Brain International School

Vikas Puri, New Delhi

REVISION SHEET

SUBJECT: PHYSICS **CLASS-X** **TERM-1**

1 MARKS

1. **The laws of reflection hold true for**

   (a) Plane mirrors only

   (b) Concave mirrors only

   (c) Convex mirrors only

   (d) All reflecting surfaces

2. **From the following options choose the one which gives negative magnification greater than one:**

   (a) Concave mirror; Nature of image – Real

   (b) Concave mirror; Nature of image – Virtual

   (c) Convex mirror; Nature of image – Real

   (d) Convex mirror; Nature of image – Virtual

3. **A 5 cm long rod is placed vertically in front of a concave mirror. If its 5 cm long image is formed at 20 cm in front of the mirror, the focal length of the mirror is**

   (a) –20 cm

   (b) –10 cm

   (c) –5 cm

   (d) 20 cm

4. **Mirror 'X' is used to concentrate sunlight in a solar furnace and Mirror 'Y' is fitted on the side of a vehicle to see the traffic behind the driver. Which statements are true?**

   (i) Image formed by mirror X is real, diminished and at focus.

   (ii) Image formed by mirror Y is virtual, diminished and erect.

   (iii) Image formed by mirror X is virtual, diminished and erect.

   (iv) Image formed by mirror Y is real, diminished and at focus.

   Options:

   (a) (i) and (ii)

   (b) (ii) and (iii)

   (c) (iii) and (iv)

   (d) (i) and (iv)

5. **The image formed by a concave mirror of focal length 50 cm is real and of magnification –1. The distance between the object and its image is**

   (a) 50 cm

   (b) 100 cm

   (c) 200 cm

   (d) Zero

6. **A student wants to obtain an erect image of an object using a concave mirror of focal length 10 cm. The object should be placed**

   (a) Less than 10 cm

   (b) 10 cm

   (c) Between 10 cm and 20 cm

   (d) More than 20 cm

7. **An optical device forms an erect image whose size is half of the object. The device is**

   (a) Concave mirror

   (b) Convex mirror

   (c) Plane mirror

   (d) Convex lens

8. **An object is placed in front of a concave mirror of focal length 15 cm and forms an image of the same size. The distance between object and image is**

   (a) 15 cm

   (b) 30 cm

   (c) 60 cm

   (d) Zero

9. **The relation R = 2f is valid**

   (a) Only for concave mirrors

   (b) Only for convex mirrors

   (c) Neither

   (d) Both concave and convex mirrors

10. **A concave mirror is used in**

    (a) Solar cooker

    (b) Rear-view mirror

    (c) Safety mirror

    (d) Viewing full-size image of distant buildings

11. **Radius of curvature of a converging mirror is 30 cm. The object should be placed at what distance to obtain a virtual image?**

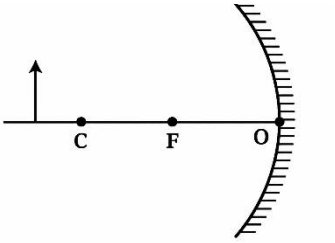
    (a) Infinity

    (b) 30 cm

(c) Between 15 cm and 30 cm

(d) Between 0 cm and 15 cm

12. For the diagram shown, according to the new Cartesian sign convention, the magnification of the image formed will have the following specifications:



(a) Sign – Positive, Value – Less than 1
(b) Sign – Positive, Value – More than 1
(c) Sign – Negative, Value – Less than 1
(d) Sign – Negative, Value – More than 1

13. Which of the following statements is not true in reference to the diagram shown above?

(a) Image formed is real.
(b) Image formed is enlarged.
(c) Image is formed at a distance equal to double the focal length.
(d) Image formed is inverted.

