[Sensory Organ-skin]

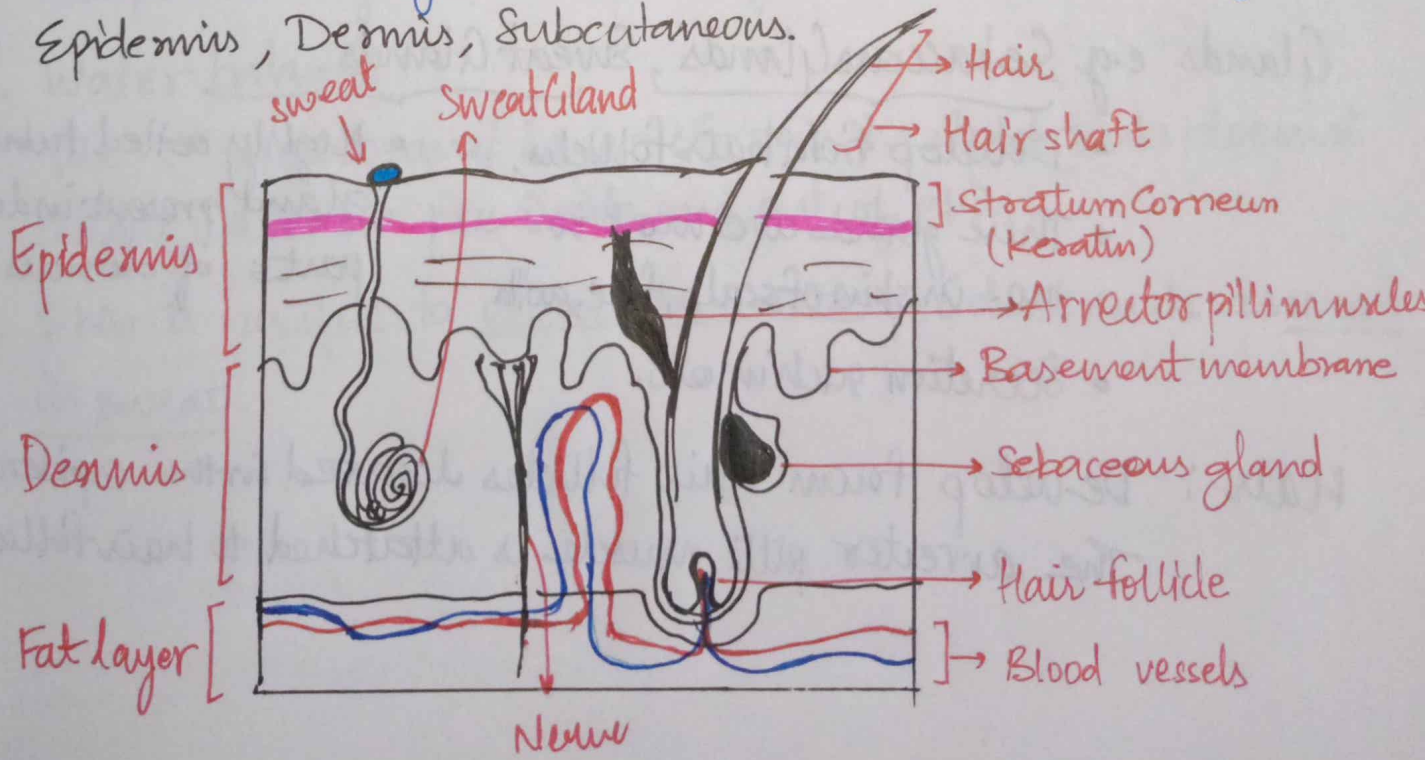
Ques. Name the layers of skin. (2M)

Three layers of skin:

- Epidermis - Superficial layer of skin
  - Composed of epithelial tissue
- Dermis - The deeper layer of skin
  - Primarily composed of connective tissue.
- Subcutaneous tissue - Deep to the dermis is subcutaneous or hypodermis layer
  - It consist of adipose or areolar tissue.

Ques. Help of diagram explain structure of skin. (5M)

- Skin is known as cutaneous membrane, covers the external surface of body.
- It is sensory and largest organ.
- Skin protect us from microbes and helps to regulate the body temperature and permit sensation of cold, hot, touch etc.
- Skin contains glands, hair, nails and three layers i.e Epidermis, Dermis, Subcutaneous.



Epidermis: Most superficial layer of skin and made up of stratified epithelium.

Epidermis of skin consist of 5 layers.

1. Stratum corneum
2. Stratum lucidum
3. Stratum granulosum (granular layer)
4. Stratum spinosum (prickle cell layer)
5. Stratum basale (germinative layer)

Dermis: Thick and tough elastic layer beneath epidermis of connective tissue which support hair.

It divided into 2 layers:

1. Papillary or superficial layer
2. Reticular or deeper layer

Subcutaneous: Deep to the dermis layer is subcutaneous or hypodermis layer.

It consist of adipose tissue and areolar tissue

Glands e.g Sebaceous Glands, Sweat Glands.

- Develop from hair follicles.
- These glands are most in no. in skin of scalp, face, axilla
- Secretion rich in oil.

- Highly coiled tubular gland present in deep parts of dermis.

Hair: Develop from hair follicles located in the epidermis

The arrector pilli muscle is attached to hair follicle.

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Ques Functions of skin. (5M)

1. Protective function of skin:

Melanin and thick 1st layer of epidermis together prevent the ~~skin~~ such injury by absorbing UV rays.
(injury such as sun burn, cancer of skin etc..)

The keratinised stratum corneum of skin provide physical barrier ~~from~~ invasion of harmful agents like bacteria and toxic chemicals.

2. Sense perception.

Skin provide sensory covering to overall body.
It contain nerve ending as well as other receptors for the general sensation.

3. Temperature regulation

Different organs metabolically produce heat which reaches the skin through blood and then it conduct, convect and radiate to exterior environment.

Temprature regulation keeps body cool.

4. Water balance

The 1st membrane/ layer of skin i.e. epidermis doesnot allow water to pass inside and out of skin.

5. Skin is useful to eliminate waste product such as urea in sweat.

Ques. Diagram and describe epidermis of skin? (5M)
or Describe layers of thick skin.

