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### CHAPTER- 10 (HUMAN EYE AND COLORFUL WORLD)

**Q. 1. Colour of sky appears blue, due to the**

- (A) atmospheric refraction (B) presence of plants in water  
(C) scattering of light (D) none of these

**Q. 2. Colour of sun appears white During the day time because**

- (A) Blue colour scatter most (B) Red colour scatter most  
(C) All colours of white light scattered away (D) white colour is least scattered

**Q. 3. Red colour is used as danger sign as**

- (A) red colour scattered least by smoke (B) red colour scattered most by smoke  
(C) Red colour absorbs by the smoke (D) red colour moves fast in air

**Q. 4. Phenomenon on which human eye is working-**

- (A) refraction (B) reflection (C) total internal refraction (D) ciliary muscles

**Q. 5. Which colour of light refracts most when passes through a prism-**

- (A) yellow (B) Red (C) orange (D) indigo

**Q. 6. Which of the following controls the amount of light entering the eye**

- (A) pupil (B) iris (C) cornea (D) lens

**Q. 7. Which type of image formed on the retina of human eye**

- (A) Real and Inverted (B) Virtual and Inverted  
(C) real and erect (D) virtual and erect

**Q. 8. The change of focal length of eye lens is caused by the action of the**

- (A) ciliary muscles (B) iris (C) cornea (D) pupil

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Q. 9 The human eye can focus objects at different distances by adjusting the focal length of the eye lens. This is due to

- (a) Presbyopia                      (b) accommodation  
(c) near – sightedness          (d) far – sightedness

Q. 10 The least distance of distinct vision for a young adult with normal vision is about

- (a) 25 m      (b) 2.5 cm      (c) 25 cm      (d) 2.5 m

### ASSERTION AND REASON BASED QUESTIONS ( Que no 11 to 15 )

Answer these questions selecting the appropriate option given below.

(A) Both A and R are true and R is correct explanation of A.

(B) Both A and R are true but R is not correct explanation of A.

(C) A true but R is false

(D) A false but R is true

Q. 11. **Assertion-** A beam of white light gives a spectrum on passing through a prism.

**Reason-** Speed of light outside the prism is different from the speed of light inside the prism.

Q. 12. **Assertion-** myopia is called far-sightedness

**Reason-** myopia is corrected by using a concave lens in front of eye lens

Q. 13. **Assertion-** by using Tyndall effect we can identify the colloidal solutions

**Reason-** In true solution the path of light is not visible.

Q. 14. **Assertion-** atmospheric refraction is responsible for advance sunrise and delayed sunset.

**Reason-** This is happening due to the temperature difference between the layers of air.

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**Q. 15. Assertion-** cataract can be corrected by using bi-focal lens.

**Reason** – The crystalline lens of old peoples become milky and cloudy; this is due to the age of person.

### Case study-based Questions- ( Que 16 to 20)

When a ray of light incident on a prism it will split in seven colours that is called dispersion of light. A prism is a transparent refracting body bounded by plane faces which are inclined to each other at a particular angle called angle of prism denoted by  $A$ . When a ray of light passes through a prism, it suffers refraction twice and hence the ray deviates through a certain angle from its original path. The angle between the incident ray and emergent ray is called angle of deviation.

**Q 16.** For which colour the angle of deviation is minimum?

- A. Red      B. Blue      C. Violet      D. Yellow

**Q 17.** When a white light falls on a prism, the ray at its surface suffers:

- (A) Refraction only      (B) dispersion only

- (C) deviation only      (D) all of above

**Q 18.** In nature, dispersion of light is happening in

- (A) Blue colour of sky      (B) Formation of rainbow

- (C) Twinkling of stars      (D) advance sunrise

**Q 19.** The cause of dispersion of light is –

- (A) All colours of light travel with the speed more than the speed of light

- (B) All colours have different angle of deviation

- (C) All the colours of light do not travel with same speed

- (D) All the colours have same wavelength

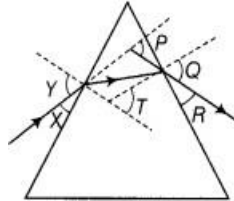
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**Q 20.** The following diagram, the path of a ray of light passing through a glass prism is shown below.



In this diagram, the angle of incidence, the angle of emergence and the angle of deviation respectively, are

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

### Answer key

1	(C)	11	(A)
2	(C)	12	(D)
3	(A)	13	(A)
4	(B)	14	(A)
5	(D)	15	(D)
6	(B)	16	(A)
7	(A)	17	(D)
8	(A)	18	(B)
9	(b)	19	(C)
10	(c)	20	(d)

### VSA ( Que 21 to 25)

Q.21. What is meant by power of accommodation of the eye ?

