SHIKSHA CLASSES

Sub. : Science **Answer Paper** **Marks : 30**

Std. : Xth - CBSE **11. Human Eye and The Colourful World**

SECTION (A) **(Each - 1 Mark)**

Q.1 : How eyes adjust in order to focus the image of near or distant objects on retina?

Ans : c) The lens becomes thicker or thinner according to the position of the object.

OR

A man finds it difficult to read the odometer on the dashboard of the car but is able to clearly read a distant road sign. Which of the following statement is correct about this man?

Ans : a) The near point of his eyes has receded away.

Q.2 : Write the name of phenomenon of the star appear shifted from their actual position.

Ans : The star appear shifted from their actual position due to phenomenon of refraction of light.

OR

Write the name of phenomenon due to which sky appears blue.

Ans : The sky appears blue due to scattering of light.

Q.3 : Assertion (A) : Blind spot is a small area of the retina which is insensitive to light where the optic nerve leaves the eye.

Reason (R) : There are no rods or cones present at the junction of optic nerve and retina in the eye.

Ans : a) Both A and R are true and R is correct explanation of the assertion.

Q.4: Assertion(A) : A rainbow is sometimes seen in the sky in rainy season only when observer's back is towards the Sun.

Reason (R) : Internal reflection in the water droplets cause dispersion and the final rays are in backward direction.

Ans : a) Both A and R are true and R is correct explanation of the assertion.

Q.5: Assertion(A) : Danger signals are made of red colour.

Reason (R) : Velocity of red light in air is maximum, so signals are visible even in dark.

Ans : c) A is true but R is false.

Q.6 : A person cannot see the distant objects clearly (though he can see the nearby objects clearly). He is suffering from the defect of vision called:

Ans : (c) Myopia

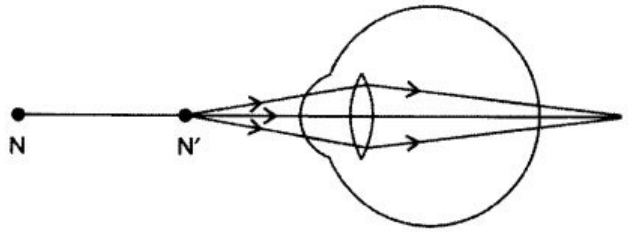
OR

A got his eye tested. The optician's prescription for the spectacles was:

Left eye: – 3 D , Right eye: – 3.50 D The person is having a defect of vision called:

Ans. : (b) Myopia

Q.7 : Study the diagram given below and answer any two questions from 5(i) to 5(iii) (2)



i) Which defect of vision is represented in this case?

Ans : b) Hypermeteropia

ii) ------ is the one of the cause of this defect.

Ans : a) As eyeball become smaller

iii) Defect can be corrected using ------

Ans : a) Convex lens

Q.8: The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because among all other colours, the red light

Ans : b) is scattered the least by smoke or fog

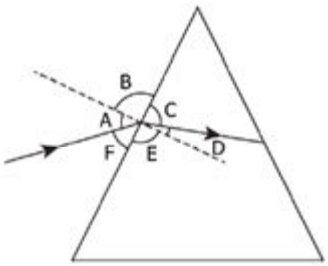
Q.9: Which of the following phenomena of light are involved in the formation of a rainbow?

Ans : b) Refraction, dispersion and total internal reflection

Q.10: The splitting of white light into different colours on passing through a prism is called

Ans : c) dispersion

Q.11: The image shows a light ray incident on a glass prism.



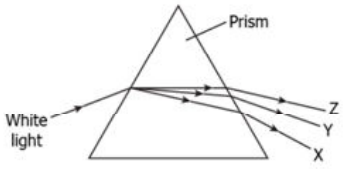
The various angles are labeled in the image. Which angle shows the angle of incidence and angle of refraction, respectively?

Ans : a) A and D

Q.12 When white light enters a prism, it gets split into its constituent colours. This is due to

Ans :(a) different refractive index for different wavelength of each colour

Q.13: The image shows the dispersion of the white light in the prism.



What will be the colours of the X, Y and Z?

Ans : (b) X: violet; Y: green; Z: red

Q.14:The bluish colour of water in deep sea is due to

Ans : c) Scattering of light

SECTION (B) **(Each - 2 Mark)**

Q.15 : Explain why do the planets not twinkle but the stars twinkle.

Ans : Planets being of larger size can be taken as a collection of large number of point-sized objects/ sources of light, which nullify the twinkling effect of each other.

Due to varying conditions of atmosphere, starlight undergoes multiple refraction and its path varying slightly while passing through the atmosphere. Therefore, the apparent position of star fluctuates and amount of light entering the eye changing continuously. The star sometimes appear brighter and some other time, it appears fainter. This causes twinkling of star.

Q.16: What is presbyopia ? State the cause of Presbyopia.

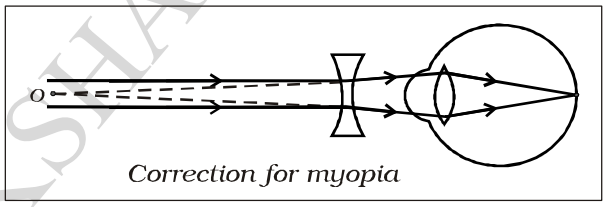
Ans : **Presbyopia :** A human eye which cannot see the near objects and distant objects clearly is said to suffer from a defect known as Presbyopia.

