CHAPTER -11 SENSE ORGANS

Progress Check 1

Question 1

State the functions of the following:

(i) Eyelids

(ii) Eyelashes

(ili) Tears

(iv) Iris

(v) Ciliary muscles

Answer

(i) Eyelids — Protects the outer surface of the eyes and can shut out light.

(ii) Eyelashes — Prevent falling of large particles into the eye.

(ili) Tears — serve as lubricant, washes away dust particles.

(iv) Iris — regulates the amount of light that can enter the eye.

(v) Ciliary muscles — It changes the shape of the lens during accommodation reflex.

Question 2

Write in proper sequence the names of all the parts of the human eye through which the light rays coming from an object pass before they form an image on the retina.

Answer

Conjunctiva → cornea → aqueous humour → lens → vitreous humour → retina

Question 3

Name the following :

(i) Place of best vision in the retina of the eye

(ii) Place of no vision in the retina of the eye

(iii) Kind of retinal cells sensitive to dim light

(iv) The circular opening enclosed by iris

(v) The fibres which collectively hold the lens in position

(vi) Capacity of the eye to focus at different distances

(vii) The kind of lens required to correct near sightedness

(viii) The layer of the wall of the eye-ball that corresponds to the black lining of the box of a camera

Answer

(i) Yellow spot

(ii) Blind spot

(iii) Rod cells

(iv) Pupil

(v) Suspensory ligaments

(vi) Accommodation

(vii) Concave

(viii) Choroid

Question 4

Give the reason for the following:

(i) Medicines dropped in the eye flow down into the nose.

(ii) A person from bright sunlight outside enters a poorly lit room and feels blinded for a short while.

Answer

(i) Nasolacrimal duct connects the eyes with the nasal cavity. Medicines dropped in the eye, sometimes flow down through this duct and come into the nose.

(ii) When a person enters a poorly lit room after being exposed to bright sunlight outside, they may feel blinded for a short while due to **dark adaptation**. The following changes take place in dark adaptation:

1. Visual purple or rhodopsin, the pigment of rods, is regenerated which was earlier broken down due to bright light.
2. Pupil are dilated permitting more light to enter the eyes.

These adjustments take a little time during which the person feels blinded.

Progress Check 2

Question 1

Categorise the following parts under

(i) external (ii) middle (iii) internal ear.

Ear drum, hammer, pinna, cochlea, anvil, stirrup, eustachian tube, tympanum, oval window, semi-circular canals.

Answer

- External Ear — Ear drum, pinna, tympanum
- Middle Ear — Hammer, Anvil, stirrup, Eustachian tube, oval window
- Internal Ear — Cochlea, semi-circular canals

Question 2

State the functions of the following :-

(i) Semi-circular canals

(ii) Cochlea

(iii) Auditory nerve

Answer

(i) Semi-circular canals

1. Dynamic Equilibrium
2. Detects head rotation

(ii) Cochlea

1. Contains organ of corti which plays role in hearing.
2. Converts sound vibrations into electrical signals and transmits it to the brain via the auditory nerve.

(iii) Auditory nerve

1. Transmits auditory signals from ear to brain.

Question 3

Mention if the following statements are true (T) or false (F) :

(i) Human ear is concerned with hearing only.

(ii) Pinna concentrates and directs sound waves towards tympanum.

Answer

(i) False
Corrected Statement — Human ear is concerned with hearing and balancing.

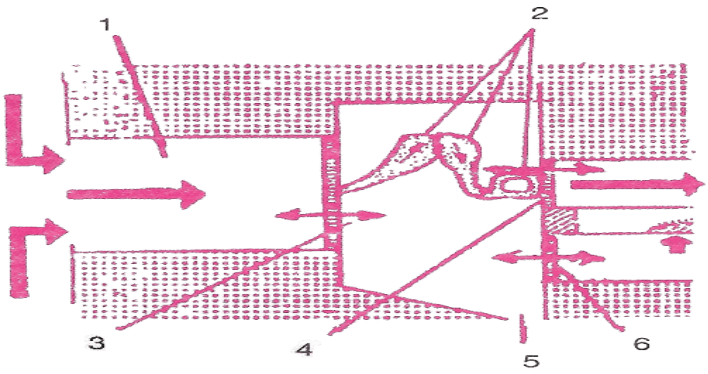
(ii) True

Question 4

Given below is a diagrammatic representation of a part of the human ear.

(i) Name the parts numbered 1-6.

(ii) Which parts of the ear shown here are complete.



Answer

(i) The parts numbered 1-6 are:

1 → Ear canal

2 → Ear ossicles

3 → Ear drum

4 → Oval wind

5 → Opening of Eustachian tube

6 → Round Window

(ii) Middle Ear

Multiple Choice Type

Question 1

The layer in the eye where sensory cells (rods and cones) are located:

1. Conjunctiva
2. Cornea
3. Choroid
4. Retina

Answer

Retina

Reason — Sensory cells are present in Retina. It acts as screen where image is formed.

