UNIT-IV Nervous System and Muscles

Function of the autonomic nervous system and central nervous system. Reflex action. Sense organs: structure and function of the eye and ear. Types of muscles. Structure, composition, properties and functions of skeletal muscles. Nerve control of muscular activity: Neuromuscular junction, Transmission of nerve impulse across it. Fuel for muscular activity. Role of oxygen : physical training, oxygen debt, second wind, vital capacity.

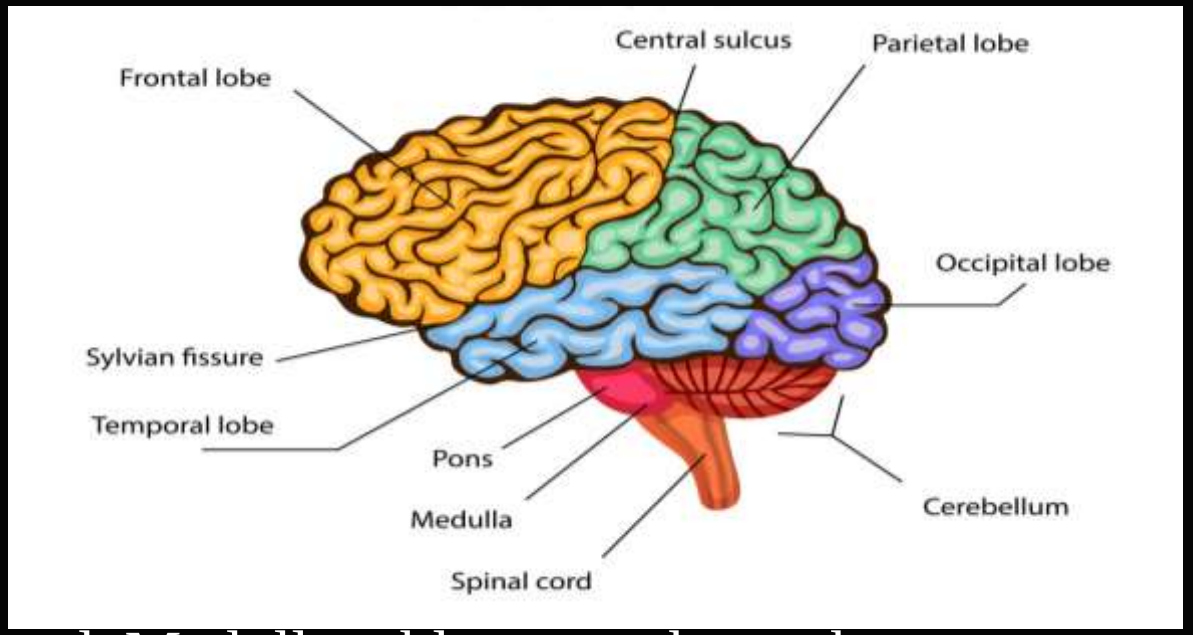
CENTRAL NERVOUS SYSTEM

Central nervous system formed by brain and spinal cord.

Brain:

Brain is the part of central nervous system which lies within the cranial cavity. It consists of the following parts:

- Cerebrum
- Cerebellum
- Mid brain
- Pons
- Medulla oblangata



Mid brain, Pons and Medulla oblongata these three structures from the **BRAIN STEM.**

AUTONOMIC NERVOUS SYSTEM

- The Sympathetic (Thoraco-Lumber Outflow)
- The Parasympathetic (Cranio-Sacral Outflow)

S.No	SYMPATHETIC SYSTEM	PARASYMPATETIC SYSTEM
1	Dilatation of the pupil of eye	Constriction of pupil
2	Dilatation of bronchi	Constriction of bronchi
3	Constriction of blood vessels	Dilatation of blood vessels
4	Decrease in glandular secretions	Increase in glandular secretions
6	Decrease in gastrointestinal motility	Increase in gastrointestinal motility

The Meninges: The brain and spinal cord are protected by three coverings called meninges. They are:

- Dura mater - which forms the outer layer
- Arachnoid mater - which forms the middle layer
- Pia mater - which forms the inner layer

Reflex Action: Reflex action occurs independent of will and it is concerned with involuntary movements. It is a defence mechanism manifesting as a quick and automatic motor response for a sensory stimulus.

Reflex Arc: It consists of structures which are involved in the production of a reflex action. These structures are:

- A sensory organ
- A sensory nerve
- The spinal cord
- A motor nerve

SENSE ORGANS

Structures of Eye:

The eye ball is almost spherical on shape and it is situated in the anterior part of orbital cavity. The eye ball contains three coats and light transmitting structures.