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Answer: The power of accommodation of the eye is the maximum variation of its power for focusing on near and far (distant) objects.

Q.22. A person with a myopic eye cannot see objects beyond 1.2 m distinctly. What should be the type of the corrective lens used to restore proper vision ?

Answer: Concave lens.

Q. 23. What is the far point and near point of the human eye with normal vision ?

Answer: For a human eye with normal vision the far point is at infinity and near point is 25 cm from the eye.

Q. 24. A student has difficulty reading the blackboard while sitting in the last row. What could be the defect the child is suffering from ? How can it be corrected?

Answer: The child is suffering from myopia. The child should use concave lens of suitable focal length.

Q. 25. A student has difficulty reading the blackboard while sitting in the front row. What could be the defect the child is suffering from ? How can it be corrected?

Answer: The child is suffering from hypermetropia. The child should use convex lens of suitable focal length.

### Short answer Type questions ( Que 26 to 30)

Q.26. What happens to the image distance in the eye when we increase the distance of an object from the eye ?

Answer: The eye lens of a normal eye forms the images of objects at various distances on the same retina. Therefore, the image distance in the eye remains the same.

Q. 27. Why do stars twinkle?

Answer: Stars appear to twinkle due to atmospheric refraction. The light of star after the entry of light in earth's atmosphere undergoes refraction continuously till it reaches the surface of the earth. Stars are far away. So, they are the point source of light. As the path of light coming from stars keep changing, thus the apparent position of stars keep changing and

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amount of light from stars entering the eye keeps twinkling. Due to which a star sometimes appear bright and sometimes dim, which is the effect of twinkling.

Q. 28. Explain why the planets do not twinkle?

Answer: The planets are much nearer to the earth than stars and because of this they can be considered as large source of light. If a planet is considered to be a collection of a very large number of point sources of light, then the average value of change in the amount of light entering the eye from all point size light sources is zero. Due to this the effect of twinkling is nullified.

Q. 29. Why does the sun appear reddish early in the morning?

Answer: The light coming from the sun passes through various denser layers of air in the earth's atmosphere before reaching our eyes near the horizon. Most of the part of blue light and light of small wavelength gets scattered by dust particles near the horizon. So, the light reaching our eyes is of large wavelength. Due to this the sun appears reddish at the time of sunrise and sunset.

Q. 30. Why does the sky appear dark instead of blue to an astronaut?

Answer: As an astronaut moves away from the atmosphere of earth, the atmosphere becomes thin. Due to the absence of molecules (or dust particles) in air, the scattering of light does not take place. Thus, sky appears dark in the absence of scattering.

### LONG ANSWER TYPE QUESTIONS ( Que 31 to 35)

Q 31. Draw the sketch diagram of human eye. And explain about the different parts of eye.

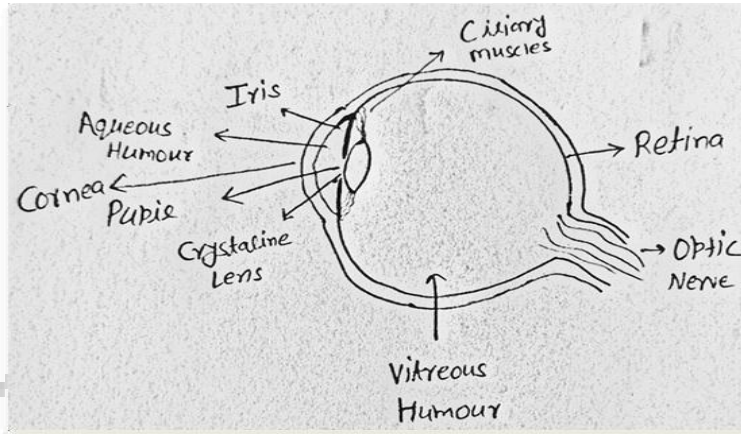
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Answer: -



The human eye is the most sensitive part of the human body. By closing our eyes, we can sense some objects with their smell, taste, sound they make or by touching them but we cannot identify the colour without opening our eyes.

Parts of human eyes: -

- Cornea- the outermost part of the eye, light enters from this part.

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- Eye lens- it is a convex lens its curvature is controlled by ciliary muscles.
- Iris- The part of the eye which controls the size of the pupil.

Pupil- The aperture of the pupil varies with the help of the iris. Pupil regulates and controls the amount of light entering the eye.

- Retina- The light-sensitive screen, where the image of any object is formed

### Q. 32 . How can we see objects?

**Answer:** - First light enters in our eye from cornea. If the light is very bright, the iris contracts the pupil to allow less light to enter the eye and in dim light the iris expands pupil to allow more light in the eye. This light incident on the eye lens and image is formed at the retina. The optic nerves transmit electrical impulses to the brain and we get information about the object.