Epidermis is the most superficial layer of skin. It is made up of stratified epithelium.

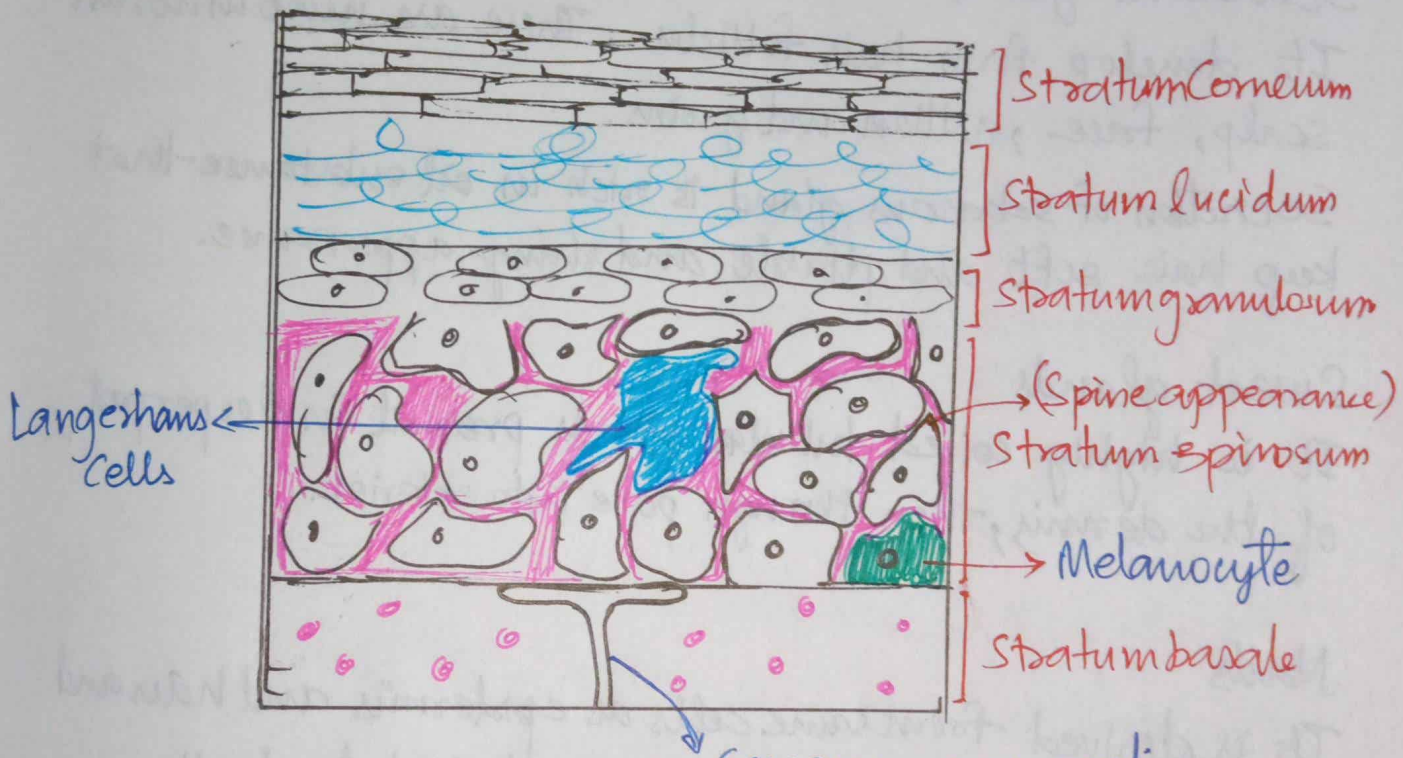
Thickest of palm and soles of feet. It contain no nerve cells or blood vessels and nutrition derived from capillary of dermis.

Epidermis consist of 5 layers:

1. Stratum corneum (horny): Most superficial layer and made up of dead and highly keratinised cells.
   Many layers of flat, dead, scale like cells.
2. Stratum lucidum (Clear): Made up of 1-2 lay layers of of clear, non-granulated cells.
3. Stratum granulosum (granular layer): 3-4 layers of skin, consist of granular cells and actively synthesise the protein keratin.
4. Stratum spinosum (Prickle cell layer): 3-5 layers thick. Individual cells have horny appearance.
   [Cytoplasmic processes come out from each cells]
5. Stratum germinativum (Germinative layer): Deepest layer of epidermis. Made up of columnar cells give rise to new cells.
   It also contain melanocytes - which synthesis skin pigment i.e Melanin.
   "Responsible for color of skin".

Cells in Epidermis

1. Melanocytes = Produce pigment called melanin and tansfer it to keratinocytes.
2. Langerhans cells = (Immune cells) protect against pathogens and toxin.



Epidermis and its layers and cells

Question. Write about the appendages of skin ? [redacted] (2.5 M)

Appendages of skin are

1. Hair follicle and hair.
2. Sweat glands and sebaceous glands.
3. Nails of fingers and toes.

Hair, The hair develops from hair follicles present in the epidermis.
Part of hair above the skin is shaft and remaining is root.
The arrector pilli muscle is attatch to hair follicle. When this muscle contract hair stand out and become erect.

Sebaceous glands
It develop from hair follicles. These are most in no. in scalp, face, axillae and groins.
Secretion of sebacous gland is rich in oil substance that keep hair soft and pliable and shiny appearance.

Sweat glands
It is highly coiled tubular glands present in deeper part of the dermis, then through pore into exterior.

Nails
It is derived from same cells as epidermis and hair and consist of hard, horny type keratinised dead cell.
Nails protect tips of fingers and toes.

[Sensory Organ : Tongue]

Ques. Short note on Tongue? (5M)

The tongue is a muscular organ in the mouth. The tongue is covered with moist tissue called mucosa.

Tiny bumps called papillae give the tongue its rough texture.

Thousands of taste buds cover the papillae. Taste buds are collections of nerve-like cells that connected into brain.

Tongue is attatch to mouth by tissue i.e. frenum.

The 4 common taste are : Sweet, Sour, Bitter and Salty
5th taste Umami resulting from tasting glutamate.