14. An object of height **4 cm** is kept at a distance of **30 cm** from the pole of a diverging mirror. If the focal length of the mirror is **10 cm**, the height of the image formed is

(a) +3.0 cm
(b) +2.5 cm
(c) +1.0 cm
(d) +0.75 cm

15. 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) Inverted
(c) Virtual and inverted
(d) Virtual and erect

16. Rays from the Sun converge at a point **25 cm behind a convex lens**. The distance at which an object should be placed in front of the lens to get a **virtual image** is

(a) 20 cm
(b) 40 cm
(c) 50 cm
(d) More than 50 cm

17. An optical device which always produces images of **m = +1** is

(a) Plane mirror
(b) Convex mirror
(c) Concave mirror
(d) Convex lens

18. An optical device **'X'** is placed obliquely in the path of a narrow parallel beam of light. If the emergent beam gets displaced laterally, the device **'X'** is

(a) Plane mirror
(b) Convex lens
(c) Glass slab
(d) Glass prism

19. To get an image of magnification **–1** on a screen using a lens of focal length **20 cm**, the object distance must be

(a) Less than 20 cm
(b) 30 cm
(c) 40 cm
(d) 80 cm

20. Absolute refractive index of glass and water is 3/2 and 4/3 respectively. If the speed of light in glass is 2×10^8 m/s, the speed of light in water is
(a) $4/9 \times 10^8$
(b) $5/2 \times 10^8$
(c) $7/3 \times 10^8$
(d) $16/9 \times 10^8$

21. The power of a combination of two lenses in contact is **+1.0 D**.If one of the lenses has focal length **+20.0 cm**, the focal length of the other lens would be

(a) –120.0 cm

(b) +80.0 cm

(c) –25.0 cm

(d) –20.0 cm

22. How will the image formed by a convex lens be affected if the upper half of the lens is wrapped with black paper?
(a) Image size half
(b) Upper half not formed
(c) Brightness reduces
(d) Lower half not formed

23. The colour of light for which the refractive index of glass is minimum is
(a) Red
(b) Yellow
(c) Green
(d) Violet

24. At what distance from a convex lens should an object be placed to get an image of the same size as the object on a screen?
(a) Beyond 2F
(b) At F
(c) At 2F
(d) Between O and F

25. When an object is placed beyond 2F of a convex lens, the image formed is
(a) Real, inverted and diminished
(b) Real, erect and magnified
(c) Virtual, erect and magnified
(d) Real, inverted and magnified

26. If a lens and a spherical mirror both have focal length –15 cm, then
(a) Both are concave
(b) Lens concave & mirror convex
(c) Lens convex & mirror concave
(d) Both convex

27. A student determines the focal length of a device by focusing a far-off object on a screen. The device is
(a) Concave lens
(b) Concave mirror
(c) Convex lens
(d) Convex mirror

28. When light passes through a glass slab, if emergent ray is parallel to incident ray, which relation is true?
(a) $n1<n2=n3$
(b) $n1>n2>n3$
(c) $n1<n2>n3$
(d) $n1=n3<n2$

29. The image of a candle flame is obtained on a screen and is three times the flame. The lens is
(a) Concave, +3
(b) Concave, –3
(c) Convex, –3
(d) Convex, +3

30. The power of two lenses in contact is +1.0 D. If one lens has focal length +20 cm, the focal length of the other is
(a) –120 cm
(b) +80 cm
(c) –25 cm
(d) –20 cm

31. When you look at an object very close to your eyes, the:
(a) Ciliary muscles of your eyes contract and the eye lens becomes thick.
(b) Ciliary muscles of your eye get relaxed and the eye lens becomes thick.
(c) Ciliary muscles of your eye contract and the eye lens becomes thin.
(d) Ciliary muscles of your eye get relaxed and the eye lens becomes thin.

32. The lens system of the human eye forms an image on a light-sensitive screen called:
(a) Cornea
(b) Ciliary muscles
(c) Optic nerves
(d) Retina

33. In the human eye, the part which allows light to enter into the eye is:
(a) Retina
(b) Pupil
(c) Eye lens
(d) Cornea

34. A person suffering from cataract has:
(a) Elongated eyeball
(b) Excessive curvature of eye lens
(c) Weakened ciliary muscles
(d) Opaque eye lens

35. To restore clear vision in persons whose eyeball size has reduced, suitable lens is:
(a) Converging lens
(b) Diverging lens
(c) Bifocal lens
(d) Cylindrical lens

36. A thin beam of white light falls on a glass prism and forms a spectrum. Which is the correct sequence of colours from top to bottom?
(a) Red, Green, Yellow, Violet, Blue
(b) Red, Yellow, Green, Blue, Violet
(c) Violet, Blue, Green, Yellow, Red
(d) Violet, Red, Green, Yellow, Blue

37. Which one of the following is the correct reason for twinkling of stars?
(a) Atmospheric reflection of starlight
(b) Atmospheric refraction of starlight
(c) Scattering of starlight
(d) Dispersion of starlight

38. Assertion (A): When rays of white light pass through a prism, they produce a spectrum of seven colours.

Reason (R): It is due to the scattering of light that red bends minimum and violet bends maximum.

