REVIEW QUESTIONS PAGE: 148

A. MULTIPLE CHOICE TYPE
(Select the most appropriate option in each case).
1. Which part of the eye is grafted in a needy patient from a donated eye?
(a) Conjunctiva **(b) Cornea**
(c) Choroid **(d) Ciliary muscles**
Solution:-
(b) Cornea

2. Which part of our ear is shaped like a snail shell?
(a) Semi-circular canals **(b) Cochlea**
(c) Stapes **(d) Eustachian tube**
Solution:-
(b) Cochlea

3. The three parts of human ear contributing in hearing are -
(a) cochlea, ear ossicles and tympanum
(b) semicircular canals, utriculus and sacculus
(c) eustachian tube, tympanum and utriculus
(d) perilymph, ear ossicles and semi-circular canals
Solution:-
(c) eustachian tube, tympanum and utriculus

4. The region in the eye where the rods and cones are located is the
(a) retina **(b) cornea**
(c) choroid **(d) sclera**
Solution:-
(a) retina

B. VERY SHORT ANSWER TYPE
1. Name the following:
(a) The photosensitive pigment present in the rods of the retina.
Solution:-
Rhodopsin

(b) The part which equalizes the air pressure in the middle and external ear.

Solution:-
Eustachian tube

(c) The ear ossicle attached to the tympanum.
Solution:-
Hammer

(d) The tube which connects the cavity of the middle ear with the throat.
Solution:-
Dura mater

(e) The part of the eye responsible for its shape.
Solution:-
Eustachian tube

(f) The nerves which transmit impulse from ear to the brain.
Solution:-
Cornea

(g) The photoreceptors found in the retina of the eye.
Solution:-
Auditory nerve

(h) The eye defect caused due to shortening of the eye ball from front to back.
Solution:-
Hypermetropia

2. Note the relationship between the first two words and suggest the suitable word/words for the fourth place.
(a) Cones: Iodopsim:: Rods: _____.
Solution:-
Cones: Iodopsim:: Rods: Rhodopsin

(b) Sound: ear drum:: dynamic balance: _____.
Solution:-
Sound: Ear drum:: Dynamic balance: Semi-circular canals

3. Which one or more of the expressions in column II are appropriate for the items listed in column I? Match the correct pairs –

Column I	Column II
(i) The blind spot	(a) colour of the eye
(ii) The yellow spot	(b) shape of the lens
(iii) Ciliary muscle	(c) amount of light entering the eye
(iv) Iris	(d) maximum sensory cells
(v) Pupil	(e) no sensory cells

Solution:-

Column I	Column II
(i) The blind spot	(e) no sensory cells
(ii) The yellow spot	(d) maximum sensory cells
(iii) Ciliary muscle	(b) shape of the lens
(iv) Iris	(a) colour of the eye
(v) Pupil	(c) amount of light entering the eye

C. SHORT ANSWER TYPE

1. Differentiate between members of each of the following pairs with reference to what is asked in brackets.

(a) Myopia and hyperopia (cause of the defect)

Solution:-

Myopia	Hyperopia
Reasons for myopia is the eye ball is lengthened from front to back or the lens is too curved	This defects results on account of either shortening of the eyeball from front to back or the lens is too flat

(b) Rods and cones (sensitivity)

Solution:-

Rods	Cones
The rod cells are sensitive to dim light but do not respond to colour.	The cones are sensitive to bright light and are responsible for colour vision.

(c) Semi-circular canal and cochlea (Function)

Solution:-

Semi-circular canal	Cochlea
Semicircular canal is widened to form an ampulla which contains sensory cells for	Cochlea is responsible for hearing.

dynamic balance.	

(d) Rod and cone cells (pigment contained)
Solution:-

Rods	Cones
Rods cells contain the pigment rhodopsin or visual purple.	Cones are contain the pigment iodopsin.

(e) Dynamic balance and static balance (definition)
Solution:-

Dynamic balance	Static balance
The sensory cells in the semicircular canals are concerned with dynamic equilibrium i.e., while the body is in motion.	The sensory patches are also located in the utriculus and sacculus which register the static balance with respect to gravity.