Tongue is divide into:

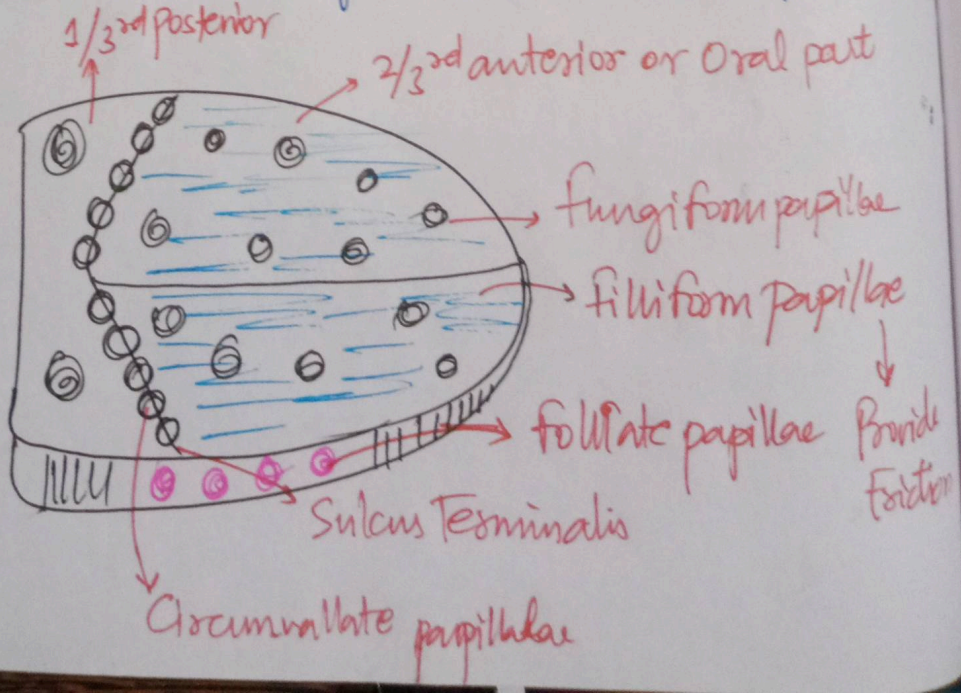
Oral part (anterior 2/3rd)

Pharyngeal part (posterior 1/3rd)

Posterior most part of tongue

Sulcus terminalis (V-shaped sulcus) → Separate oral - and pharyngeal

Foramen Caecum 2 limbs of V meet at median pit.



Ques. Describe Taste buds? (5M)

Taste buds are sensory organs that are found on tongue and allow to experience tastes that are sweet, salty, sour and butter.

Taste buds are embedded in the epithelium of the tongue and make contact with environment through taste pore.

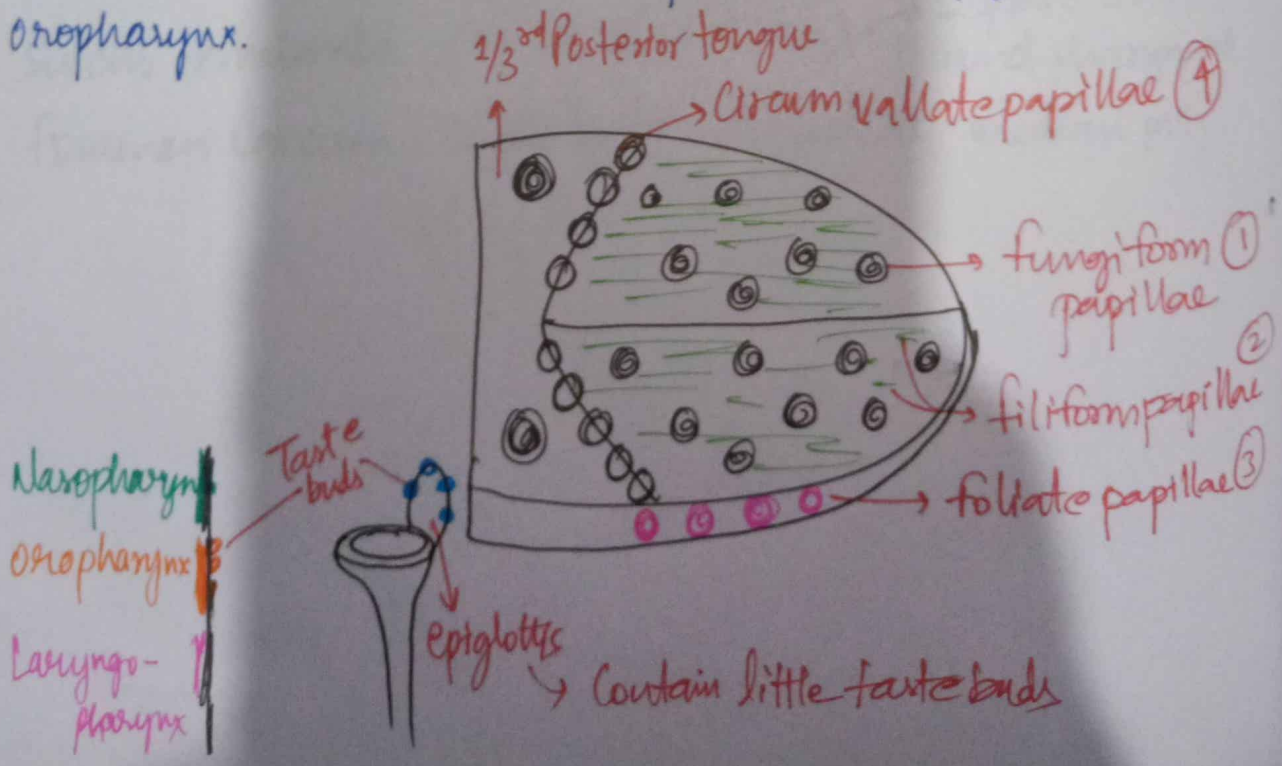
There are four types of Taste buds:

a) Fungiform - Most in no., near tip of tongue.
b) FiliForm - Confined to back edge of tongue.
c) Foliate - found occasionally on posterolateral surface
d) Circumvallate - Arranged in V-form.

