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For causes, you may include all possible causes of the disorder, be they genetic or external.

## Assignment

Define Shortedness. What are the symptoms and causes. And how can it be treated?

Shortsightedness is also called myopia. It is a refractive error and person with shortsightedness is unable to see the distant objects clearly.

Normally, when light enters into the eye, cornea bends the light and lens has the role to focus the light on retina where clear image of the object is formed. However in shortsightedness, instead of retina, image is formed in

the front of retina, and therefore, clear picture is not formed.

### Symptoms:

- (i) Faraway objects look blurred.
- (ii) Headache
- (iii) Eye strain
- (iv) Squinting

### Causes:

As in the shortsightedness, image is formed in front of retina. So, there may be multiple reasons of it, two of them are given below.

#### (i) increased axial length of eye

The distance from cornea to retina is called axial length of eye. And due to elongation of eyeball light is not focused on the retina, but in front of retina.

thus prevent clear formation of image.

## (ii) Cornea is too curved

If the cornea is too curved, it prevent the light focusing directly on the retina.

## Treatment

### (i) Eyeglasses:

The concave lenses in eyeglasses provide a simple way to correct shortsightedness.

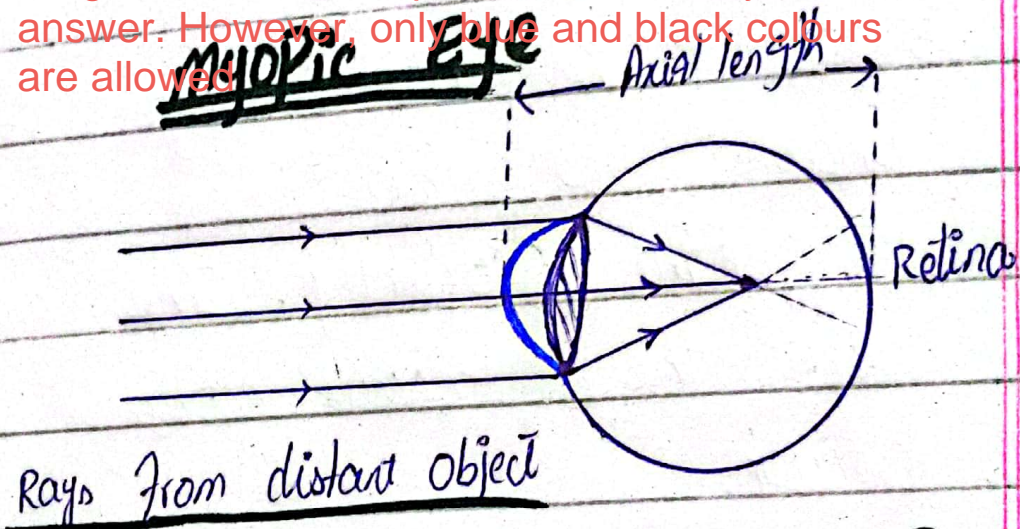
### (ii) Contact lenses:

Contact lenses work like eyeglasses. They correct the way light bends when it enters into eye.

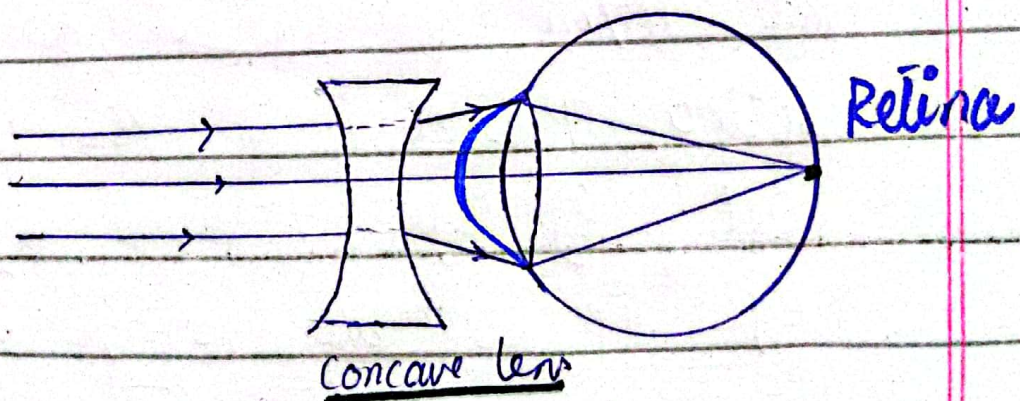
### (iii) Surgery:

Different types of surgeries like Laser in-situ Keratomileusis (LASIK), Refractive Lens Exchange (RLE), and Photorefractive Keratectomy (PRK) are performed to correct short sightedness.