Causes : This defect arises due to the ageing of a person. The ciliary muscles are weakened and the flexibility of the crystalline lens of the human eye decreases with age of the person. As a result, human eye is unable to focus on close as well as distant objects.

OR

Draw a ray diagram to show how myopia defect can be corrected using a lens of appropriate focal length.

Ans :



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SECTION (C) **(Each - 3 Mark)**

Q.17: Why can't we see clearly when we enter a dim light room from bright sunlight?

Ans : The pupil in the eye acts as a variable aperture, whose size is increased or decreased by the muscles present in the iris. When the light is bright, the iris muscles decrease the size of aperture of the pupil.This allows less light to enter in the eye ball. However, in dim light the iris muscles tends to increase the aperture of the pupil, so that more light could enter the eye ball.It is this

small interval of time in which you cannot see clearly.

OR

Why does sky appear blue? Explain.

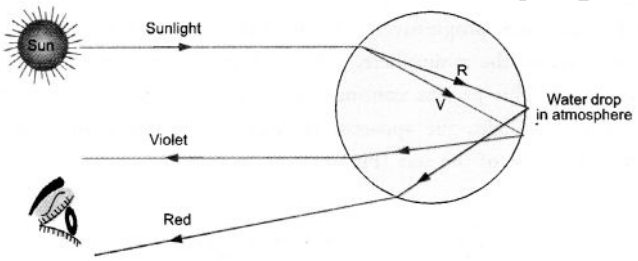
Ans : When the white light coming from the sun passes through the atmosphere, the violet, indigo and blue wavelength in it encounter suspended particles in air whose diameters are more than their wavelengths.Thus, their waves are absorbed and then scattered in all possible directions. The scattered light from these particles, suspended all around in the sky reach our eyes and hence the sky appears blue.

Q.18 : Why do we see a rainbow in the sky only after rainfall ?

Ans : The rainbow is formed due to the dispersion of sunlight.

When sunlight falls on the water drops suspended in the atmosphere after rainfall, rainbow is formed due to the dispersion of sun light. The water drops suspended in air (or atmosphere) act as prisms.

Rainbow is the example of dispersion of sunlight. The formation of rainbow after rainfall is shown in figure.

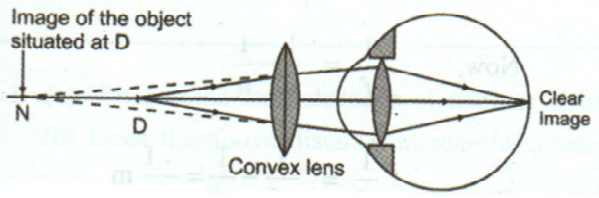


Conditions for Observing a Rainbow : When sunlight falls on a water drop suspended in air, then the sunlight is refracted. The refracted sunlight splits (or dispersed) into its constituent colours (i.e., seven colours). Thus, water drop suspended in air behaves as a glass prism. The red colour deviates the least and the violet colour deviates the most. Different colours of refracted sunlight fall on the opposite face of the water drop.- Now, each colour suffers internal reflection. The reflected colours on reaching the lower surface of water drop are refracted again into the air. Thus, we get a spectrum of seven colours, which is known as a rainbow.

SECTION (D) **(5 Mark)**

Q.19 : Make a diagram to show how hypermetropia is corrected. The near point of hypermetropia eye is 1m. What is the power of lens required to correct this defect? Assume that the near point of normal eye is 25cm.

Ans: i)



ii) Distance of the object for eye lens.

= Distance of normal near point

u = - 25 cm.

Distance of the image from eye lens.

= Near point of hypermetropic eye

v = -1 m = -100 cm.

Applying,

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

$$\Rightarrow \quad \frac{1}{f}=\frac{1}{-100}-\frac{1}{-25}=\frac{1}{25}-\frac{1}{100}$$

$$\Rightarrow \quad \frac{1}{f}=\frac{4-1}{100}=\frac{3}{100}$$

$$\therefore \quad f=\frac{100}{3}cm$$

$\therefore$ Power of lens

$$=\frac{1(m)}{f}=\frac{100cm}{f}$$

$$=\frac{100cm\times 3}{100cm}=+3D.$$

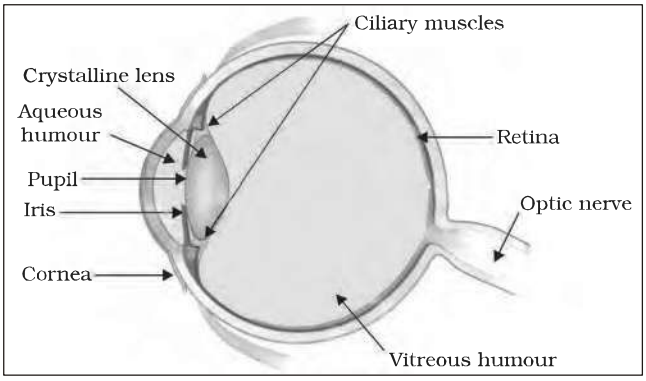
Thus, a convex lens of power +3D is required.

OR

Explain the working of human eye with neat diagram.

Ans : **Working of the Eye :** The light rays coming from the object enter the eyes through the pupil and fall on the eye lens. The eye lens then converges the light rays and produce an image of the object on the retina which is real and inverted. Retina has a large number of light-sensitive cells that can generate electrical signals. After the image is formed on the retina it sends electrical signals to the brain and we have a sensation of image. Also, even though the image formed on the retina is inverted our mind interprets it as erect.

So, the eye lens is the convex lens and the retina is the screen of the eye.



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