Information about taste is transmitted to brain by:

a) Facial (VII)
b) Glossopharyngeal (IX)
c) Vagus nerves (X)

Some taste buds are also present in epiglottis, and Oropharynx.



~~Functions~~ (Applied conditions)

Dysgeusia: Phantom taste perception.
lingering taste often bitter or sour, even when there is nothing in your mouth.

Hypogeusia: Person reduced ability to taste things.

Ageusia: Complete lack of ability to taste anything.

Ques Des

Ear is

1. Ex
2. M
3. In

External e

Middle ear

M

Eardrum ←

Ques Describe middle Ear?

Short note on middle Ear

The middle ear lie within

tympanic membrane.

air-filled

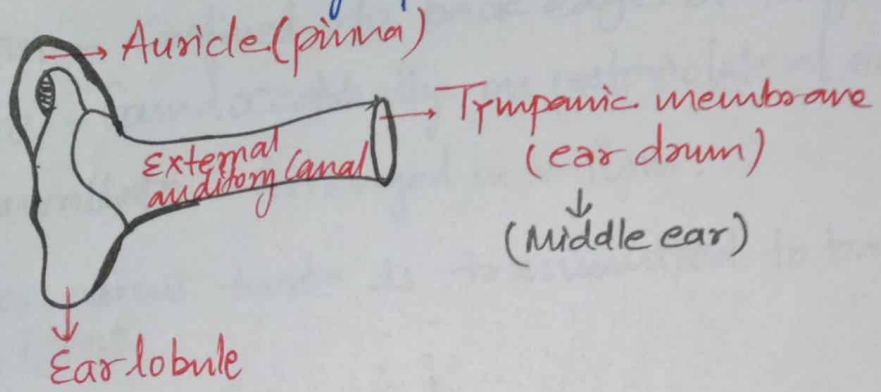
[Sensory Organ : Ear]

Ques Describe structure of Ear ? (5M)

Ear is divided into three main regions:

1. External Ear - Contain Auricle (pinna)
2. Middle Ear - Auditory ossicles, Oval window, Eustachian tube
3. Inner Ear - Semicircular canals, Vestibule, Cochlea

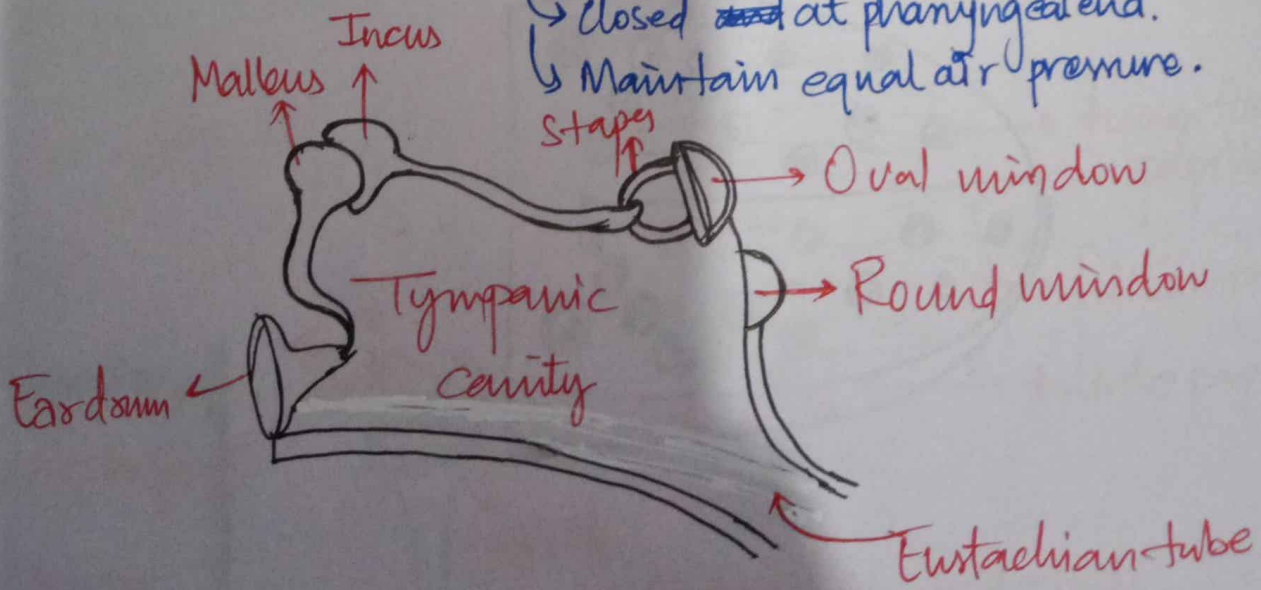
External ear consist of: Auricle (pinna), External auditory canal, ~~Tympanic membrane (ear drum)~~



Middle ear consist of: Auditory ossicles i.e Malleus, Incus, Stapes } Connected by Synovial joints

Oval window - interse^{n} of External & middle ear.

Eustachian tube
- ↳ closed at pharyngeal end.
- ↳ Maintain equal air pressure.