2 MARKS

39. Why is the concave lens used as a corrective lens for a myopic eye?

40. An object is placed 25 cm in front of a concave mirror of focal length 15 cm. Use mirror formula and new Cartesian sign convention to determine the position of the image formed.

41. How does the focal length of the eye lens change as the distance of the object from the eyes is altered? Explain.

42. Draw a labelled ray diagram to show the formation of image due to a concave mirror when an object is placed between its pole and principal focus.

43. Find the magnification of the image formed by a spherical mirror from the following data

U= -20 cm, f= -15cm

44. Draw a labelled ray diagram to show the formation of image due to a concave mirror when an object is placed between its centre of curvature and principal focus.

45. (i) How does the change in curvature of the eye lens help us in seeing nearby objects clearly?
(ii) State the range of the power of accommodation of a normal human eye.

46. Define the power of accommodation. What happens to the image distance in the eye when the object distance increases? Name and explain the role of the responsible part of the eye.

47. A security mirror used in a big showroom has radius of curvature 5 m. If a customer is standing at a distance of 20 m from the cash counter, find the position, nature and size of the image formed in the security mirror.

48. The refractive index of medium A is 1.5 and that of medium B is 1.33. If the speed of light in air is 3×10^8 m/s, what is the speed of light in medium A and B respectively?

49. A lens combination consists of a convex lens of focal length 30 cm and a concave lens of focal length 15 cm placed together. Find the equivalent focal length and power of this lens combination.

50. A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. Calculate the size of the image formed if the distance of the object from the lens is 10 cm.

51. Define the term power of accommodation. Write the modification in the curvature of the eye lens which enables us to see nearby objects clearly.

52. Write the name of the lens and position of the object in front of, front of, it, so that a virtual and magnified image is formed.

53. An object is placed perpendicular to the principal axis of a convex lens of focal length 20 centimeter. If object is located at 30 centimeter from this lens, using lens formula, find out the position and nature of the image is formed.

54. Define **pole** of a spherical mirror.

55. Trace the sequence of events which occur when a bright light is focused on your eyes.

56. Draw a ray diagram showing the path of a ray through an equilateral triangular glass prism. Mark the angle of incidence (∠i) and angle of deviation (∠D).

57. What happens when light is scattered from (i) very fine particles and (ii) very large size particles of a medium? Justify your answer in each case.

58. Name the phenomenon of light responsible for Tyndall effect. Write an event where this phenomenon can be observed.

59. The colour of the clear sky from the earth appears blue but from space it appears black. Why?

3 MARKS

60. Draw a ray diagram to show the correction of the eye defect of an old man who cannot see an object placed closer than 1 m clearly.

61. An object is placed 25 cm in front of a concave mirror of focal length 15 cm. Use mirror formula and Cartesian sign convention to determine the position of the image formed.

62. Write about the power of accommodation of the human eye. Explain why the image distance does not change when object distance changes.

63. An object is placed at a distance of 30 cm in front of a concave mirror of focal length 20 cm. Use mirror formula to determine the position of the image formed in this case.

64. An object is placed at a distance of 30 cm in front of a concave mirror of focal length 20 cm. Use mirror formula to determine the position of the image formed in this case.

65. An object is placed at a distance of 10 cm in front of a concave mirror of focal length 15 cm. Use mirror formula to determine the position of the image formed by this mirror.

66. Draw a labelled ray diagram to show the formation of image due to a concave mirror when an object is placed between the pole and principal focus.

67. "The linear magnification produced by a spherical mirror is **+3**."Based on this statement answer the following questions:

(a) What is the type of mirror?

(b) Where is the object located?

(c) List two properties of the image formed (other than size/magnification).

68. Find the magnification of the image formed by a spherical mirror from the following data:

u = –20 cm, f = –15 cm

Draw a labelled ray diagram for the image formation by a concave mirror when the object is placed between the centre of curvature and focus.