2. State whether the following statements are true (T) or false (F). If false, correct them by changing any one single word in each.
(a) Deafness is caused due to rupturing of the pinna.
Solution:-
False.
Deafness is caused due to rupturing of the eardrum.

(b) Semicircular canals are concerned with static (positional) balance.
Solution:-
False.
Semicircular canals are concerned with dynamic balance.

3. Mention, where in living organisms are the following located and state their main functions:
(a) Fovea centralis
Solution:-
Fovea centralis or yellow spot lies at the back of the eye almost at the centre on the horizontal axis of the eyeball. This spot contains the maximum number of sensory cells and particularly the cones. As a result, this is the region of brightest vision and also of the colour vision.

(b) Organ of corti
Solution:-
The middle canal contains areas possessing sensory cells, spiral organ called organ of corti for hearing.

4. Mention if the following statements are true (T) or false (F). Give reason.
(a) Sometimes medicines dropped into the eyes come into the nose and even throat.
Solution:-
True
A nasolacrimal duct conducts the secretion into the nasal cavity.

(b) Ciliary muscles regulate the size of the pupil.
Solution:-
False
Ciliary muscles regulate the size of the lens.

(c) Yellow spot of the retina is the region of the colour vision.
Solution:-
True
Fovea centralis or yellow spot lies at the back of the eye almost at the centre on the horizontal axis of the eyeball. This spot contains the maximum number of sensory cells and particularly the cones. As a result, this is the region of brightest vision and also of the colour vision.

(d) The auditory nerve is purely for perceiving sound.
Solution:-
False
The auditory nerve responsible for sound as well as for the body balance.

(e) Malleus, incus and stapes are collectively called ear ossicles.
Solution:-
True
The middle ear contains three tiny bones malleus, incus and stapes or hammer, anvil and stirrup in popular terms and a eustachian tube which connects the cavity of the middle ear with the throat.

(f) Short-sightedness and hyperopia are one and the same thing.

Solution:-
False
Short-sightedness is myopia and hyperopia is long-sightedness.

(g) Blind spot is called so because no image is formed on it.
Solution:-
True
Lateral to the yellow spot on the nasal side is the blind spot. There are no sensory cells here and, therefore, this is point of no vision. This is the point at which the nerve fibres from all the sensory cells of the retina converge and bundle together to leave the eyeball in the form of the optic nerve.

5. Given below are two sets (a) and (b) of five parts in each. Rewrite them in correct sequence.
(a) Cochlea, tympanum, auditory canal, ear ossicles, oval window.
Solution:-
Auditory canal, tympanum, ear ossicles, oval window, cochlea.

(b) Conjunctiva, retina, cornea, optic nerve, lens
Solution:-
Conjunctiva, cornea, lens, retina, optic nerve

6. Given below are certain structures. Write against each their special functional activity.
(a) Organ of Corti and ……
Solution:-
Organ of Corti and hearing

(b) Olfactory nerve and ……..
Solution:-
Olfactory nerve and smell

(c) Retina and ……
Solution:-
Retina and vision

7. Answer the following:

(a) What is the function of the lacrimal gland and where is it situated in the body?
Solution:-
They are located at the upper sideward portion of the orbit. Six to twelve ducts of the gland pour the secretion over the front surface. The movements of the eyelids spread the liquid which mainly serves as a lubricant. The tears also keep the front surfaces of the eye clean by washing away dust particles.

(b) In what two ways is the yellow spot different from the blind spot?
Solution:-
Yellow spot contains the maximum number of sensory cells and particularly the cones. As a result, this is the region of brightest vision and also of the colour vision. There are no sensory cells here and, therefore, this is point of no vision. This is the point at which the nerve fibres from all the sensory cells of the retina converge and bundle together to leave the eyeball in the form of the optic nerve.

(c) Name an age-old eye defect. What causes it?
Solution:-
Presbyopia is a condition affecting older people who cannot see near objects clearly. Their lens loses flexibility resulting in a kind of farsightedness. This again is corrected by a convex lens.

(d) What is meant by the power of accommodation of the eye?
Solution:-
To see an object clearly, its image should be in sharp focus in each eye. The process of focusing the eye to see objects at different distances is called power of accommodation of the eye.

(e) Mention the characteristics of the image that falls on the retina of the eye.
Solution:-
The image on the retina is inverted and real.