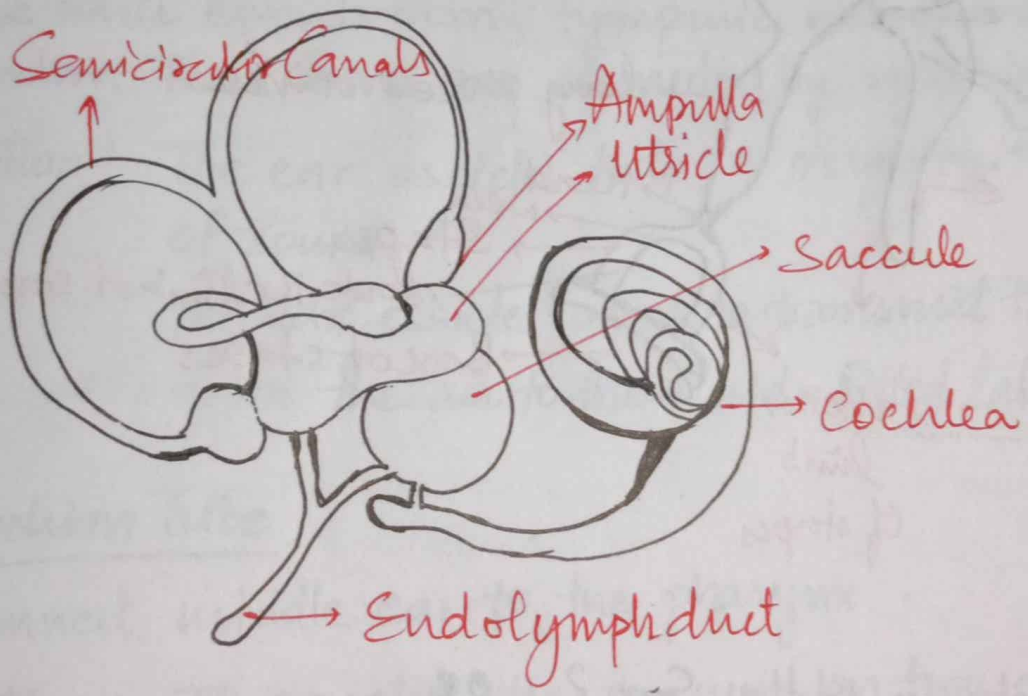
Inner Ear Consist of :
(Also called labyrinth)

Two main division of labyrinth

Outer Bony Labyrinth
↓
Divided into three regions
- Semicircular Canals
- Vestibule
- Cochlea

It contain perilymph.

Inner membrane Labyrinth
↓
- It is series of sacs and tubes inside bony labyrinth.
- It contains endolymph
- Membrane labyrinth consist of
  - Utricle
  - Saccule



Ques. Name and describe Ear ossicles ? (4M)

There are three Ear ossicles : Malleus (hammer shape)
Incus (anvil shape)
Stapes (stirrup shape)

1. Malleus : Handle is attatch to inner side of tympanic membrane and
Head is attatch to incus.

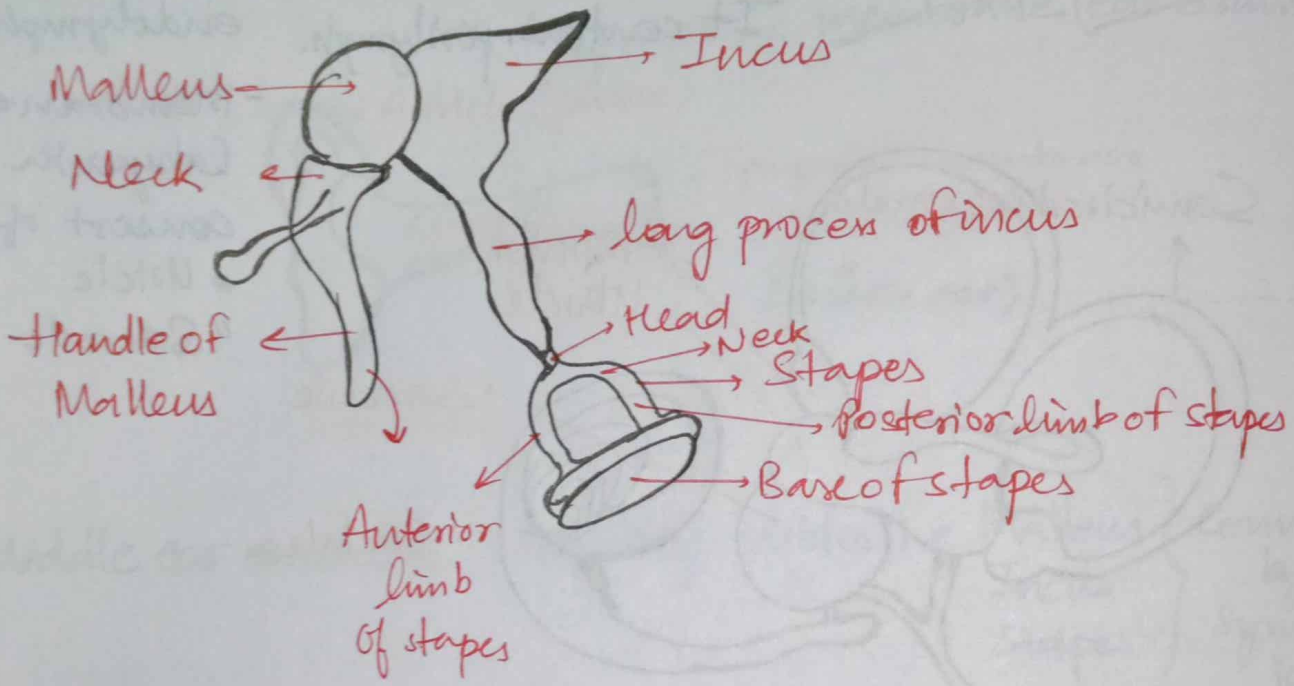
2. Incus: One side attatch to mallens and otherside is articulate with head of stapes.

3. Stapes: foot plate attatch to margins of oval window. Smallest and lightest bone.

Functions of Ear ossicles:

(i) It is to magnify the intensity of sound.

(ii) Ear ossicles increase the pressure within middle ear by 20-22 times. This inc. pressure in oval window.



Ques Describe middle Ear? OR (5M)
Short note on middle Ear?

The middle ear lie within temporal bone and extends from tympanic membrane.

The middle ear is an air-filled chamber and consist of the following part:

1. Tympanic Membrane
2. Ear Ossicles
3. Eustachian tube

Tympanic Membrane

It consist of connective tissue and kept in position by handle of malleus.