Question 2

The vitamin required for the synthesis of rhodopsin is :

1. Vitamin A
2. Vitamin B
3. Vitamin C
4. Vitamin D

Answer

Vitamin A

Reason — Vitamin A (Retinol) is necessary for the synthesis rhodopsin.

Question 3

An aperture that controls the passage of light into the eye is:

1. Blind spot
2. Pupil
3. Yellow spot
4. Iris

Answer

Pupil

Reason — The size of pupil increases or decreases to regulate the amount of light entering the eyes.

Question 4

Tears have an antiseptic property due to the presence of:

1. Lysosome
2. Aqueous humour
3. Lysozyme
4. Vitreous humour

Answer

Lysozyme

Reason — Lysozyme helps to fight the infection or avoid infection due to its antiseptic property.

Question 5

Which of the following is responsible for the adjustment of the size of pupil ?

1. Iris

2. Sclera
3. Lens
4. Choroid

Answer

Iris

Reason — The iris contains radial muscles to widen and circular muscles to constrict the pupil.

Question 6

The median canal of cochlea is filled with :

1. Perilymph
2. Lymph
3. Endolymph
4. Tissue fluid

Answer

Endolymph

Reason — The median canal of cochlea is filled with fluid called endolymph.

Question 7

The thin, transparent extension of sclerotic layer found in front of the lens is:

1. Cornea
2. Cochlea
3. Conjunctiva
4. Choroid

Answer

Cornea

Reason — The thin, transparent extension of sclerotic layer found in front of the lens is transparent and buldges out. This is known as cornea.

Question 8

The part of the inner ear which is responsible for hearing is :

1. Semicircular canal
2. Utriculus

3. Cochlea
4. Sacculus

Answer

Cochlea

Reason — Cochlea has organ of corti which is responsible for hearing.

Question 9

The spiral organ possessing sensory cells for hearing is:

1. Ampulla
2. Semicircular Canal
3. Vestibule
4. Organ of Corti

Answer

Organ of Corti

Reason — The middle canal of cochlea contains spiral organ called organ of Corti for hearing.

Question 10

Which of the following structures equalises the air pressure on either side of the tympanum ?

1. Auditory tube
2. Eustachian tube
3. Vestibular canal
4. Tympanic canal

Answer

Eustachian tube

Reason — Eustachian tube connects the cavity of middle ear with throat. It equalises the air pressure on either side of the tympanum.**Question 11**

When a person comes out of a cinema hall after a noon show, he experiences a dazzling effect for a short period of time. It happens due to degeneration of (P) ..... and regeneration of (Q) ..... pigments. Which of the following options is correct for P and Q ?

1. P - Iodopsin, Q - Rhodopsin
2. P - Rhodopsin, Q - Iodopsin

3. P - Visual violet, Q - Visual purple
4. P - Iodopsin, Q - Visual violet

Answer

P - Rhodopsin, Q - Iodopsin

Reason — Rhodopsin pigment is responsible for vision in low light and iodopsin pigment is responsible for vision in bright light. When we enter into bright light from low light the rhodopsin pigment bleaches (degenerates) rapidly due to intense light which causes dazzling effect.

Assertion Reason type

Question 12

Assertion. Lacrimal gland is a kind of endocrine gland which secretes an enzyme called thrombokinase.

Reason. Lacrimal gland is located in the upper outer portion of the orbit of the eye. Tears act as a lubricant and also have antiseptic property.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True.

Explanation
The lacrimal gland is an exocrine gland located above the eyeball. It secretes lacrimal fluid (tear fluid), a watery fluid isotonic to plasma, onto the surface of the eyeball. These tears help clean, lubricate, nourish, and maintain eye health.

Question 13

Assertion. Choroid layer provides nourishment to the eye and also prevents light rays form reflecting and scattering inside the eye.

Reason. Choroid layer is the outermost layer of the eyeball which surrounds the sclerotic layer. This layer contains two types of pigments-Rhodopsin and Iodopsin.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is True and R is False

Explanation
Choroid layer lies between the retina and the sclera. The choroid plays a crucial role in maintaining eye health by supplying nutrients to the retina.

Question 14

Assertion. The image formed on the retina is straight and real.

Reason. Images from the retina are transmitted to the brain through the optic nerve. Then brain interprets it in an upright position. Both the eyes form two images but the brain interprets them as one due to the overlapping of the images.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True.

Explanation
The image formed on the retina is actually inverted (upside down) and real.
The brain receives inverted images from the retina through the optic nerve and then processes and interprets these images as upright. Additionally, the brain merges the two slightly different images from each eye into a single cohesive image due to the overlapping visual fields.

Question 15

Assertion. Myopia is caused due to the shortening of the eyeball from front to back.

Reason. Myopia can be corrected by using suitable convex (converging) lens and the power of the glasses used is mentioned in plus "+".

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

Both A and R are False.