•Outer fibrous coat containing sclera and cornea.

•Middle vascular coat containing choroid, ciliary body and iris.

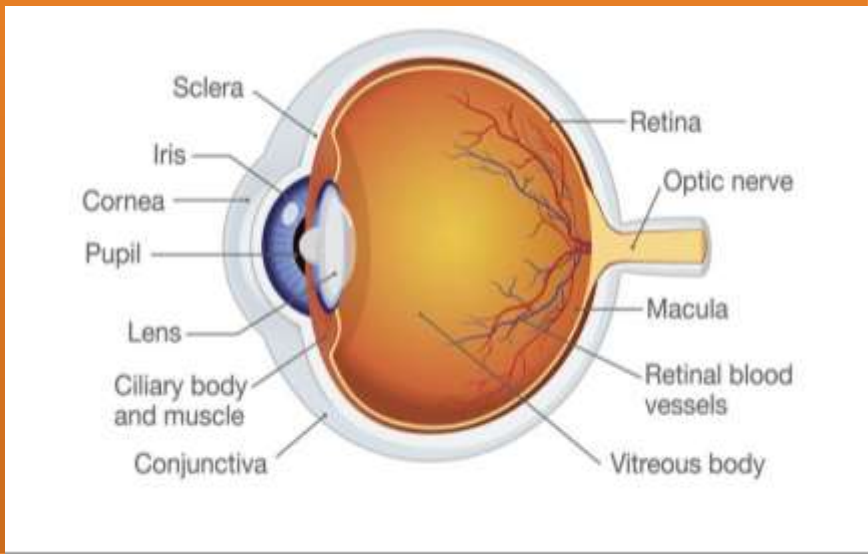
•Inner nervous coat containing retina.

The light transmitting structures are:

•Aqueous humour

•Lens

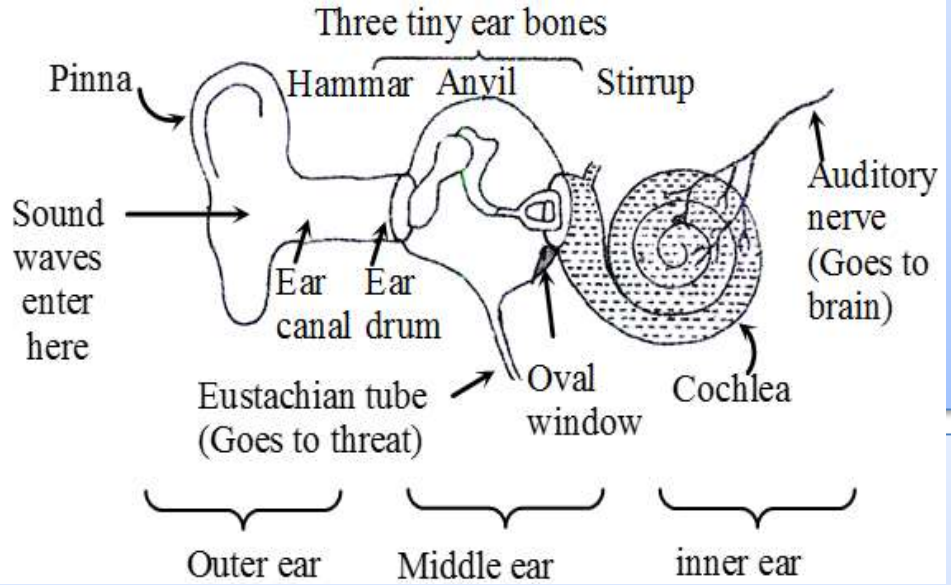
•Vitreous humour



EAR

Ear is concerned with the functions of hearing and equilibrium. It is divided into the following three parts:

- External ear
- Middle ear
- Internal ear



MECHANISM OF HEARING

- Sound waves in air are collected by pinna.
- The external auditiory meatus directs these waves to the tympanic membrane which then vibrates.
- The vibrations are transmitted by malleus, incus and stapes to the membrane covering fenestra ovalis
- /From the inner surface of this membrane, vibrations are transmitted to organ of corti through perilymph and endolymph.
- From the organ of Cotri, the impulses are carried to brain stem through cochlear portion of 8^{th} nerve.
- The fibres are then carried to auditory centre of brain which is present in the temporal lobe of the opposite side.