It forms lateral wall of middle ear.

function: It is pressure reciever.
It act as resonator i.e start vibrating freely when sound wave strike.
It critically dampens (i.e stop vibration)

Ear Ossicles

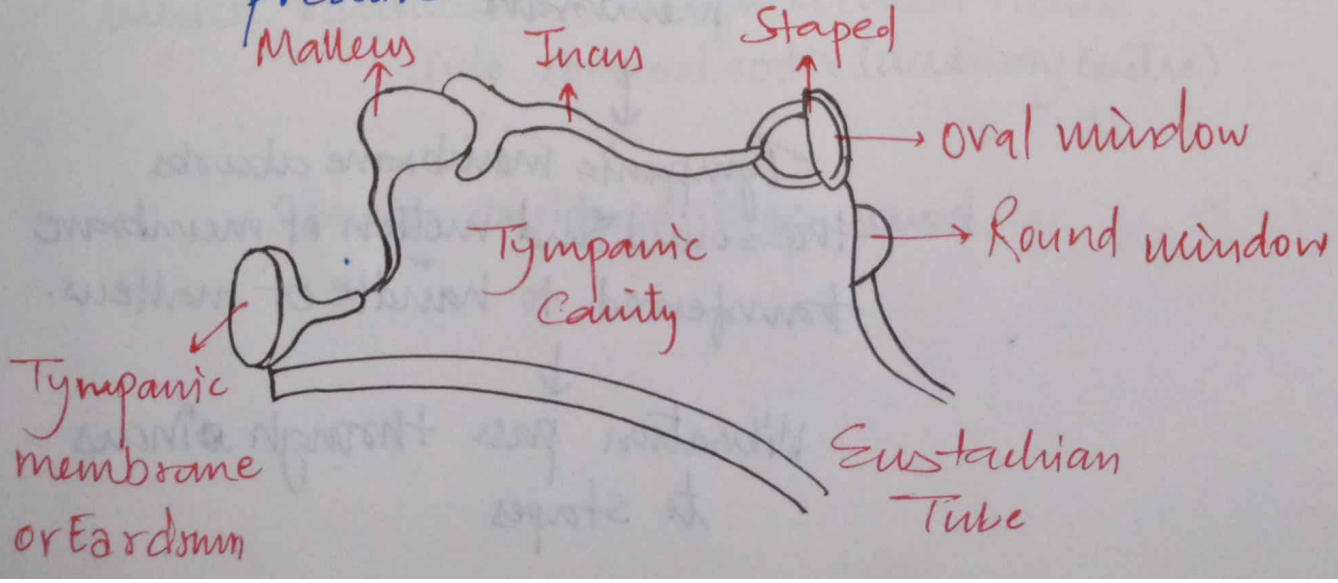
- Three tiny bony ossicles i.e Mallens, Incus, Stapes.
- These bones extends from tympanic membrane to the oval window. These bones are connected by synovial joint.

function: The ear ossicles help to magnify the intensity of sound.
The ear ossicles serve to transmit the sounds from the air to the fluid-filled labyrinth.

Eustachian Tube

It connect middle ear to the pharynx.

function: It equalise the pressure on two sides of the tympanic membrane when atmospheric pressure inc. or dec.



Explain physiology of hearing? (6M)

Hearing is the process by which the ear transforms sound vibrations into nerve impulse that are conveyed to Brain.

1st, The air vibrations from atmosphere are converted to vibrations of the tympanic membrane and ear ossicles. help to enhance the amount of amplifications. These in turn become vibration in the fluids within the cochlea.

finally, fluid vibration travel along basilar membrane that stimulate the hair cells of organ of corti.

These cells convert sound vibrations into nerve impulses in the fibre of cochlear nerve, which transmit them to the brainstem. From which they are relayed to primary auditory area of cerebral cortex (centre of brain for hearing).

OR

Hearing Mechanism: Air Vibrations (collected by earaurdes)

↓

Cavity or Earcanal enhance the amt. of sound that reaches tympanic membrane

↓

Tympanic membrane absorbs the sound and motion of membrane transferred to handle of malleus.

↓

Vibration pass through incus to stapes

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Vibration pass through incus to stapes

which have effect on covering of Oval window.

↓

Vibration transmit sound waves to perilymph of vestibule and the scala vestibule

↓

Ressner's membrane present b/w scala vestibule and scala media vibrates

↓

Endolymph present in scala media moves up and down

↓

Basilar membrane now receives these movements of endlymph and vibrates

↓

Organ of corti, the hearing receptor move up & down

↓

The hairs on top of hair cells which embedded in tectorial membrane now tilt or bend

↓

This mechanical action i.e bending of hair produces action potential

↓

This action potential give generation to nerve impulse which transmitted through cochlear nerves into cerebral cortex (auditory centre)

↓

Brain considered it as sound.

which have effect on covering of Oval window.

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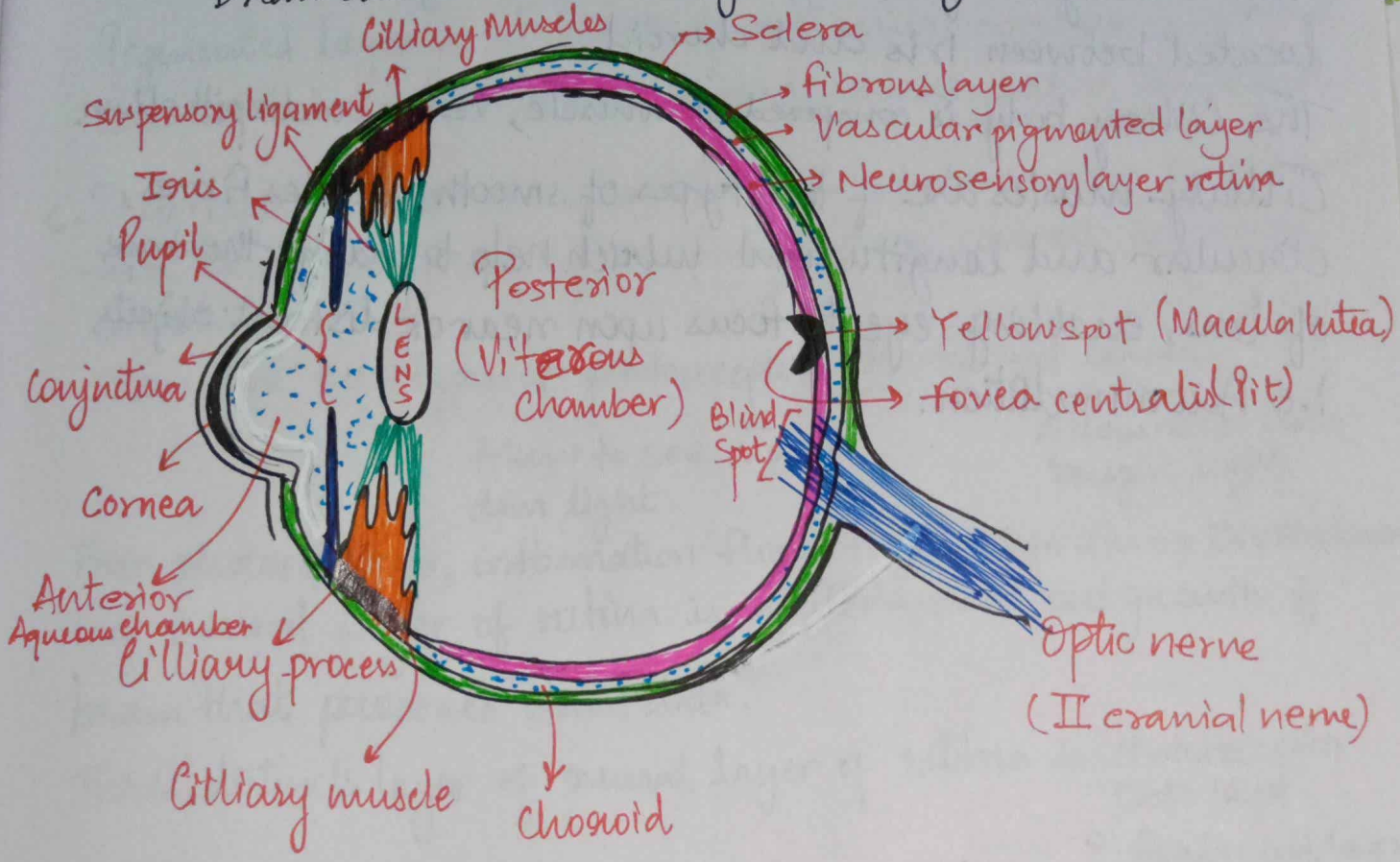
[Sensory Organ: Eye]