8. What is meant by optical illusion? Give one example.
Solution:-
In a movie, pictures are projected on a screen at the rate of about 24 pictures per second, but we cannot see the individual frames on account of the after-images in our eyes. The life-like continuous movement on the screen is an illusion. Television too is similar, where the scanning beam of a picture frame of the TV camera moves so rapidly

on the viewing screen of the TV set that our eyes cannot keep pace with it. Out of numerous other optical illusion.

9. Where are the following located? Briefly mention the function of each:
(a) Oval window
Solution:-
Oval window is a membrane-covered opening leading to the inner ear. It is located in the middle ear.

(b) Cochlea
Solution:-
The cochlea is spiral-shaped and looks like a snail shell. It is located in the inner ear. It helps in transmitting impulses to the brain via the auditory nerve.

(c) Semicircular canals
Solution:-
Semicircular canal is located in the inner ear. It is widened to form an ampulla which contains sensory cells for dynamic balance.

(d) Utriculus
Solution:-
It is located in the inner ear. The short stem joining the bases of semicircular canals to the cochlea. These parts also contain sensory cells for static balance when the body is stationary as in standing.

10. Complete the following table by filling in the blank spaces.

Structure	**Function**
1. Yellow spot	**(i) ……..**
2. ……	**(ii) Transfers impulse from inner ear to brain**
3. ……	**(iii) Helps to change the focal length of the eye lens**
4. Oval window	**(iv) ……**
5. ……	**(v) Dynamic equilibrium**

Solution:-

Structure	**Function**
1. Yellow spot	(i) Region of brightest vision
2. Auditory nerve	(ii) Transfers impulse from inner ear to brain

3. Ciliary muscle	(iii) Helps to change the focal length of the eye lens
4. Oval window	(iv) Sets fluid in the cochlear canal into vibration
5. Semicircular canals	(v) Dynamic equilibrium

D. LONG ANSWER TYPE

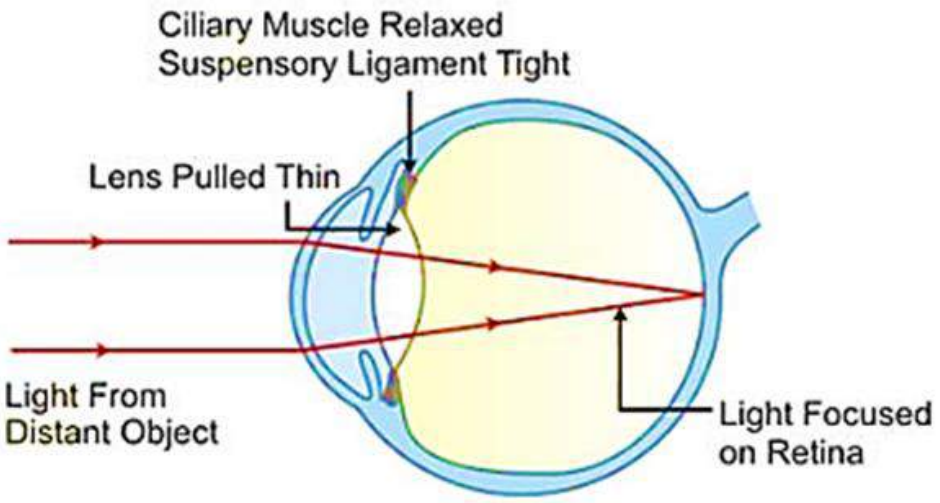
1. Describe the mechanism of focusing the image of a distant object in your eye when you raise your head after reading a book.

