

Chapter No-21
Neural Control And Coordination

Q. No-1 Explain Structure & Function of Neuron.

- Neuron is a microscopic structure composed of three major parts, namely cell body, dendrites & axon.
- The cell body contains cytoplasm with typical cell organelles & certain granular bodies called 'Nissl's granules'.
- Dendrites are short fibres which repeatedly branch & emerge out of the cell body. They transmit impulses towards the cell body.
- The Axon is a long fibre, the distal end of which is branched.
- Each branch terminates as a bulb-like structure called synaptic knob. Comprising of the synaptic vesicle containing neurotransmitters.
- Axon transmit nerve impulses from the cell body to synapse. Neurons are divided into three types depending upon the number of axon & dendrites.
- There are two types of axon namely ~~my~~ myelinated & non myelinated.
- The Schwann cells enclose the myelinated nerve fibres & form the myelin sheath around the axon.
- Gaps between two adjacent myelin sheath are known as nodes of Ranvier.
- myelinated nerve fibre are found in spinal & cranial Nerves.

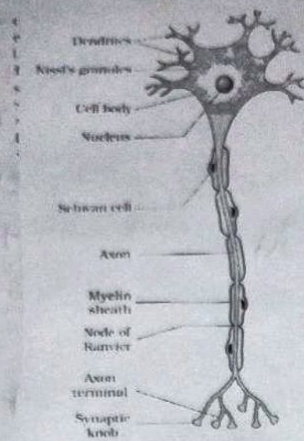


Figure 21.1 Structure of a neuron

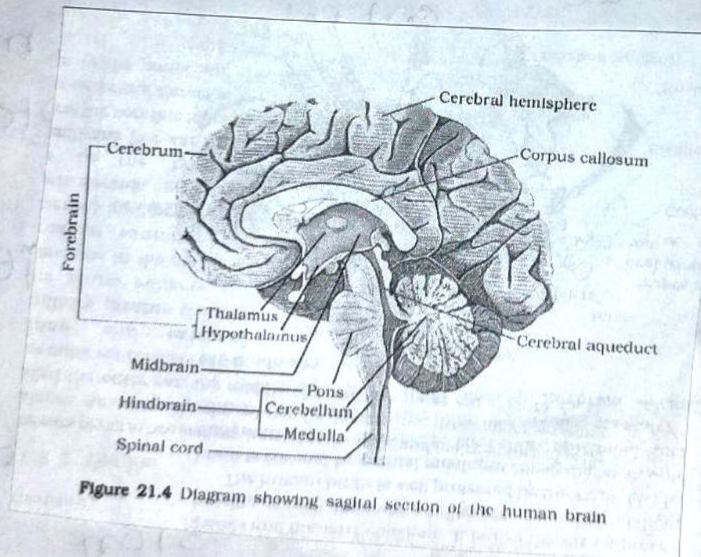
Q. No. 2 - Explain central Neural System

- The brain is the central information processing organ of our body, & act as the 'command' & 'control' system.
 - The human brain is well protected by the skull. Inside the skull, the brain is covered by cranial meninges consisting of an outer layer called dura mater.
 - A very thin middle layer called arachnoid.
 - & inner layer called pia mater.
 - The brain can divided into three major parts. (a) Forebrain (b) midbrain (c) hindbrain.
- (a) Forebrain :-**
- It consist of cerebrum, thalamus & hypothalamus.
 - Cerebrum forms major part of human brain.
 - Cerebrum divides into two parts.

A dorsal portion of the midbrain consists mainly of four round swelling called corpora quadrigemina.

Hindbrain :-

- Hind brain consist of pons, medulla oblongata & cerebellum.
- pons consist of fibre tracts that interconnect different regions of the brain.
- The medulla contains centres which control respiration, cardiovascular reflexes & gastric secretion
- Cerebellum controls balance & posture.



which are left & right cerebral hemisphere.

- The hemispheres are connected by a tract of nerve fibres called corpus callosum.
- The layer of cells which covers the cerebral hemisphere is called cerebral cortex.
- The cerebral cortex contain motor areas, sensory areas & large region that neither clearly sensory nor motor in function. These regions called as the association areas.
- association area controls complex function like intersensory associations, memory & communication.
- The cerebrum wraps around a structure called thalamus, which is a major coordinating centre for sensory & motor signaling.
- Hypothalamus controls the urge for eating & drinking & body temperature.
- They also release hypothalamic hormones.
- Limbic system is involved in controlling sexual behavior & expression of emotional reaction.