Explanation
Myopia is caused due to the lengthening of the eyeball from front to back or if the lens is too curved. It can be corrected by suitable concave (diverging) lens and the power of the glasses used is mentioned in minus "-".

Question 16

Assertion. Semi-circular canals are present in the middle ear and they contain sensory cells responsible for the static balance of the body.

Reason. One end of each of the three semi-circular canals is widened to form an ampulla which contains the sensory cells for dynamic balance.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True

Explanation
Semi-circular canals are present in the inner ear and they contain sensory cells responsible for the dynamic balance of the body.

Question 17

Assertion. The tube/canal which transmits the air currents from the pinna to tympanum is termed as eustachian tube.

Reason. The eustachian tube equalizes the air pressure on either side of the ear drum allowing it to vibrate freely.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True

Explanation
Eustachian tube connects the cavity of the middle ear with the throat.

Question 18

Assertion. The human ear is responsible for hearing, dynamic equilibrium and also static balance.

Reason. Cochlea, semi-circular canals and vestibule (utriculus and sacculus) are responsible for hearing, dynamic balance and static balance respectively.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

Both A and R are True.

Explanation
The inner ear contains the vestibular apparatus, which includes the vestibule and semicircular canals. These structures help maintain postural equilibrium.

Very Short Answer Type

Question 1

Name the following:

(a) The photosensitive pigment present in the rods of the retina.

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

(c) The ear ossicle attached to the tympanum.

(d) The tube which connects the cavity of the middle ear with the throat.

(e) The part of the eye responsible for its shape.

(f) The nerves which transmit impulse from ear to the brain.

(g) The photoreceptors found in the retina of the eye.

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

Answer

(a) Rhodopsin

(b) Eustachian tube

(c) Hammer

(d) Eustachian tube

(e) Sclerotic layer or Sclera

(f) Auditory nerves

(g) Rods and cones

(h) Hypermetropia

Question 2

Note the relationship between the first two words and suggest the suitable word/words for the fourth place.

(a) Cones : Iodopsin :: Rods: ..... .

(b) Eyes : Photoreceptors :: Ears : ..... .

(c) Ears : Auditory nerve :: Eyes : ..... .

(d) Ear pinna : Auricle :: Inner ear : ..... .

(e) Semi-circular canal : Ampulla :: Cochlea : ..... .

Answer

(a) Cones : Iodopsin :: Rods: ***Rhodopsin***.

(b) Eyes : Photoreceptors :: Ears : ***Phonoreceptors***.

(c) Ears : Auditory nerve :: Eyes : ***Optical nerve***.

(d) Ear pinna : Auricle :: Inner ear : ***Membranous labyrinth***.

(e) Semi-circular canal : Ampulla :: Cochlea : ***Basilar membrane***.

Question 3

Match the terms in column I with those in column II and write down the matching pairs.

Column I	Column II
Conjunctiva	Viral infection
Cornea	Ciliary body
Choroid	Spiral-shaped
Cochlea	Transparent epithelium
Conjunctivitis	Suspensory ligament

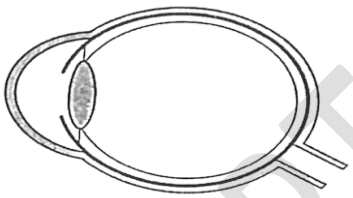
Column I	Column II
	Contains melanin
	Transparent but appears black

Answer

Column I	Column II
Conjunctiva	Transparent epithelium
Cornea	Transparent but appears black
Choroid	Contains melanin, Ciliary body
Cochlea	Spiral-shaped
Conjunctivitis	Viral infection

Question 4

Given below is the structure of a human eye. Read the information below the diagram and fill in the blanks:



Human eye

Eyes are the sense organs located in deep sockets on the front side of the head. Eyes can receive the light stimulus and hence considered as photoreceptors. Eyes are protected with eyelids, eyebrows and tear glands, etc. Eyes are visionary in function.

The wall of the eyeball is composed of three concentric layers. The middle layer of the eyeball is (a) ....., richly supplied with blood vessels whereas the innermost layer is (b) ..... which contains two types of sensory cells. (c) ..... is the extension of the middle layer of the eyeball which regulates the size of the (d) ..... . The image formed on the yellow spot of the eye is the (e) .....

Answer

(a) Choroid

(b) Retina

(c) Iris

(d) Pupil

(e) brightest

Short Answer Type

Question 1

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.

(b) Semicircular canals are concerned with static (positional) balance.

Answer

(a) False
Corrected statement — Deafness is caused due to rupturing of the ***eardrum***.

(b) False
Corrected statement — Semicircular canals are concerned with ***dynamic balance***.

Question 2

Where are the following located?

(a) Yellow spot

(b) Lacrimal gland

(c) Organ of Corti

(d) Eustachian canal

(e) Incus

Answer

(a) **Yellow spot** lies at the back of the eye almost at the centre on the horizontal axis of the eyeball.