Diagram is fine. You place in between your answer. However, only blue and black colours are allowed.



use of concave lens to correct myopia



②

Define farsightedness. Discuss its symptoms, causes and how can it be corrected?

Definition

Def.

Farsightedness, also called hypermetropia, is a refractive error, in which, eye is unable to bend or refract the light correctly. Thus cannot see the nearer objects clearly.

For the normal eye vision, the light is focus on the retina present in posterior part of eye. However, hypermetropic eye is unable to focus light on retina, but behind the retina and thus, clear image is not formed on retina.

## Symptoms:

- (i) Blurry close-up vision
- (ii) Eye strain
- (iii) Squinting when reading
- (iv) Double vision when reading
- (v) Dull pain in eyes
- (vi) Headache

## Causes:

### (i) Decreased Axial length:

Decreased axial length of eye may be the cause of farsightedness. When the eyeball becomes shorter than normal length, it enables the eye to focus light on the retina thus clear image is not formed.

## (ii) curvature of cornea flatter

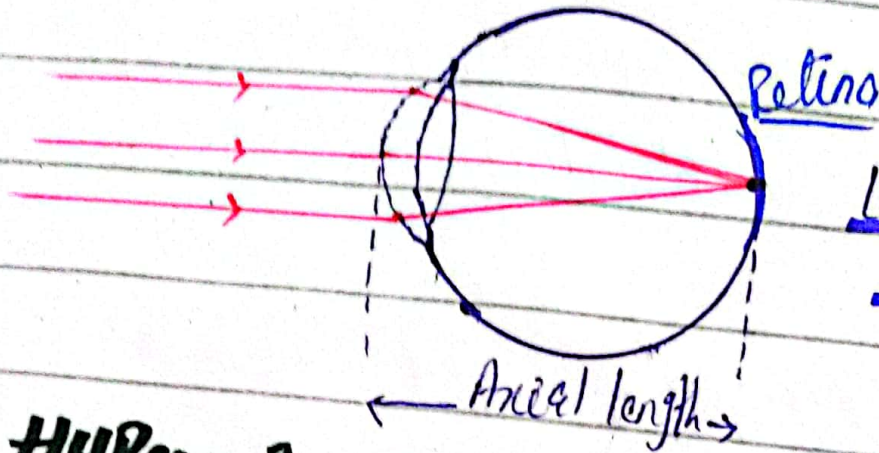
Far-sightedness can also be caused by flatter curvature of cornea. As it unable the eye to focus light on the retina and ultimately blur image is formed on retina.

## (iii) Decreased Refractive Index

When refractive index is decreased, light is not focused on retina and thus unclear image is formed on retina.

Only blue and black colours are allowed.