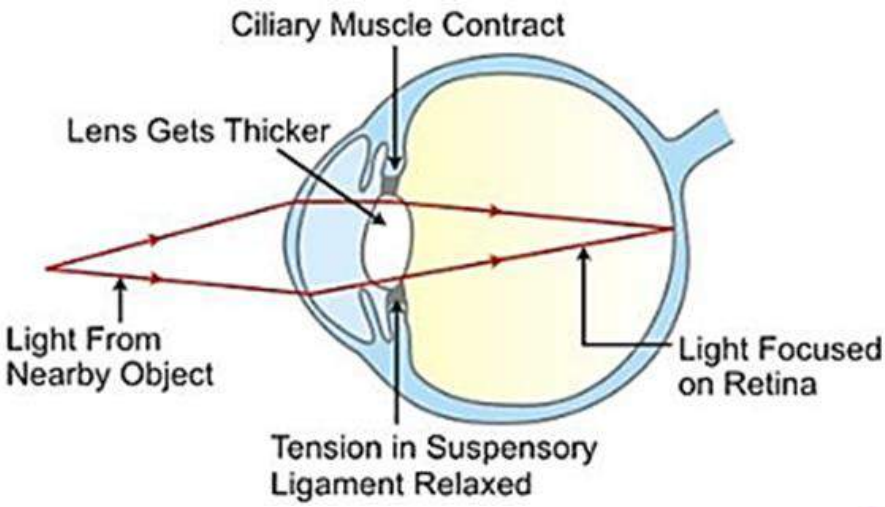
Solution:-

To see an object clearly, its image should be in sharp focus in each eye. For distant vision, the lens is more flattened or thinner. Changes in the shape of the lens is brought about by the ciliary muscles.

In the normal condition (ciliary muscles relaxed), the lens remains stretched by the suspensory ligaments and it is less convex, suited for viewing distant objects shown fig (a).

When we look at nearby objects, the ciliary muscles (which are circular) contract and tend to pull the ciliary body slightly forward. This releases the tension on the suspensory ligament making it loose and the lens, on account of its elasticity, becomes thicker and more rounded or convex shown in fig (b).





2. Sometimes you remember a vivid picture of a dream you saw. What is the role of your eyes in this experience?
Solution:-
The brain sees the vivid picture of the dream through the eyes. Our eyes have actually never seen the vivid picture. This is an example of optical illusion. The area of the dream is controlled by the cerebrum of the central nervous system. So sometimes we can remember the vivid picture seen in the dream.

3. By closing the eyes and gently pressing them by your palms, you may see some specks of brilliant light. How do you get this sensation while there is no light entering your eyes?
Solution:-
By closing the eyes and gently pressing them by our palms, we may see some specks of brilliant light because, if we look at a bright object and then close our eyes, the sensation of light persists for a short period. This is known as persistence image or the after image. It lasts for one-tenth of a second. Therefore by closing the eyes and gently pressing them with your palms, you see some specs of brilliant light.

4. Explain the terms 'adaptation' and 'accommodation' with reference to the eye.
Solution:-
Adaptation,
When you pass from a brightly lighted area to a dark room (such as cinema hall), you experience difficulty in seeing objects for a short while. Slowly, your vision is improved. This improvement is called dark adaptation. This change is due to regeneration of the visual purple or rhodopsin, the pigment of the rods, which was earlier broken down due

to bright light. When a person with dark adapted eyes moves to a brightly lighted area, as in coming out of a cinema hall after the noon show, he experiences a dazzling effect for a short period. After a few seconds. He comes back to normal viewing through light adaptation.

Accommodation,

To see an object clearly, its image should be in sharp focus in each eye. The process of focusing the eye to see objects at different distances is called power of accommodation of the eye. This is mainly brought about by a change in the curvature of the elastic lens making it thinner or fatter. For distant vision, the lens is more flattened or thinner. For near vision, the lens becomes more convex or rounded.

5. You do not enjoy watching a movie from a very short distance from the screen in a cinema hall. Why?

Solution:-

While watching a movie from a very short distance a blurred image is formed. Because, our eyes are designed to focus at a great variety of distances. If object is too close the eye lens cannot curve enough to focus the image on to the retina and hence causing strain to the eyes. Therefore we cannot enjoy watching a movie from a very short distance from the screen in a cinema hall.