Ques. Diagram of Eye? OR (5M)
Draw and labelled diagram of Eye ball?



Eye is special organs of sight. Human eyeball is a hollow, spherical structure.

The wall of eyeball contain three principle layers:

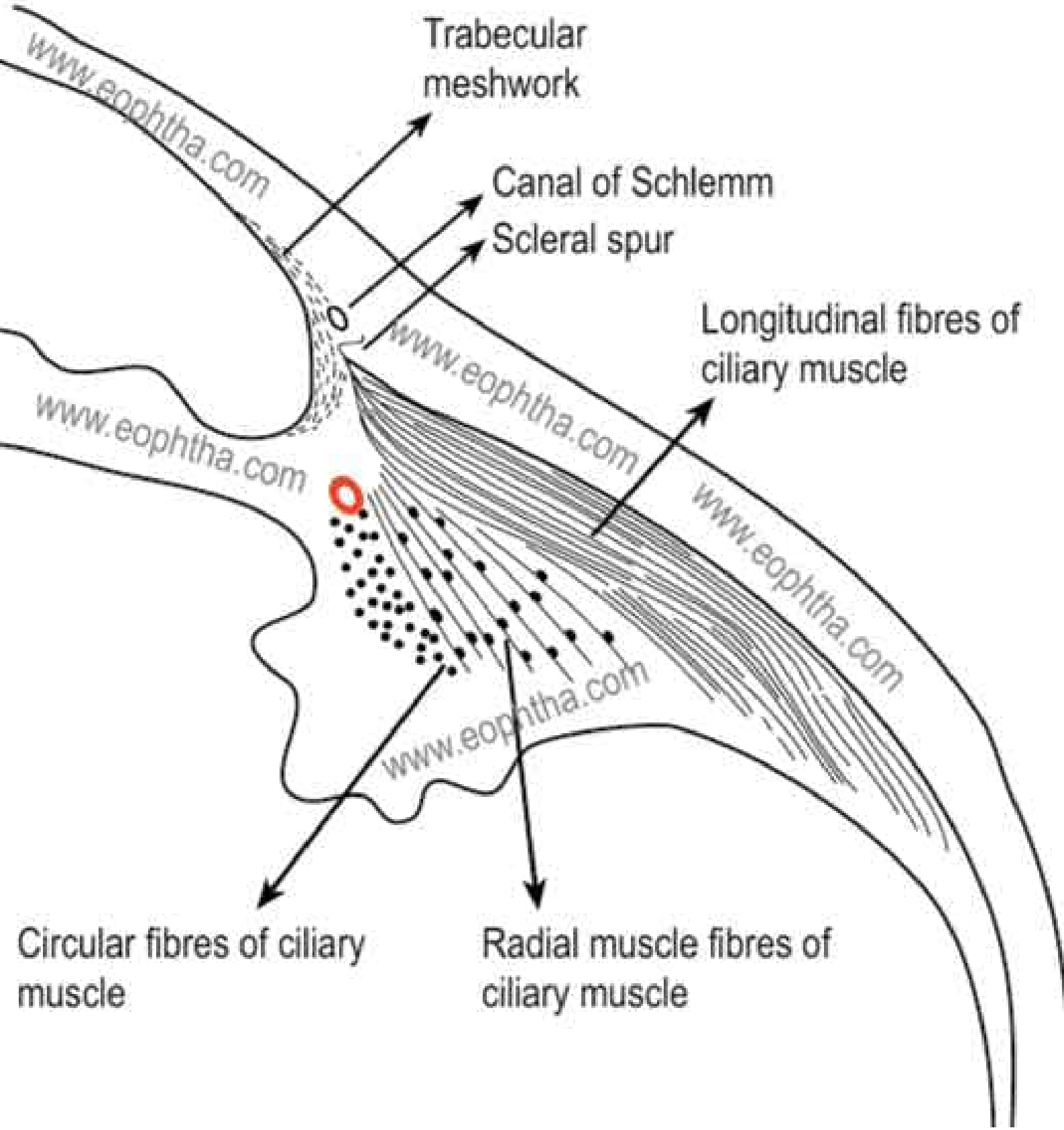
- The outer fibrous layer i.e Sclera
- The middle vascular layer i.e Choroid
- Inner nervous layer i.e Retina

Eye ball also contain Lens, Aqueous humour and vitreous humour.