(b) **Lacrimal glands** are located at the upper sideward portion of the eye orbit.

(c) **Organ of Corti** is present in the middle cochlear canal of the ear.

(d) **Eustachian canal** connects middle ear to throat.

(e) **Incus** is located in middle ear.

Question 3

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

(b) Conjunctiva, retina, cornea, optic nerve, lens.

Answer

(a) Auditory canal, tympanum, ear ossicles, oval window, cochlea

(b) Conjunctiva, cornea, lens, retina, optic nerve.

Question 4

Write the main functional activity of each of the following structures.

(a) Cochlea

(b) Semicircular canal

(c) Iris

(d) Choroid

(e) Ciliary body and suspensory ligament

Answer

(a) **Cochlea** — Hearing.

(b) **Semicircular canal** — Dynamic Equilibrium.

(c) **Iris** — Regulates the size of pupil controlling the amount of light entering the eyes.

(d) **Choroid** — Provides nourishment to the eye and prevents light rays from reflecting and scattering inside the eye.

(e) **Ciliary body and suspensory ligament** — Accommodation of eye.

Question 5

Complete the following table by filling in the blank spaces.

Structure	**Function**
(1)	(i) Transfers impulse from inner ear to brain
(2)	(ii) Helps to change the focal length of the eye lens
(3)	(iii) Dynamic equilibrium

Answer

Structure	Function
Auditory nerve	Transfers impulse from inner ear to brain
Ciliary muscle	Helps to change the focal length of the eye lens
Semicircular canals	Dynamic equilibrium

Question 6

Name the following:

(a) Two pigments of the sensory cells.

(b) Two types of adaptations.

(c) Two kinds of accommodations.

(d) Three layers of the eyeball.

Answer

(a) Rhodopsin or visual purple and iodopsin or visual violet.

(b) Dark adaptation and light adaptation.

(c) Distant vision accommodation and near vision accommodation.

(d) Sclera, choroid and retina.

Question 7

Name the eye defects caused due to each of the following:

Cause	Eye defect
(a) Lens turns opaque	..... .
(b) Uneven curvature of the cornea	..... .
(c) Deficiency of vitamin A	..... .
(d) Lens loses its flexibility	..... .
(e) Eye ball lengthens from front to back	..... .
(f) Lens becomes too flat	..... .

Answer

Cause	Eye defect
(a) Lens turns opaque	Cataract
(b) Uneven curvature of the cornea	Astigmatism
(c) Deficiency of vitamin A	Night blindness
(d) Lens loses its flexibility	Presbyopia
(e) Eye ball lengthens from front to back	Myopia
(f) Lens becomes too flat	Hyperopia

Descriptive Type

Question 1

Define the following terms:

(a) Conjunctiva

(b) Lysozyme

(c) Adaptation

(d) Power of accommodation

(e) Ear ossicles

Answer

(a) **Conjunctiva** — A thin membrane covering the entire front part of the eye . It is continuous with the inner lining of the eyelids.

(b) **Lysozyme** — Lysozyme is an enzyme present in tear which has antiseptic property.

(c) **Adaptation** — Adaptation of the eye is the process by which the eyes adjust to changes in light levels, allowing us to see clearly in both bright and dim environments.

(d) **Power of accommodation** — Power of accommodation is the ability of the eye lens to focus near and far object clearly on the retina by adjusting the thickness of lens (and hence focal length).

(e) **Ear ossicles** — The three bones present in ear, i.e. malleus, incus and stapes; together are called ear ossicles.

Question 2

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

(a) Myopia and hyperopia (type of lens used for correction)

(b) Rods and cones (sensitivity)

(c) Aqueous humour and vitreous humour (location)

(d) Near and distant accommodation (shape of lens)

(e) Dark and light adaptation (pigments which will be regenerated)

(f) Night blindness and colour blindness (sensory cells which cannot function properly)

Answer

(a) Difference between myopia and hyperopia (type of lens used for correction) —

Myopia	**Hyperopia**
Myopia can be corrected by suitable concave (diverging) lens which causes the light rays to diverge before they strike the lens of the eye.	Hyperopia can be corrected by suitable convex (converging) lens.

(b) Difference between rods and cones (sensitivity) —

Rods	**Cones**
Rods are sensitive to dim light but do not respond to colour.	Cones are sensitive to bright light and are responsible for colour vision.

(c) Difference between aqueous humour and vitreous humour (location) —

Aqueous humour	**Vitreous humour**
Aqueous humour is the front chamber between the lens and the cornea.	Vitreous humour is larger cavity of the eyeball behind the lens.

(d) Difference between near and distant accommodation (shape of lens) —

Near accommodation	Distant accommodation
For near accommodation, the lens becomes more convex or rounded.	For distant accommodation, the lens is more flattened or thinner.

(e) Difference between dark and light adaptation (pigments which will be regenerated) —

Dark adaptation	Light adaptation
For dark adaptation, visual purple or rhodopsin pigment will be regenerated.	For light adaptation, visual violet or iodopsin pigment will be regenerated.