6. Enumerate the common defects of vision, their causes and the possible methods of correcting them.

Solution:-

Defect of vision	**Cause**	**Corrective measure**
1. Myopia	The eye ball is lengthened from front to back or the lens is too curved.	This defect can be corrected by using suitable concave lens
2. Hyperopia	This defect results on account of shortening of eye ball from front to back or the lens is too flat.	This defect can be corrected by using suitable convex lens
3. Astigmatism	It arises due to Uneven curvature of the cornea	This defect can be corrected by using suitable cylindrical lenses
4. Presbyopia	Their lens losses flexibility resulting in a kind of farsightedness.	This defect can be corrected by using suitable convex lens

5. Cataract	This is because of the lens turns opaque	This defect can be corrected by surgery or use of convex lens or implantation of plastic lens.
6. Colour blindness	Genetic defect	No control measure
7. Squint	Formation of cross-eye	Surgery and suitable exercise

7. Name the three ear ossicles. How do they contribute in the mechanism of hearing?
Solution:-
Malleus (hammer), Incus (anvil) and Stapes (stirrup). The three bones are collectively called the ear ossicles. The last ear ossicle, stapes, vibrates and transmits the vibration to the oval window. The role of other two ear ossicles is to magnify the vibration of stapes as a result of their lever like action.

8. What is meant by power of accommodation of the eye? Name the muscles of the eye responsible for the same…….
Solution:-
To see an object clearly, its image should be in sharp focus in each eye. The process of focusing the eye to see objects at different distances is called power of accommodation of the eye.
The ciliary muscles are responsible for the power of accommodation.

E. STRUCTURED/APPLICATION/SKILL TYPE
1. With reference to the functioning of the eye, answer the questions that follow:
a. What is meant by power of accommodation of the eye?
Solution:-
To see an object clearly, its image should be in sharp focus in each eye. The process of focusing the eye to see objects at different distances is called power of accommodation of the eye.

b. What is the shape of the lens during (1) near vision (2) distant?
Solution:-
(1) The shape of the lens during the near vision is flattened.
(2) The shape of the lens during the distant is rounded or more complex.

c. Name the two structures in the eye responsible for bringing about the change in the shape of the lens.

Solution:-
Ciliary muscles and suspensory ligament are the two structures in the eye responsible for bringing about the change in the shape of the lens.

d. Name the cells of the retina and their respective pigments which get activated (1) in the dark and (2) in the light.
Solution:-
(1) The rod cells of the retina and their pigment rhodopsin get activated in the dark.
(2) The cone cells of the retina and their pigment iodopsin get activated in the light.

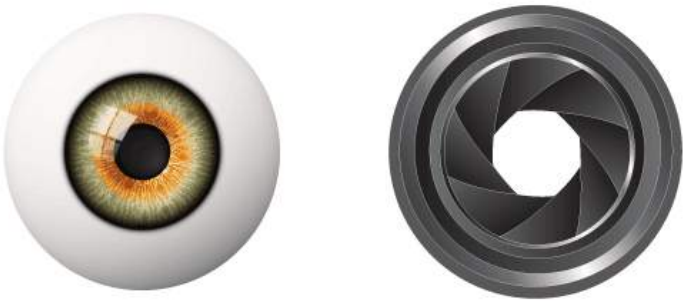
2. With reference to the human ear, answer the questions that follow:
a. Given the technical term for the structure found in the inner ear.
Solution:-
The inner ear or membranous labyrinth has two main parts the cochlea and the semi-circular canals.

b. Name the three small bones present in the middle ear. What is the biological term for them collectively?
Solution:-
The middle ear contains three tiny bones are malleus, incus and stapes.

c. Name the part of the ear associated with (1) static balance (2) hearing (3) dynamic balance.
Solution:-
The part of the ear associated with static balance is utriculus and sacculus (inner ear)
The part of the ear associated with hearing is internal ear
The part of the ear associated with dynamic balance is semi-circular canals (inner ear)

d. Name the nerve, which transmits messages from the ear to the brain.
Solution:-
The nerve, which transmits messages from the ear to the brain collectively they are termed as ossicles.

3. The figure below compares a part of our eye with a part of a photographic camera.



(a) Name the corresponding parts of the eye and the camera shown here that are comparable in function.

Solution:-

Cornea in the eye is the corresponding parts to the lens cover of the camera and iris and pupil act like the aperture of a camera.