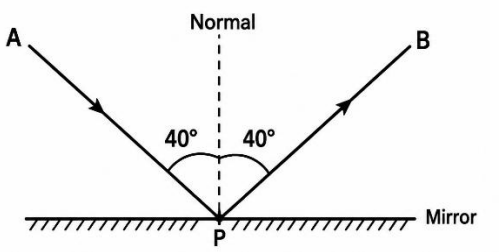
69. Draw a labelled ray diagram to show the reflected ray corresponding to an incident ray of light parallel to the principal axis of a convex mirror. Mark the angle of incidence and angle of reflection.

70. If the image formed by a spherical mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it? Draw a labelled ray diagram to support your answer.

71. An object is placed at a distance of 30 cm in front of a convex mirror of focal length 15 cm. Write four characteristics of the image formed by the mirror.

72. An object is placed at a distance of 12 cm in front of a concave mirror of radius of curvature 30 cm. List four characteristics of the image formed by the mirror.

73. The ray diagram shown represents the reflection of light from a plane mirror.



(a) State the laws which help to find out the angle of incidence and angle of reflection in the ray diagram given above.

(b) Find out the angle of incidence and angle of reflection in the given ray diagram.

74. Draw ray diagrams to show the nature, position and relative size of the image formed by a convex mirror when the object is placed

(i) at infinity

(ii) between infinity and the pole of the mirror.

75. (a) Complete the following ray diagram to show the formation of image.

(b) Mention the nature, position and size of the image formed.

(c) State the sign of the image distance in this case using the Cartesian sign convention.

76. State Snell's Law of refraction of light. Write an expression for the absolute refractive index of a medium in terms of speed of light.

77. Light enters from air to a glass having refractive index 1.50. Calculate the speed of light in the glass. Given: Speed of light in vacuum = 3 × 10^8 m/s.

78. An object is placed at a distance of 15 cm from a convex lens of focal length 20 cm. List four characteristics (nature, position, etc.) of the image formed by the lens.

79. (a) Write the expression for magnification produced by a lens in terms of object distance and image distance.
(b) A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. Calculate the size of the image if the object is 10 cm from the lens.

80. (a) Write the name of the lens and the position of the object so that a virtual and magnified image is formed.
(b) An object is placed 30 cm from a convex lens of focal length 20 cm. Using the lens formula, find the position and nature of the image.

81. The power of a lens is +4 D. Find its focal length. An object is placed 50 cm from the optical centre. State the nature and magnification of the image and draw a ray diagram.

82. An object of height 10 cm is placed 25 cm away from a converging lens of focal length 15 cm. Calculate the image distance and image height.

83. Define power of a lens. The focal length is –10 cm. State the nature of the lens and its power. If an object is placed 20 cm away, what will be the sign of magnification?

84. An object is kept 1 m from a lens of power +2 D.
(i) Identify the type of lens.
(ii) Calculate focal length and image distance.

85. (a) Water has refractive index 1.33 and alcohol 1.36. Which is optically denser? Give reason.
(b) Draw a ray diagram for light passing obliquely from water to alcohol.
(c) State the relation between angle of incidence and angle of refraction.

86. The refractive index of X with respect to Y is 2/3 and of Y with respect to Z is 4/3. Find the refractive index of Z with respect to X. If speed of light in X is 3×10^8 m/s, calculate the speed in Y.

87. How far should an object be placed from a convex lens of focal length 20 cm to obtain a real image at 30 cm? Determine the image height if the object is 4 cm tall.

88. A real image 2/3 of the size of the object is formed by a convex lens when the object is 12 cm away. Find the focal length.

89. State the laws of refraction. Explain absolute refractive index and write its expression in terms of the speed of light in vacuum.

90. What is meant by power of a lens? Write its SI unit. A student uses lenses of focal lengths 40 cm and –20 cm. Write the nature and power of each.

91. Draw ray diagrams to show formation of three-times magnified (a) real image and (b) virtual image by a converging lens. Mark O, F and 2F.

92. Name the type of lenses required for correction of presbyopia. Write the structure of the lenses commonly used and give the reason for such design.