Ques. With labelled diagram describe structure of ciliary body of eye ball? (5M)

The Ciliary body is forward continuation of the choroid layer. The Ciliary body is the site of humor production. It is located between iris and choroid.

The Ciliary body is composed of muscle, vessels and epithelium. Ciliary musles are of two types of smooth muscles fibres, circular and longitudinal which help to change the shape of lens, enabling eye to focus upon near or distant objects i.e Accommodation.


Trabecular meshwork
Canal of Schlemm
Scleral spur
Longitudinal fibres of ciliary muscle
Circular fibres of ciliary muscle
Radial muscle fibres of ciliary muscle
www.eophtha.com

Ques. Draw diagram of structure of inner ~~ear~~ eye? (5M)

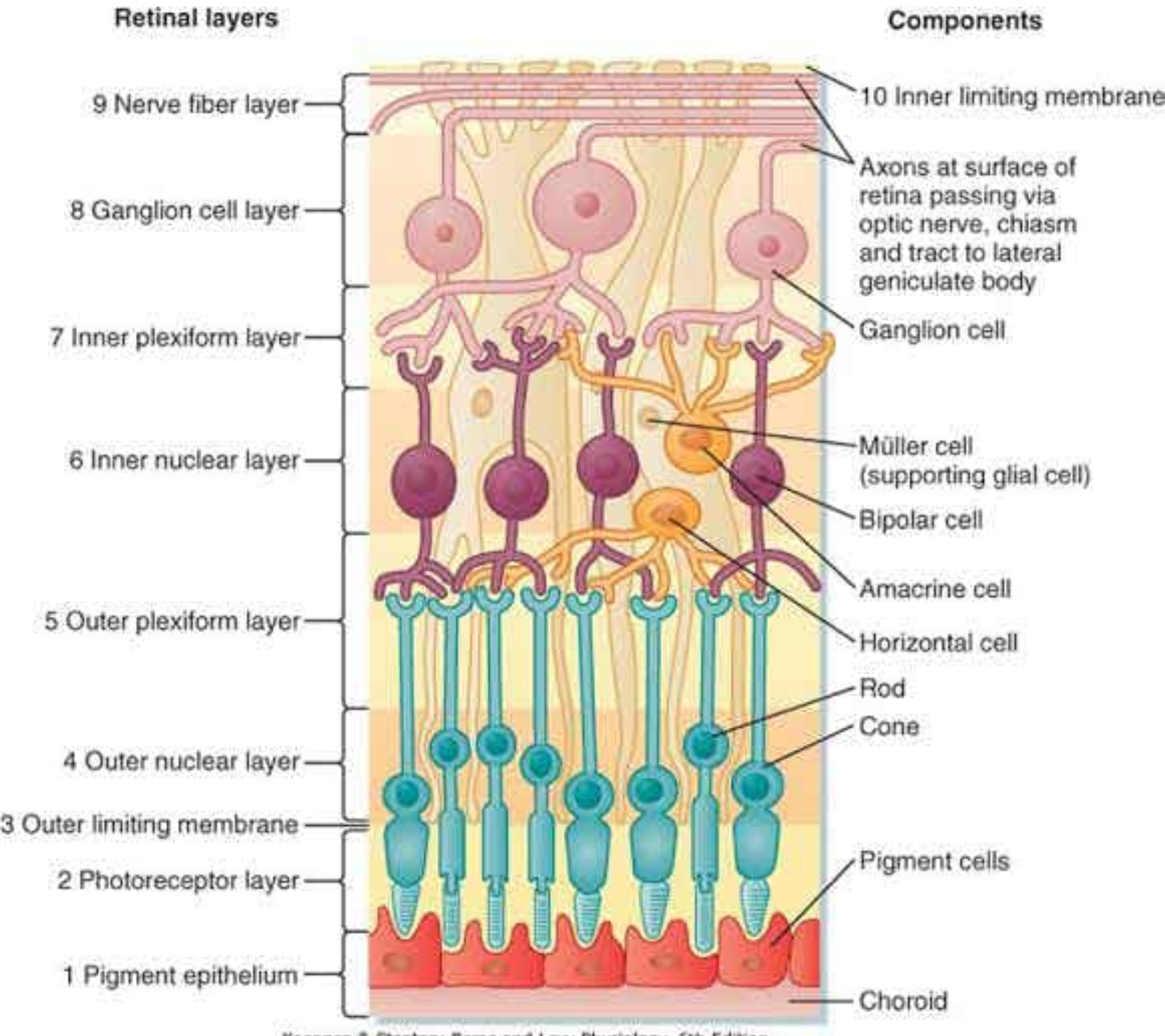
Inner eye is the inner most layer of eye i.e Retina
Retina consist of a pigmented layer and a neural layer.
Pigmented layer is a sheet of melanin-containg epithelial cells located between choroid and neural past of the retina.

1. Photoreceptors are specialised cells in photoreceptor layer that begin the process by which light rays convert into nerve impulses.
There are two types of photoreceptors Rods and Cones.
Rods → Allow to see us in dim light
Cones → Allow to see us in bright light

From photoreceptors, information flows through synaptic → Bipolar layer.
The neural layer of retina is multilayered outgrowth of brain that processes visual data.
Three distincts layer of neural layer of retina is 1. Photoreceptor cell layer
2. Bipolar cell layer
3. Gangolian cell layer

from synaptic layer to Bipolar layer then to gangolian cell layer.
The axons of gangolian cells extends^ to the optic disc and exit eyeball as optic nerve (II) Posteriorly
Optic disc also known as the "blind spot." It contains no rods and no cones.

The macula lutea or yellow spot is exact centre of the Retina, as visual axis of eye.
The fovea centralis a small depression in macula, contains only cones.



Ques. Write layers of eye? (1m) / Coverings of eye ball. (2m)

There are three layers of eye
Outermost layer Sclera
Middle layer choroid
Innermost layer Retina

Sclera is fibrous layer, Help to maintain the spherical shape of eyeball.

Choroid is supplies blood vessels to eye and contain pigment granules that prevent reflection of light in the eye.

Retina lines its surface and contains photoreceptors responsible for converting light into nerve impulses.