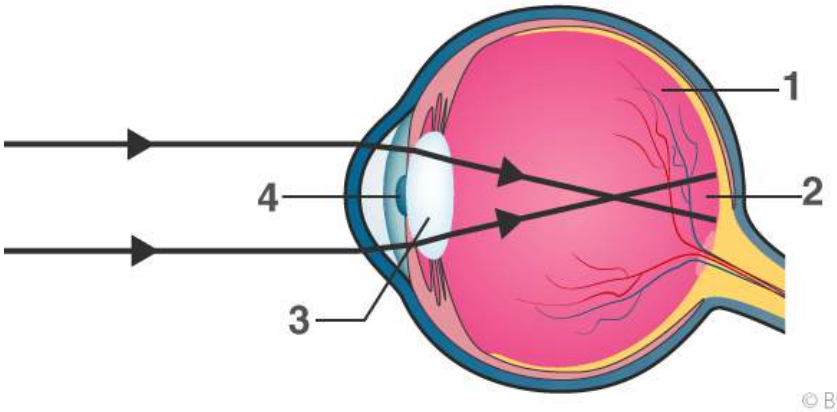
(b) Explain the mode of working and the functions of the parts of the eye mentioned above.

Solution:-

The white portion on the front of the eye is the sclerotic layer, itself visible through the conjunctiva. It bulges out and becomes transparent in the front region where it covers the coloured part of the eye this part is called the cornea.

The iris is also an extension of the choroid, partially covering the lens and leaving a circular opening in the center, the pupil.

4. Given below is a diagram depicting a defect of the human eye? Study the same and answer the questions that follow:



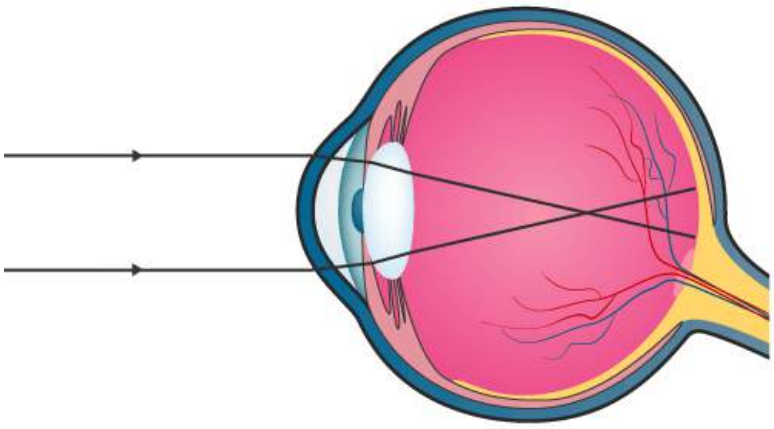
(a) Name the defect shown in the diagram.
Solution:-
The defect shown in this diagram is Myopia.

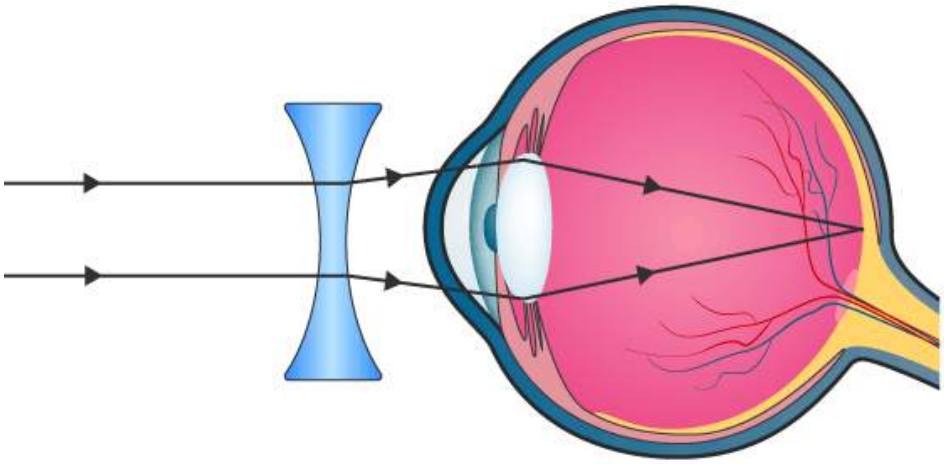
(b) Give two possible reasons for this defect.
Solution:-
The eye ball is lengthened from front to back or the lens is too curved.