(f) Difference between night blindness and colour blindness (sensory cells which cannot function properly) —

Night blindness	Colour blindness
In night blindness, the rod cells cannot function properly.	In colour blindness, the cone cells cannot function properly.

Question 3

Give reason:

(a) Sometimes medicines dropped into the eyes come into the nose and even throat.

(b) Three small bones of ear ossicles are advantageous as compared to one single bone for hearing.

(c) Blind spot is considered as 'area of no vision'.

Answer

(a) Nasolacrimal duct connects the eyes with the nasal cavity. Medicines dropped in the eye, sometimes flow down through this duct and come into the nose and even throat.

(b) Three small bones of ear ossicles transmit the vibrations received by the tympanum and amplify them. If these were replaced by a single bone, the vibrations received by the tympanum would not be amplified. Hence, three small bones of ear ossicles are advantageous as compared to one single bone for hearing.

(c) There are no sensory cells in the blind spot and therefore, this is considered as 'area of no vision' and image striking it cannot be perceived.

Question 4

Mention the characteristics of the image that falls on the retina of the eye.

Answer

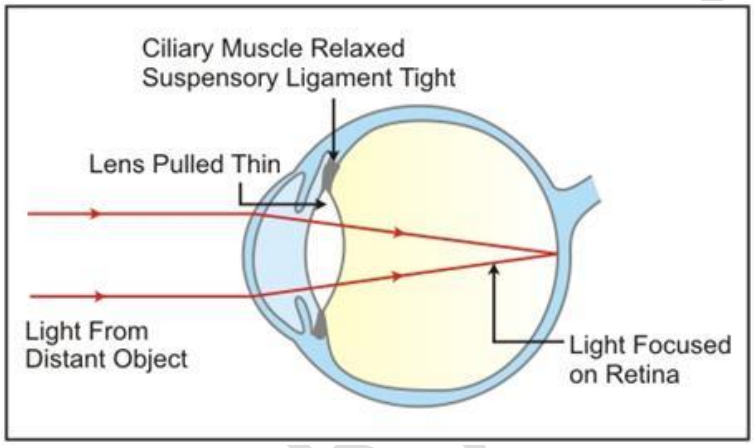
The image formed on the retina is inverted and real.

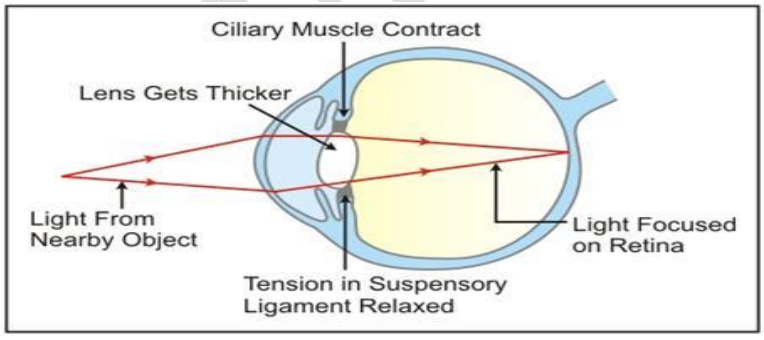
Question 5

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

Answer

Light rays from the object enter the eyes through the transparent structures.
For distant vision, the lens is more flattened or thinner.
For near vision, the lens becomes more convex or rounded.
While reading a book, the lens is more convex or rounded due to contraction of ciliary muscles because the book is usually read from a short distance. When we raise our head and look at a distant object, the ciliary muscles relax to build the tension on the suspensory ligament so that they can stretch the lens. This change in the curvature of the lens makes us focus on distant object.





Question 6

By closing the eyes and gently pressing them with your palms, you may see some specs of brilliant light. How do you get this sensation while there is no light entering your eyes?

Answer

The sensation of light persists for a period of time after we look at a bright object and then close eyes. It lasts for one-tenth of a second. Due to this by closing the eyes and gently pressing them with our palms, we see some specs of brilliant light.

Question 7

Name the three ear ossicles. How do they contribute in the mechanism of hearing?

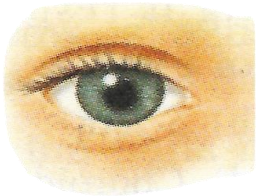
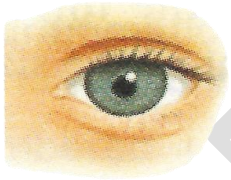
Answer

The three ear ossicles are: Malleus (hammer), Incus (anvil) and Stapes (stirr up).
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.

Structured / Application / Skill Type

Question 1

The figures (A) and (B) given below are showing some kind of adjustment. Study the figures and answer the questions that follow.

A   B

(a) Identify the kinds of adjustments done in the figure (A) and (B).

(b) Distinguish between the adjustments of figures (A) and (B) on the basis of :

(i) The size of pupil.