93. Draw a ray diagram to show refraction of a ray of light through a triangular glass prism and mark: (i) angle of incidence (ii) angle of emergence (iii) angle of deviation. What happens if a beam of white light falls on the prism? Give reason.

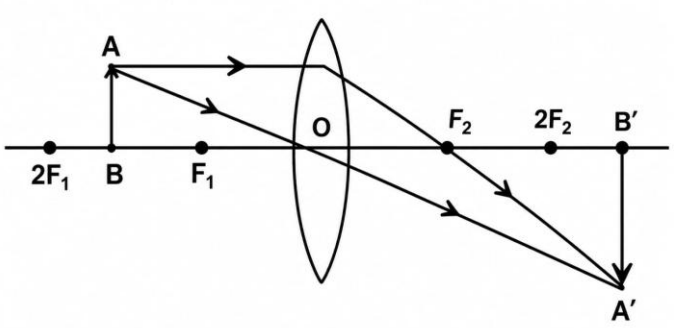
94. What is dispersion of white light? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism.

95. What is scattering of light? How is scattering of light different from reflection of light? Explain.

96. Give reasons: (a) Danger signals at airports and on tall buildings are red. (b) The sky appears dark to passengers flying at very high altitudes. (c) The path of a beam of light through a colloidal solution is visible.

5MARKS

97. Study the given ray diagram and answer:



(a) Is the lens converging or diverging?
(b) List three characteristics of the image.
(c) At which object position is magnification –1?

98. (a) State the role of ciliary muscles.
(b) Identify the defect of vision and corrective measure for:
(i) Milky and cloudy eye lens.
(ii) Excessive curvature of eye lens.
(iii) Large focal length (longer than normal).
(iv) Weakened ciliary muscles.

99. (i) Define the term power of accommodation of the human eye. What happens to the image distance in the eyes when the distance of an object is increased gradually from about 5 m to 500 m from our eyes? Name and explain the role of the part of the human eye responsible for it in this case.

(ii) A person is unable to see distinctly the objects placed beyond 2 m from his eyes. Name the defect of vision the person is suffering from. List two possible causes of this defect and write the type of lenses used for its correction.

100. (i) The power of a lens 'X' is –2.5 D. Name the lens and determine its focal length in cm. For which eye defect is this lens prescribed?

(ii) Magnification m = –2. Using the New Cartesian Sign Convention, if an object is placed 20 cm from the optical centre, state: (I) Nature of image (II) Size compared to object (III) Position of image (IV) Sign of image height.

(iii) The focal lengths of lenses A and B are 10 cm and 20 cm respectively. Which lens has a higher degree of convergence/divergence? Give reason.

101. A student is unable to see clearly the words written on the blackboard at about 3 m. Name the defect of vision, state its possible causes and explain its correction.

102. A student suffering from myopia cannot see distinctly beyond 5 m. List two possible reasons. With the help of ray diagrams explain: (i) Why distant objects are not seen clearly. (ii) The type of corrective lens used and how it corrects the defect.

103. Define dispersion of white light. State the colour which bends (i) the most (ii) the least while passing through a glass prism. Draw the dispersion diagram.

104. How will you use two identical glass prisms so that white light emerging from the second prism becomes white again? Draw and label the ray diagram.

105. Differentiate between a glass slab and a glass prism. What happens when a narrow beam of (i) monochromatic light and (ii) white light passes through (a) a glass slab and (b) a glass prism?

106. (a) Why do the component colours of white light split into a spectrum while passing through a glass prism? Explain.
(b) Draw a labelled ray diagram to show the formation of a rainbow.

107. What is a rainbow? Draw a labelled diagram to show the formation of a rainbow.

108. (i) Name and explain the phenomenon responsible for making the path of a beam of light visible in a smoke/dust-filled room. Also state the dependence of the colour of received light on particle size. (ii) A presbyopic person uses bifocal lenses of powers +2.0 D and –0.5 D. Which lens corrects distant vision and what is its focal length?

109. (a) State the relation between the colour of scattered light and the size of the scattering particle. (b) The apparent position of an object seen through hot air fluctuates. State the basic cause. (c) Complete the path of white light through two identical prisms.

CBQ

110. A lens combination consists of a convex lens of focal length 30 centimeter and a concave lens of focal length 15 centimeter placed together. Find the equivalent focal length and power of this lens combination.