(c) Name the parts labeled 1 to 4.
Solution:-
1 represents vitreous humour
2 represents blind spot
3 represents lens
4 represents pupil

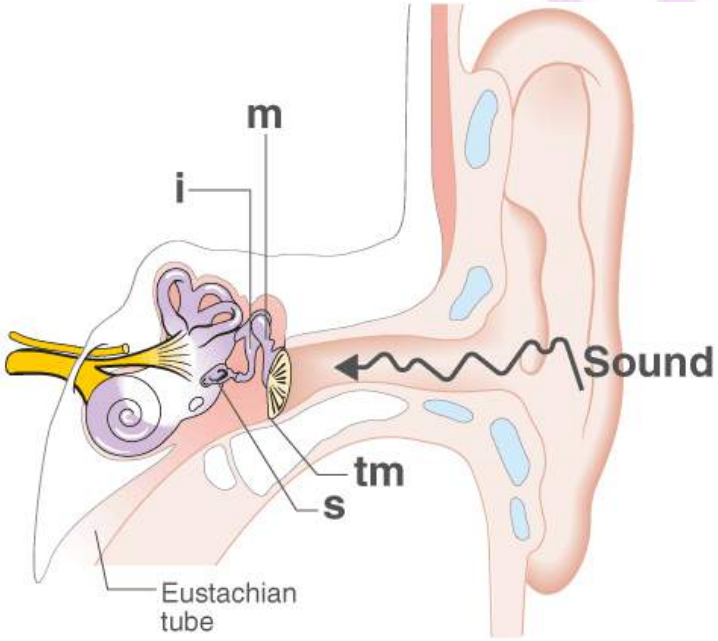
(d) Name the type of lens used to correct this eye defect.
Solution:-
Concave lens is used to correct this eye defect.

(e) Draw a labeled diagram to show how the above mentioned defect is rectified using the lens named above.
Solution:-





5. The figure below is the sectional view of a part of the skull showing a sense organ:



(i) Name the sense organ.
Solution:-
Ear.

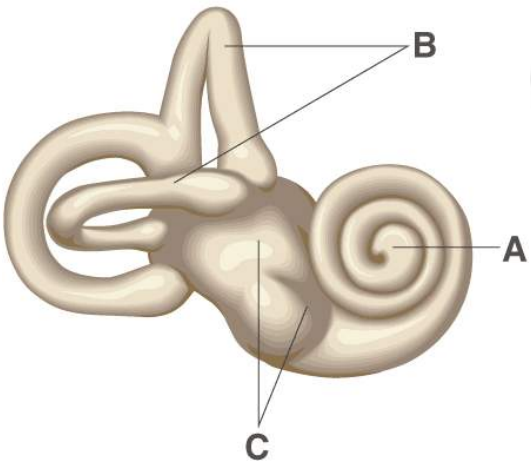
(ii) What are the parts labeled 'm', 'i' and 's'? What do these parts constitute collectively?
Solution:-
The part ‘m’ represents malleus.

The part ‘i’ represents incus.
The part ‘s’ represents stapes.
These are collectively called as ear ossicles.

(iii) What do you call the part shown in the form of a spiral? What is its function?
Solution:-
The part shown in the form of cochlea.
The vibrating movements of the fluid stimulate the hair-like processes of the sensory cells of the cochlea and the impulse are transmitted to the brain via the auditory nerve.

(iv) Name the part labeled 'tm'. What is its function?
Solution:-
The part named ‘tm’ is Tympanic membrane. It vibrates and then sets the ear ossicles into vibration in the process of hearing.