(ii) The pigment which gets regenerated.

(iii) Cells of the retina.

Answer

(a) Kinds of adjustments done in the figure:

(A) → dilated pupil due to dim light.

(B) → Constricted pupil due to bright light.

(b)

S. No.	Factor	A	B
(i)	The size of pupil	bigger	smaller
(ii)	The pigment which gets regenerated	Rhodopsin (visual purple)	Iodopsin.
(iii)	Cells of the retina	Rods become active and cones become inactive	Cones become active and rods become inactive

Question 2

With reference to human eye and ear answer the questions that follow :

(a) Name the parts of the eye associated with:

(i) Regulation of the size of pupil.

(ii) Regulation of the shape of lens.

(iii) Keeping the lens moist and protecting it from physical shock.

(iv) The layer providing nourishment to the eye.

(b) Name the part of the ear associated with :

(i) Static balance.

(ii) Dynamic balance.

(iii) Hearing.

(iv) Amplification of vibrations.

Answer

(a)

(i) Regulation of the size of pupil — **Iris**.

(ii) Regulation of the shape of lens — **Ciliary muscles**.

(iii) Keeping the lens moist and protecting it from physical shock — **Aqueous Humour**.

(iv) The layer providing nourishment to the eye — **Choroid layer**.

(b)

(i) Static balance — **Vestibule**.

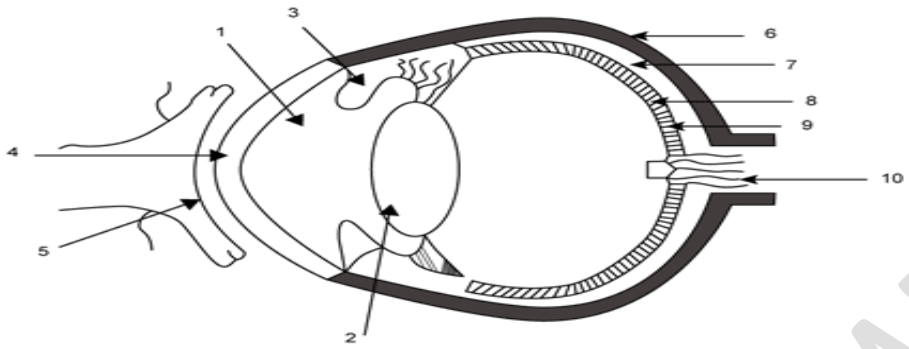
(ii) Dynamic balance — **Ampulla**.

(iii) Hearing — **Organ of Corti**.

(iv) Amplification of vibrations — **Ear ossicles (Malleus, incus and stapes)**.

Question 3

The figure given below refers to the vertical section of the eye of a mammal. Study the figure carefully and answer the following questions.



(a) Label the guidelines shown as 1 to 10.

(b) Write one important role of parts shown as 3 and 7.

(c) Write one structural difference between the parts shown as 9 and 10.

(d) Mention one functional difference between the parts shown as 6 and 8.

Answer

(a) The guidelines are labelled below:

- 1 → Aqueous chamber
- 2 → Lens
- 3 → Iris
- 4 → Cornea
- 5 → Conjunctiva
- 6 → Sclera
- 7 → Choroid
- 8 → Retina
- 9 → Yellow spot
- 10 → Optic nerve (Blind spot)

(b) Part 3 (Iris) — It contains radial muscles to dilate the pupil and circular muscles to constrict the pupil.

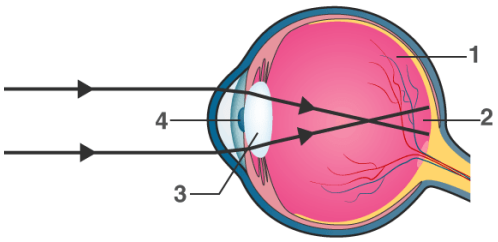
Part 7 (Choroid) — It is the middle layer of the eyeball, richly supplied with blood vessels and provides nourishment to the eye.

(c) Part 9 (yellow spot) contains sensory cells especially the cone cells while part 10 (blind sport) contains no sensory cells.

(d) Part 6 (sclera) gives shape to the eyeball and part 8 (retina) acts as screen to form image of an object.

Question 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.

(b) Give two possible reasons for this defect.

(c) Name the parts labelled 1 to 4.

(d) Name the type of lens used to correct this eye defect.

(e) Draw a labelled diagram to show how the above mentioned defect is rectified using the lens named above.

Answer

(a) Myopia

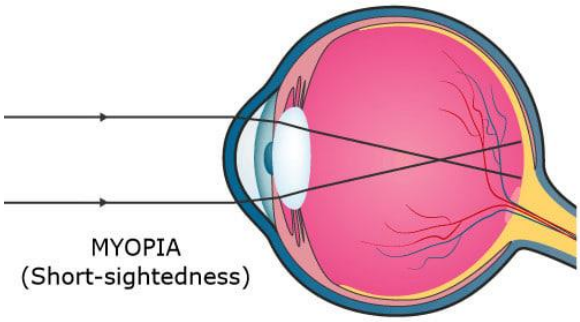
(b) The two possible reasons for myopia are either the eye ball is lengthened from front to back or the lens is too curved.

