The radius of curvature of a concave mirror whose focal length is 5 cm is .....

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5. Large ..... mirrors are used to concentrate sunlight to produce heat in solar furnaces.

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## Exercise IV Match The Following

1.

- |   |                               |
|---|-------------------------------|
| 1. Ratio of height of image to height of object | (a) Concave mirror            |
| 2. Used in hairpin bends in mountains           | (b) Total internal reflection |
| 3. Coin inside water appearing slightly raised  | (c) Magnification             |
| 4. Mirage                                       | (d) Convex mirror             |
| 5. Used as Dentist's mirror                     | (e) Refraction                |



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## Exercise V Assertion Reason

1. Assertion : For observing the traffic at a hairpin bend in mountain paths a plane mirror is preferred over convex mirror and concave mirror.

Reason : A convex. mirror has a much larger field of view than a plane mirror or a concave mirror.



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

**Answer: D**



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2. Assertion : Incident ray is directed towards the centre of curvature of spherical mirror. After reflection it retraces its path.

Reason : Angle of incidence  $i =$  Angle of reflection  $r = 0^\circ$ .

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

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

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

**Answer: B**

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### Exercise VI Answer Very Briefly

1. According to Cartesian sign convention, which mirror and which lens has negative focal length?

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2. Name the mirror(s) that can give (i) an erect and enlarged image, (ii) same sized, inverted image.



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3. If an object is placed at the focus of a concave mirror, where is the image formed?



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4. Why does a ray of light bend when it travels from one medium to another?



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5. What is speed of light in vacuum?

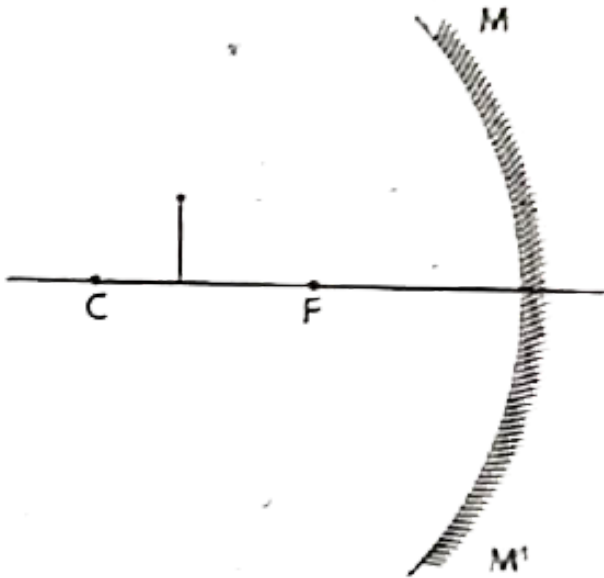


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6. Concave mirrors are used by dentists to examine teeth. why?

Exercise Vii Answer Briefly

1. (a) Complete the diagram to show how a concave mirror forms the image of the object.



- (b) What is the nature of the image?

2. Pick out the concave and convex mirrors from the following and tabulate them Rear-view mirror, Dentist's mirror, Torch-light mirror, Mirrors in shopping malls, Make-up mirror.

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3. State the direction of incident ray which after reflection from a spherical mirror retraces its path. Give reason for your answer.

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4. What is meant by magnification? Write its expression. What is its sign for real image and virtual image?

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5. Write the spherical mirror formula and explain the meaning of each symbol used in it.



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## Exercise Viii Answer In Detail

- (a) Draw ray diagrams to show how the image is formed, using a concave mirror when the position of object is (i) at C (ii) between C and F (iii) between F and P of the mirror.  
(b) Mention the position and nature of image in each case.



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2. Explain with diagrams how refraction of incident light takes place from rarer to denser medium



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## Exercise Ix Numerical Problems

1. A concave mirror produces three times magnified real image of an object placed at 7 cm in front of it. Where is the image located? (21 cm in front of the mirror).

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2. Light enters from air into a glass plate having refractive index 1.5. What is the speed of light in glass ? ( $c = 3 \times 10^8 \text{ms}^{-1}$ )

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3. The speed of light in water is  $2.25 \times 10^8 \text{ms}^{-1}$ . If the speed of light in vacuum is  $3 \times 10^8 \text{ms}^{-1}$ , calculate the refractive index of water.

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1. Light ray emerges from water into air. Draw a ray diagram indicating the change in its path in water.

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2. When a ray of light passes from air into glass, is the angle of refraction greater than or less than the angle of incidence?

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3. What do you conclude about the speed of light in diamond if the refractive index of diamond is 2.41? way from the mirror. Does the image become smaller or larger? What do you observe?

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**Exercise In Text Problems**



1. Find the size, nature and position of the image formed when an object of size 1 cm is placed at a distance of 15 cm from a concave mirror of focal length 10 cm.

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2. An object 2 cm high is placed at a distance of 16 cm from a concave mirror which produces a real image 3 cm high. Find the position of the image.

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3. A car is fitted with a convex mirror of focal length 20 cm. Another car is 6 m away from the first car. Find the position of the second car as seen in the mirror of the first. What is the size of the image if the second car is 2 m broad and 1.6 m high?

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4. Speed of light in glass is  $2 \times 10^8 \text{ms}^{-1}$  . Find the refractive index of glass.

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5. Light travels from a rarer medium to a denser medium. The angle of incidence and refraction are respectively  $45^\circ$  and  $30^\circ$  . Calculate the refractive index of the second medium with respect to the first medium.

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## Activity

1. Stand before the mirror in your dressing table or the mirror fixed in a steel almirah. Do you see your whole body?

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2. Hold a concave mirror in your hand (or place it in a stand). Direct its reflecting surface towards the sun. Direct the light reflected by the mirror onto a sheet of paper held not very far from the mirror. Move the sheet of paper back and forth gradually until you find a bright, sharp spot of light on the paper. Position the mirror and the paper at the same location for few moments. What do you observe? Why does the paper catch fire?



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3. Take a convex mirror. Hold it in one hand. Hold a pencil close to the mirror in the upright position in the other hand. Observe the image of the pencil in the mirror. Is the image erect or inverted? Is it diminished or enlarged? Move the pencil slowly away from the mirror. Does the image become smaller or larger? What do you observe?



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#### 4. Refraction of light at air - water interface

Put a straight pencil into a tank of water or breaker of water at an angle of  $45^\circ$  and look at it from one side and above. How does the pencil look now?



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