Midbrain :

- It is located between the thalamus / hypothalamus of the forebrain & pons of the hindbrain.
- A canal called the cerebral aqueduct passes through the midbrain.

Q. No. 3 Draw labelled diagrams of Eye & Describe Structure?

- the adult human eye is spherical & consist of 3-layer
- The external layer is composed of dense connective tissue called Sclera.
- the anterior portion of this layer is called Cornea.
- middle layer choroid contain blood vessels.
- The ciliary body it self continue forward to form a pigmented & opaque structure called the iris.
- The inner layer is retina. it contain three layer of neural cell.
- Inner layer ganglion cells, middle bipolar cells & outer photoreceptor cells.
- There are two types of photoreceptor cells namely rods & cones.
- these cells contain the light sensitive proteins called the photopigments.
- The day light vision & colour vision are functions of cones. & Twilight vision is the function of rods.
- The optic Nerve leave the eye & retina blood vessels enter it at a point medial to and slightly above the posterior pole of the eye ball.
- Photoreceptor cells are not present in that region & hence called blind spot.
- The space between the eye cornea & lens is called the aqueous chamber.

The space between lens & Retina is called the Vitreous chamber.

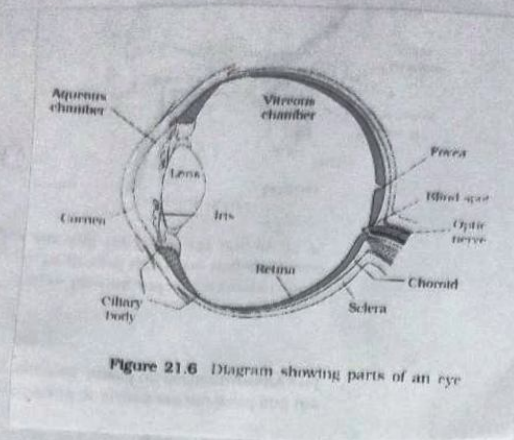
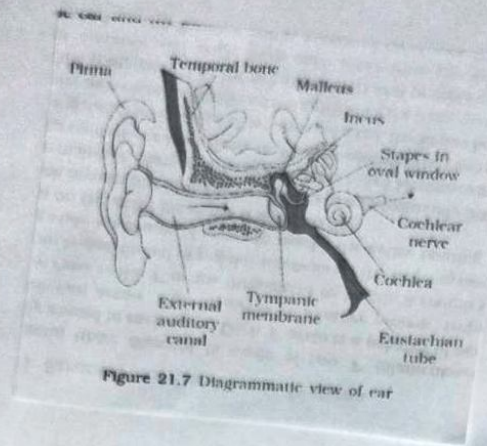


Figure 21.6 Diagram showing parts of an eye

Q.No. 4 Explain the mechanism of vision.

- The light rays of visible wavelength fall on retina through cornea & lens to generate impulse in rods & cones.
- photosensitive pigments composed of opsin & retinal.
- changes in structure of the opsin causes membrane permeability to generate action potential that is transmitted to brain via optic nerve.
- the neural impulses are analysed & image formed on the retina is recognised based on earlier memory & experience.

Q. No 5. Draw Labelled diagram of Ear & Describe Explain mechanism of Hearing!



Mechanisms of Hearing

- The external ear receives sound waves & directs them to the ear drum.
- The ear drum vibrates in response to the sound waves & these vibrations are transmitted through the ear ossicles, to the oval windows.
- The vibrations are passed through the oval windows on the fluid of the cochlea, where they generate waves in the lymph.
- The waves in the lymph induced a ripple in the basilar membrane.
- These movement of basilar membrane bend the hair cells, pressing them against the tectorial neurons.

- Nerve impulses are generated in the afferent fibre via auditory nerves to auditory cortex of the brain.
- where the impulse are analysed & sound is recognised.

Mechanisms of hearing

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- the vibrations are passed through the oval window to the fluid of the cochlea where they generate waves in the lymph.

- the waves in the lymph induce a ripple in the basilar membrane.

- this movement of basilar membrane leads to hair cells pressing from against in the spiral ganglion neurons.