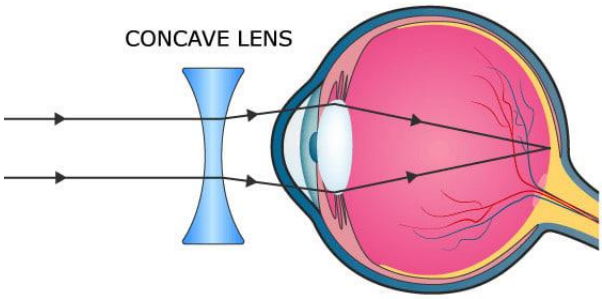
(c) Parts labelled 1 to 4 are:

- 1 → Vitreous humour
- 2 → Yellow spot
- 3 → Lens
- 4 → Pupil

(d) Concave lens

(e) The below diagrams show the condition of Myopia and how it is corrected using a Concave Lens:





Question 5

(a) Draw a neat and well labelled diagram of the membranous labyrinth found in the inner ear.

(b) Based on the diagram drawn above in (a), give a suitable term for each of the following descriptions:

(i) The structure responsible for hearing.

(ii) The sensory cells that help in hearing.

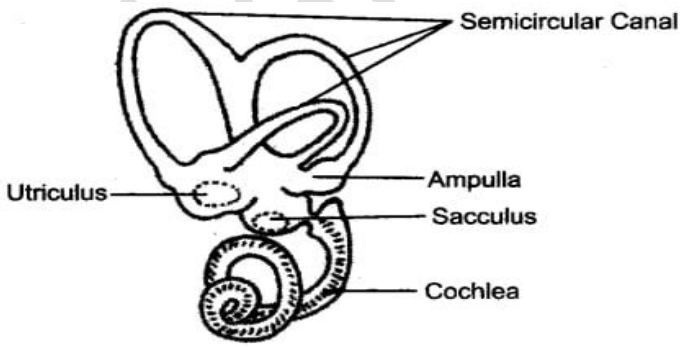
(iii) The membrane-covered opening that connects the middle ear to inner ear.

(iv) The nerves that carry impulses from the ear to the brain.

(v) The tube which equalises the air pressure on either side of the ear drum.

Answer

(a) Below labelled diagram shows the membranous labyrinth found in the inner ear:



(b)

(i) Cochlea

(ii) Organ of corti

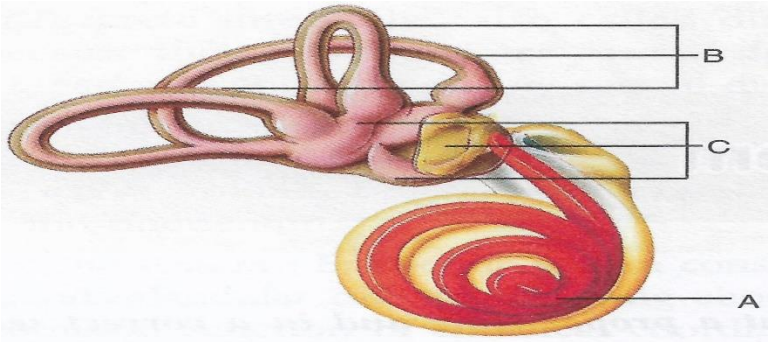
(iii) Round window

(iv) Auditory nerve

(v) Eustachian tube

Question 6

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



Labyrinth of the inner ear.

(i) Give the collective biological term for Malleus, Incus and Stapes.

(ii) Name the parts labelled A, B and C in the diagram.

(iii) State the functions of the parts labelled 'A' and 'B'.

(iv) Name the audio receptor region present in the part labelled 'A'.

Answer

(i) Ear ossicles

(ii) The labelled parts are:

- A → Cochlea
- B → Semicircular canals
- C → Ear ossicles

(iii) Cochlea helps in transmitting impulses to the brain via the auditory nerve. Semicircular canals help in maintaining dynamic equilibrium of the body.

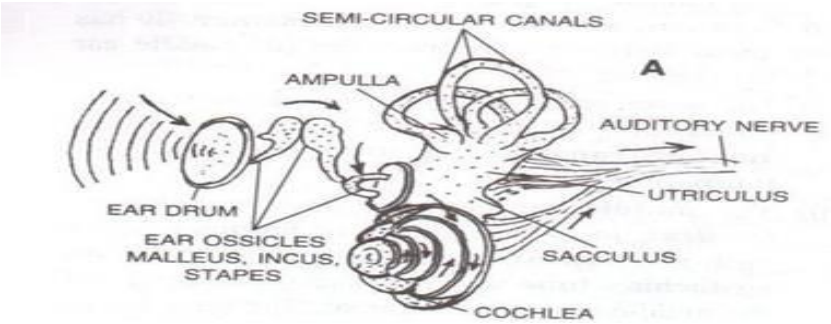
(iv) Organ of Corti

Question 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.