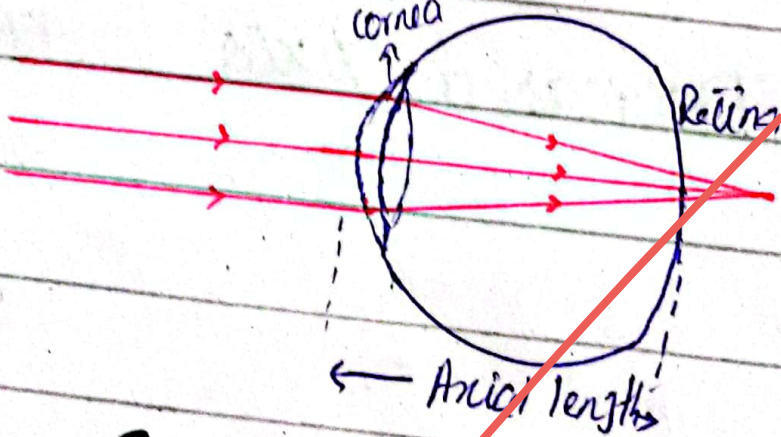
## Normal Eye



Light Focused on Retina

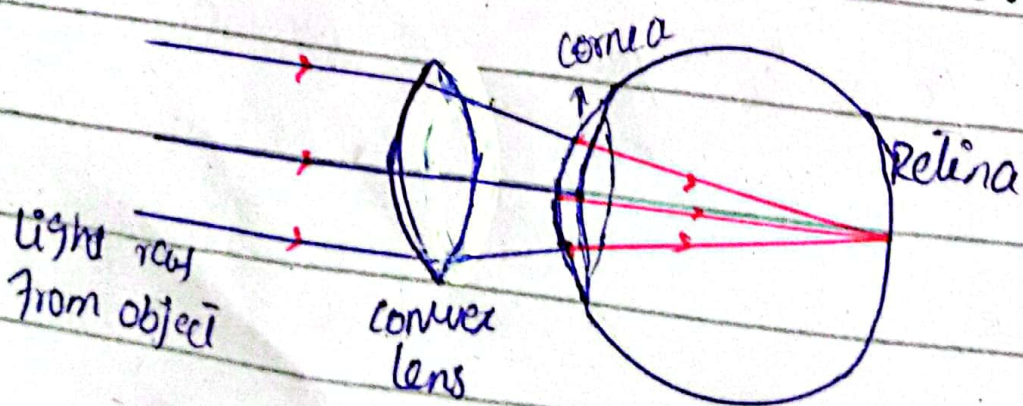
## Hypermetropia

- Flatten cornea
- Shorten Eyeball



Light - Focused behind Retina

## Use of Convex lens to correct Hypermetropia



Light - Focused on Retina



# Treatment

## i) Eye-glasses:

Convex lens is used for correction of far-sightedness. Convex lens in front of eye, bend the light before it enters into the eye thus facilitate the cornea and lens to bend, or focus light on retina.

## ii) Contact lens:

Contact lenses are also used for correction of hypermetropia. Contact lenses work in the same way as spectacles work but contact lenses are placed <sup>directly</sup> on cornea instead of in-front of cornea.

(ii) Surgery :

Surgery is also the solution of far-sightedness.

LASIK eye surgery can be performed to correct far-sightedness.

# Color blindness

## Definition:

The inability of eye to distinguish between certain colors is called color blindness. This usually happens between greens and reds, and occasionally blue.

In retina, there are two types of light detecting cells i.e. rods and cone.

Rods are sensitive to low light level and help us to see in the dark.

However, Cone cells detect colors, and are concentrated near the center of our vision.

There are further three types of cone cells that see color: Red, green and blue.

Our brain uses input from these three types of cone cells

to perceive all colours.

## Causes

(i) Lack of cone cells / cone cells stop functioning

As we know that, cone cells are responsible for colour detection. In case, when there is lack of cone cells or cone cells stop functioning, eyes become unable to distinguish between colours.

In most of the cases, colour-blindness is genetically inherited from parents. But it can also be caused by some other disease like

(i) Glaucoma

(ii) Diabetes

(iii) Parkinson

(iv) Leukemia

(v) Cataract

## Symptoms

People affected by color blindness may not be able to distinguish

- Different shades of red and Green
- Different shades of blue and yellow
- Any colour

## Treatment

There is no proper treatment for color-vision difficulties. But wearing a colored filter over eyeglasses may enhance perception of contrast between the confused colors.

## Causes

Colorblindness has several causes.

### (i) Inherited disorder

In most of the cases, colorblindness is inherited genetically from parents.

### (ii) Diseases:

Some disease may also become the cause of color-blindness. For example,

- (i) Diabetes
- (ii) Leukemia
- (iii) Parkinson
- (iv) cataract
- (v) Alzheimer's disease

### (iii) Certain medication

Some medication can alter color vision, such

as some drugs that treat  
certain autoimmune disease,  
heart problems, nervous disorders,  
and psychological problems.

## (iv) Chemicals

Exposure to  
some chemicals in workplace,  
such as carbon disulfide  
and fertilizers, may cause  
loss of color vision.

# Nightblindness

Nightblindness, also called Nyctalopia, is a type of vision impairment. People with night blindness experience poor vision at night or in dimly lit environment.

## Causes of night blindness

- ① Nearsightedness: untreated case of Nearsightedness or blurred vision can cause night blindness.
- ② Cataract: cataract may also cause night blindness.
- ③ Diabetes: People with diabetes are at higher risk of developing eye disease.
- ④ Deficiency of vitamin A: Vitamin A, also called retinol, play a role in transforming nerve impulses into images in retina. Thus, deficiency of V A can cause night blindness.



## ⑤ Retinitis Pigmentosa:

This

is a rare genetic condition and in this retinal Photoreceptor cells namely the rods and cones begin to degenerate.

### Symptoms:

- (i) Sensitivity to light
- (ii) Bluery vision in low light

### Treatment:

(i) Night blindness caused by cataract and can be treated by removing the cataracts themselves.

(ii) Surgery

Attempted well.