**RECEPTION, RESPONSE & CO- ORDINATION**

1. **Structural difference**- the cell body in motor neurone is terminal (at the end) and inside the central is nervous system. While the cell body in sensory neuron is not terminal but has axon on both end i.e. bipolar.

**Functional differences** – motor neurone carries impulses from CNS to the effectors i.e. muscles, while sensory neurons carry impulse for receptor to CNS.

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| Hormone | Site of production | Function |
| Oestrogen | Ovary | Initiate and control development of secondary sexual characteristics |
| Aldosterone | Aldernal gland | Mineral reabsorption |

1. (i)



 (ii) P- Protection/ insulation

 Q- Impulses transmitted/depolarization is faster.

1. (a)

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| **Adaptation** | **Function** |
| Conjunctiva - An epithelium colourless | Protects eyeball |
| Cornea: Transparent/curved | Allow light/ refract light entering the eye |
| Aqueous/vitreous: clear | Allow light to pass through/ refract light.Maintain the shape of the eye |
| Iris. Opaque and contractile | Controls light intensity/amount of light entering the eye. |
| Ciliary muscle/ body contractile | Control curvature of lens, secretes humour  |
| Suspensory ligaments: are fibrous | Hold lens in position |
| Lens is transparent; lens is biconvex | To allow light to go though/to refract light/ to focus light. |
| Retina- contain light sensitive cells | Where an image is formed which perceive light. |
| Cones: contain pigments | For colour vision/ bright light/ light of high intensity |
| Rods contain pigments | For dim light vision |
| Forea centralis: High concentration of cones | For accurate vision |
| Choroid: Layer has blood vessels | For nutrition and pigments.Reduce light reflection and absorb stray light |
| Sclera- Tough/ non elastic or fibrous | Gives eye shape and protects |
| Optic nerve | Contain sensory neurones for transmitting impulses from retina to brain. |

(b)

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| **Defect** | **Correct** |
| Myopia/ short sightedness | Biconcave/diverging lenses |
| Hypermetropia/long sightedness | Biconvex/ converging lenses |
| Astigmation | Use of cylindrical lenses with combined curvature |

1. When an impulse passes along the axon, the membrane of the axon becomes depolarized to sodium ions to diffuse into the axon; the inside of the axon becomes positively charged relative to the outside, an action potential is generated.
2. Cerebrum/ cerebral hemisphere/ cerebral cortex
3. (a) B- Cerebellum

C- Medulla oblongata

(b) - Control locomotion

* + Control voluntary movement
	+ Vision/ hearing/ smell/ taste
	+ Intelligence/ memory
	+ Personality speech
	+ Mediates cranial co-ordination

(c) Loss of muscle coordination/ balance

1. (a) Cones- Discrimination of colour/ sensitive to high light intensity / bright light.

(b) Rods- Dim light vision/ low light intensity

1. (a) (i) -Receive sound waves

-Transforms sound waves into vibrations

-Transmit vibration to the ear ossicles

(ii) Equalizes the air pressure in the middle ear to that in the outer ear.

 (iii) Amplify/ transmit vibrations from the lympanic membrane in the

 inner ear.

(b) There are three semi- circular canals arranged in a plane at right angles to each other. At the end of each canal is a swelling called ampulla which contains receptors.

Movement of the beat cause movement of the fluid in at least one canal/ the fluid movement deflect the coperta and stimulate the receptors/sensory hairs. Nerve impulses are transmitted to the brain by the auditory nerve.

1. The organisms move towards light so as to absorb it for photosynthesis.
2. (a) Thigmotropsm

(b) -That part of plants is offered support

-The leaves become more exposed to sunlight increasing photosynthesis.

-Flowers become exposed to pollinating agents.

(a) X- Motor neurone

Y- Receptor

 (b) Acetylcholine

1. (a) Alter the shape of the lens during accommodation

(b) - Rods- sensitive to dim light

- Cannot distinguish colour

- Cones- Sensitive to colour

- Enhance high clarity of vision

1. (a) Ear ossicles Magnify sound wave vibrations from the ear drum

(b) Cochlea Receives sound vibrations from the oval window and

transmits into the auditory nerve.

(c) Semi- circular canals Structures that help maintain body balance

(d) Eustachian tube Enhance equalizing of pressure between outer and

the middle ear.

1. (a) In the central nervous system (spinal cord)

(b) (i) Motor neurone

 (ii) P – Dendrites

 Q- Axoplasm (Axon)

(c) Insulates the axon

1. (a) Auxin

(b) Growth response due to touch of a part of a plant e.g. tendrils

1. The ear is an organ involved in perceiving sound and maintaining body

balance and posture. It is made of the following sections.

* + Pinna- That is funnel shaped structures made of skin and cartilage. It receives sound waves and directs them to the ear tube.
	+ External /auditory meatus- That is a canal lined with hair and wax. It allows passage of sound waves to the middle ear. The hairs and wax trap dust particles that enter the ear.
	+ Tympanic membrane that is a thin flexible sheet-like structure receives sound waves and passes the vibration to the ossicles.
	+ Middle ear that is composed of:

Tiny bones known as ossicle. They are stapes, anvil and incus. They amplify vibration from the tympanic membrane.

* + Eustachian tube that connects the ear to the nasal cavity. It balances pressure on both sides of the tympanic membrane.
	+ Oral window that is a thin flexible membrane that opens into the inner ear. it receives vibrations from the ossicles and passes them to the inner ear.

Inner ear that is composed of:

* + Vestibular apparatus that are the semi circular canals, utricles and the saccules. They help in maintenance of body balance and posture.
	+ Cochlea that is a coiled structure that has sensory cells for hearing. It is connected to the auditory nerve that is involved in transmission of sounds to the brain.
1. - Presence of rods having rhodopsin pigment that is sensitive to dim light.
	* Rods are more sensitive to motion and easily notes movement from the cornea of the eye.
	* More than 120 million rods present on the retina.
2. Perceive sound waves.

Maintain body balance and posture.

1.

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|  Response of human eye | Response of flowering plant |
| * Quick response
* Does not result to growth
* Mediated by nerve impulses and brain
* The response is not permanent
 | * Slow response
* Results to growth
* Mediated by growth hormones (auxins)
* Response is more permanent
 |

1. (i) Thigmotropism

(ii) Auxins on the stem are sensitive to touch. They migrate to opposite side.

Growth is more on the touched side. This causes bending.

 (iii) Have more chlorophyll to trap sunlight

* + Have stomata for entry of carbon dioxide.
	+ Thin and transparent cuticle to allow entry of light into the photosynthetic cells
	+ Presence of veins for transportation of raw materials to the leaf or food for the leaf.
1. Euglena have chlorophyll and are autotropic. They move towards light source (positive phototactic) to absorb sunlight for photosynthesis.
2. Acetylcholine is a chemical substance present at the synaptic knob. When a nerve impulse reaches the synapsis, acetylcholine forms in vesicles moving to the membrane.
3. In the spinal chord.
4. - Tar is deposited on parts of the respiratory tract causing cancer.
	* Hardening the blood vessels and can cause heart attack.
	* Irritation of the respiratory tract resulting to frequent coughing.
	* Smoke can cause air pollution.
5. (i) Cones on retina.

(ii) Vitreous humour.

(iii) Suspensory ligaments.