Answer

Below is the labelled diagram of the inner ear:



Utriculus and Sacculus collectively termed as vestibule are responsible for maintaining static balance in human beings.

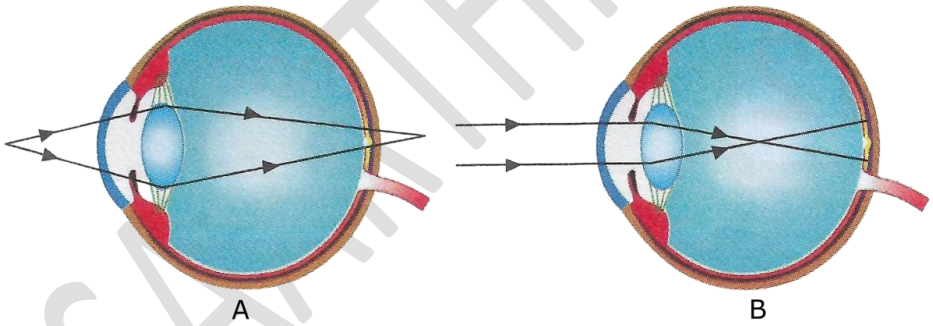
Question 8

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.

(b) What are the two conditions shown in sections A and B of the eye as applicable to her?

(c) What kind of reading glasses does she need ?



Answer

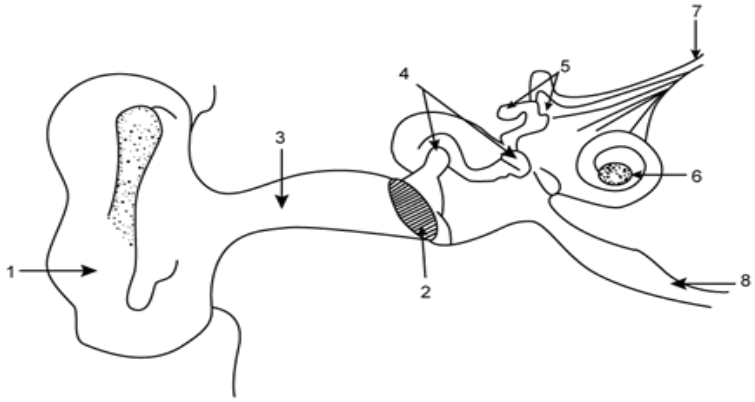
(a) Myopia

(b) The condition shown in section A is Hyperopia as the image is formed behind the retina. The condition shown in section B is Myopia as the image is formed in front of the retina.

(c) She needs reading glasses with concave lens.

Question 9

The figure given below shows the principal parts of a human ear. Study the diagram and answer the following questions.



(a) Label the parts 1 to 8.

(b) State the role of parts 6, 7 and 8.

(c) Why is it harmful to use a sharp object to remove ear wax? Mention the number and name of the part involved.

Answer

(a) The labelled parts are:

- 1 → External ear (pinna)
- 2 → Ear drum (tympanum)
- 3 → Auditory canal
- 4 → Malleus
- 5 → Semicircular canals
- 6 → Cochlea
- 7 → Auditory nerve
- 8 → Eustachian tube

(b) Part 6 (Cochlea) — It contains sensory cells for hearing.

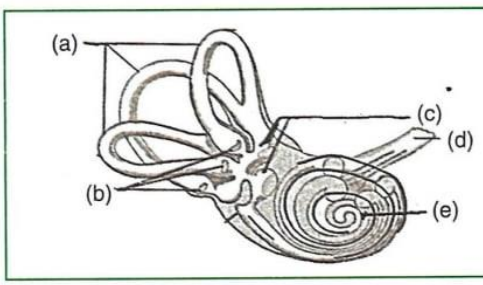
Part 7 (Auditory nerve) — It transmits impulse of hearing to the brain.

Part 8 (Eustachian tube) — It equalizes air pressure on both the sides of the tympanum.

(c) It is harmful to use a sharp object to remove ear wax as it can rupture the ear drum.
The part involved is part 2 — Ear drum (tympanum).

Question 10

Given below is the internal structure of the human ear. Match the structures marked (a) to (e) with their correct function.



1. Responsible for hearing.
2. Concerned with balance and spatial orientation.
3. Transmits impulses from ear to brain.
4. Contains sensory cells for dynamic balance.
5. Concerned with static balance.

Answer

(a) Semicircular canals - Concerned with balance and spatial orientation.

(b) Ampulla - Contains sensory cells for dynamic balance.

(c) Utriculus and Sacculus - Concerned with static balance.

(d) Auditory nerve - Transmits impulses from ear to brain.

(e) Cochlea - Responsible for hearing.