6. Given below is a diagram of a part of the human ear. Study the same and answer the questions that follow:



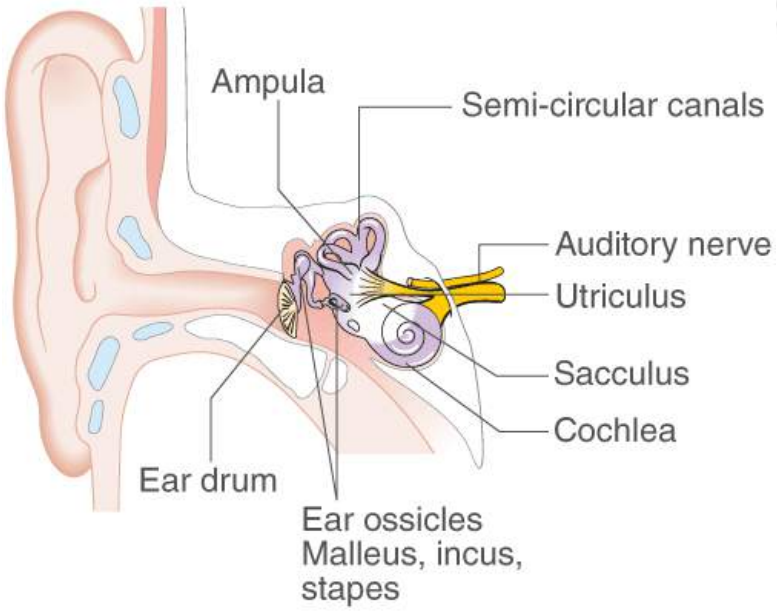
(i) Give the collective biological term for Malleus, Incus and Stapes.
Solution:-
Ear ossicles is the collective biological term for Malleus, Incus and Stapes.

(ii) Name the parts labeled A, B and C in the diagram.
Solution:-
The part ‘A’ represents Cochlea.
The part ‘B’ represents Semicircular canals.
The part ‘C’ represents Ear ossicles.

(iii) State the functions of the parts labeled 'A' and 'B'.
Solution:-
The function of Cochlea (A) is vibrating movements of the fluid stimulate the hair-like processes of the sensory cells of the cochlea and the impulse are transmitted to the brain via the auditory nerve.
The function of Semicircular canals is canal is widened to form an ampulla which contains sensory cells for dynamic balance.

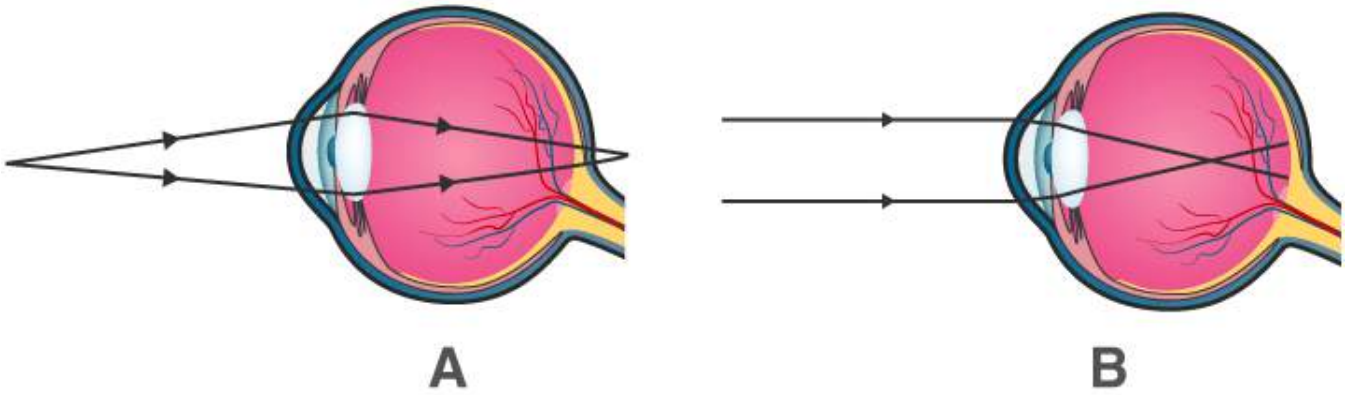
(iv) Name the audio receptor region present in the part labeled 'A'.
Solution:-
Organ of corti is the audio receptor region present in the part labeled 'A'.

7. Draw a labelled diagram of the inner ear. Name the part of the inner ear that is responsible for static balance in human beings.
Solution:-



Utriculus and Sacculus are responsible for maintaining static balance in human beings.

8. Have a look at the posture of this girl who is reading a book and answer the questions which follow:



(a) Name the problem she is facing.
Solution:-
The problem she is facing is Myopia.

(b) What are the two conditions shown in sections A and B of the eye as applicable to her?
Solution:-
Section ‘A’ is applicable to Normal eye and section ‘B’ is applicable to Myopia.

(c) What kind of reading glasses does she need?
Solution:-
She required looking glasses with the concave lens.