S. No.	Object distance (u) cm	Image distance (v) cm
1.	−150	+30
2.	−75	+37.5
3.	−50	+50
4.	−37.5	+75
5.	−30	+150
6.	−15	+37.5

(a) Without calculation, find out the focal length of the given convex lens. Justify your answer.

(b) Which one of the observation given in the table is not correct and why?

(c) Find out the value of magnification for u = –30 cm. Write the nature of the image formed. Give reason for your answer.

(d) Analyse the data given in the table above and draw the labelled ray diagram for u = –30 cm and v = +150 cm.

111. Lenses can form different types of images depending upon their focal length and the position of the object. A convex lens can create real, inverted or virtual, erect images, while a concave lens forms only virtual and diminished images. The focal length determines the power of the lens. Convex lenses have positive focal length while concave lenses have negative focal length by convention. When lenses are placed together, their combined power is determined by the sum of their individual powers. Ray diagrams help to visualize how light converges or diverges through a lens to form an image.

(a) A convex lens of focal length 20 cm is used to form an image. If an object is placed at 40 cm from the lens, what will be the position and nature of the image?

(b) Illustrate the formation of image with the help of a ray diagram, when the object is placed between the optical centre and principal focus of a concave lens.

(c) (i) A lens combination consists of a convex lens of focal length 30 cm and a concave lens of focal length 15 cm placed together. Find the equivalent focal length and power of this lens combination.

OR

(c) (ii) Two lenses are placed in contact. One is a concave lens with focal length 2 m and the other is a convex lens with focal length 1.5 m. What type of lens will the combination behave as (convex or concave)? Give reason.

112. The students in a class took a thick sheet of cardboard and made a small hole in its centre. Sunlight was allowed to fall on this small hole and they obtained a narrow beam of white light. A glass prism was taken and this white light was allowed to fall on one of its faces. The prism was turned slowly until the light that comes out of the opposite face of the prism appeared on the nearby screen. They studied this beautiful band of light and concluded that it is a spectrum of white light.

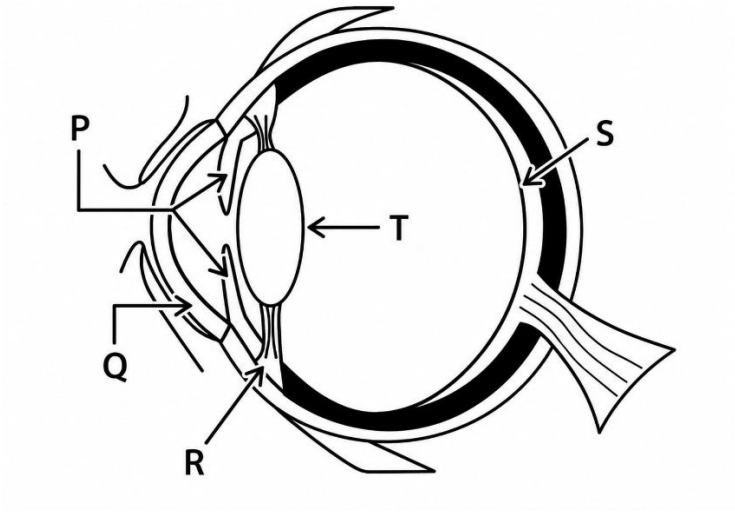
(i) Give one more instance where such a spectrum is observed.
(ii) What happens to white light?
(iii)List two conditions necessary to observe a rainbow.

(iv) Draw a ray diagram of rainbow formation and mark: (a) dispersion (b) internal reflection (c) final refraction.

113. (a) Rupal suffers from myopia. Where would the image form in her eye?
(b) Name the type of lens that is generally used to correct myopia.

(c) Rupal underwent cataract surgery and her eye lens was replaced with an artificial lens with a fixed focal length, made of a plastic material, silicone. State one likely visual disadvantage that Rupal is likely to experience as compared to a person who has normal eyesight.

(d) Identify the parts of the eye labeled in the diagram from the descriptions given below by writing the labels as your answer.



(i) It helps in changing the focal length of the lens.
(ii) It causes most of the refraction of the light entering the eye.
(iii) It controls the amount of light entering the eye.
(iv) It acts as a screen on which the image is formed