### Q.33.What do you mean by the defect hypermetropia in human eye, how it can be corrected? Draw suitable ray diagrams.

**Answer:** -

(i) a person can't see – nearby objects clearly

a person can see –distant objects clearly

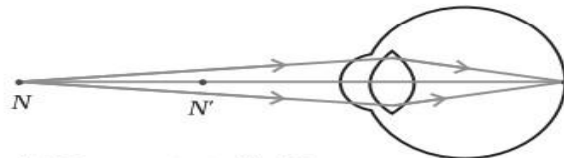
(ii) Defect arises due to

-Focal length of eye lens increased ( power decreased)

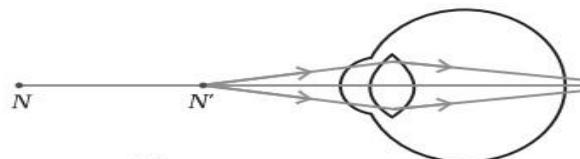
- Shortening of eyeball

(iii) Defect correction by

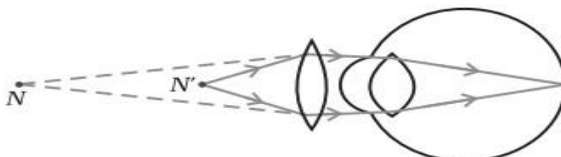
Using a convex lens of suitable power



(a) Near point of a Hypermetropic eye



(b) Hypermetropic eye



(c) Correction for Hypermetropic eye



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**Q.34. What do you mean by the defect myopia in human eye, how it can be corrected? Draw suitable ray diagrams.**

(i) a person can see – nearby objects clearly

a person can't see –distant objects clearly

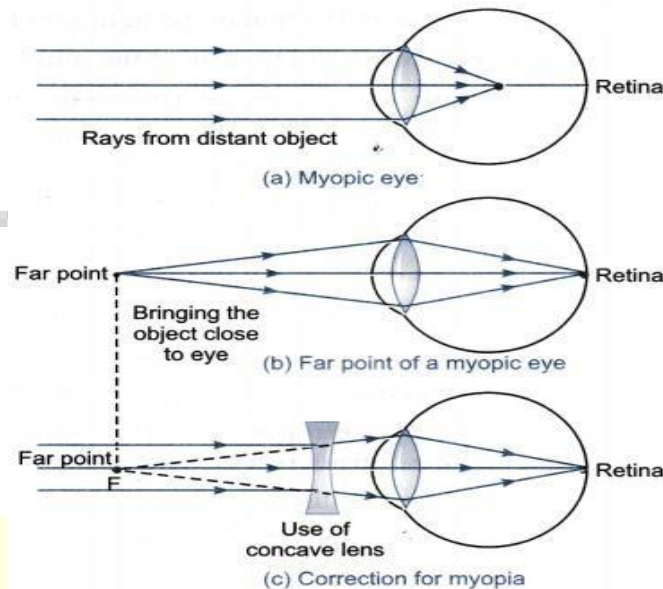
(ii) Defect arises due to

-Focal length of eye lens decreased (power increased)

-Elongation of eyeball

(iii) Defect correction by

Using a concave lens of suitable power



**Q.35 . What is dispersion of light? Explain it with a suitable diagram. Draw the necessary diagram, and show the recombination of light by using glass prisms.**

**Answer: - Dispersion of light by a glass prism:** - The splitting of light into its component colours is called dispersion of light. A prism can split the incident white light into a band of colours. The sequence of colours is Violet, Indigo, Blue, Green, Yellow, Orange and Red. We remember it with "VIBGYOR".

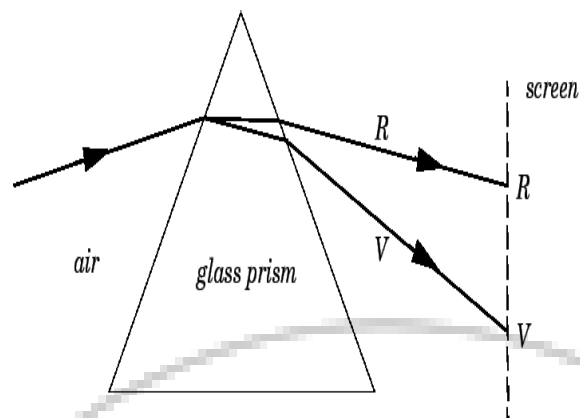
- The band of the coloured components of a light beam is called its spectrum.

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- Red light bends least and violet most.

**Recombination of spectrum:** - Isaac Newton was the first to use a glass prism to obtain the spectrum of sunlight. By using one prism light splits in seven colours and by using another prism in inverted position with respect to the first prism, we found a beam of white light emerging from the other side of the second prism. So here first prism is splitting second is recombining.

