

# Nervous System

## REVIEW QUESTIONS

### Multiple Choice Questions:

1. Put a tick mark (✓) against the correct alternative in the following statements:

(a) Medulla oblongata controls

1. Smelling
2. **Beating of heart and respiratory movement**
3. Intelligence and will power
4. Balancing the body

(b) Balance of body is controlled by:

1. Spinal cord
2. **Cerebellum**
3. Cerebrum
4. Medulla

(c) The smell of good food causes watering of your mouth. It is a

1. Natural reflex
2. **Acquired reflex**
3. Inborn reflex
4. Ordinary reflex

(d) The structural and functional unit of nervous system is a

1. Axon
2. **Nephron**
3. Neuron
4. Texon

### Short Answer Questions:

#### Question 1.

Name the two types of coordination which take place in our body.

#### Answer:

- (a) Nervous coordination: By nerves and brain
- (b) Chemical coordination: By hormones

### Question 2.

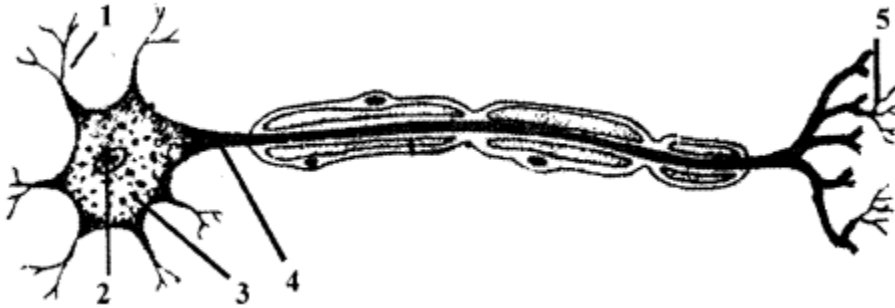
You are driving your bicycle at a fast speed. Suddenly, a small boy comes in front of your cycle and, without wasting any time in thinking, you immediately apply the brakes and accident is avoided. What name is given to such an action?

#### Answer:

Reflex action (acquired).

### Question 3.

Given below is the diagram of a neuron. Name the parts numbered 1-5.



#### Answer:

1. Dendrite
2. Nucleus
3. Cell Body (Nylon)
4. Axon (Nerve fibre)
5. Node of Ranvier

### Question 4.

Write one word in the space provided to complete the second pair of the related words pertaining to nervous system.

Memory : cerebrum : : breathing :

Balance : cerebellum : : reasoning :

#### Answer:

Memory : cerebrum : : breathing: medulla oblongata

Balance : cerebellum : : reasoning : cerebrum

### Question 5.

Differentiate between the following pair of terms:

- (a) Stimulus and impulse
- (b) Receptor and effector
- (c) Motor nerve and sensory nerve

#### Answer:

**(a) Stimulus:** Any change in the environment that usually results in change in the activity of the body.

**Impulse:** A wave of electrical disturbance that runs through the nerves.

**(b) Receptor:** The nerve cell on receiving the stimulus sets up the waves of impulses towards the central nervous system.

**Effector:** Any muscle or gland on receiving the impulse from the brain (or the spinal cord), contracts or secretes.

**(c) Motor nerve:** It contains only motor neurons,

**Example:** Nerves going to the muscles of the eyeball.

**Sensory nerve:** It contains only sensory neurons.

**Example:** optic nerve of the eye.

### Question 6.

(a) Name the three major divisions of the human nervous system.

(b) Name the three main parts of human brain.

**Answer:**

(a)

1. The central nervous system (brain and spinal cord)
2. The peripheral nervous system
3. The autonomic nervous system

(b)

1. Cerebrum
2. Cerebellum
3. Medulla oblongata

### Question 7.

Give the function of each of the following:

(a) Olfactory nerve:

(b) Optic nerve:

(c) Facial nerve:

**Answer:**

**(a) Olfactory nerve:** The sense of smell is present in the epithelial layers of the nasal chambers. The sense of smell is carried to the brain by the olfactory nerve. They arise from the anterior ends of the olfactory lobes and are distributed to lining of nasal chambers.

**(b) Optic nerve:** It carries the reflection of the object from the retina to the brain. The image formed on the retina is in a reverted position and the correct picture is formed in the brain as the object is. The optic nerves arise from the side of diencephalon. They innervate the retina of the eye and are sensory in nature.

**(c) Facial nerve:** It carries message and all expressions of the face, mastication work done by the teeth, movement of the neck and the activities of the salivary glands to the brain. It arises from the side of medulla. On the whole facial nerves are mixed in nature.

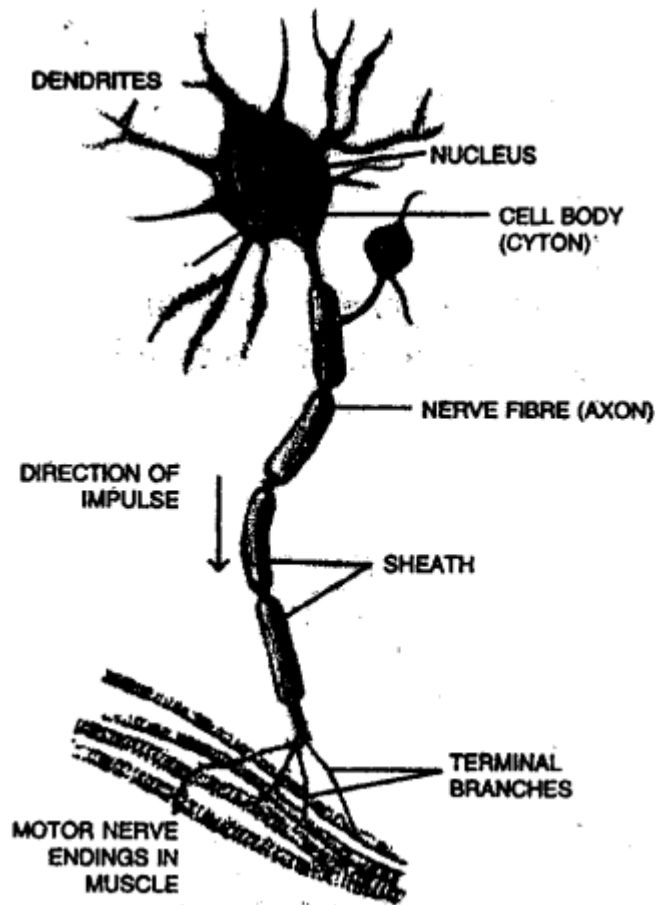
## Long answer questions

### Question 1.

With the help of a suitable diagram describe the structures of a neuron.

#### Answer:

Nervous system consists of special cells called nerve cells or neurons. It has a main cell body called cyton. It gives out many processes called dendrites. From it a very long process is given out. It is called axon or nerve fibre.



The cell body has a nucleus. The dendrites get the message from the organs and send this message to the axon through the cell body. Then the axon sends the message to muscles to contract or to the gland for secretion.

The neurons make contact with one another through their processes. The axon at its end branches and meets the dendrites of another neuron. The meeting point is called synapse. The message is passed on from one axon to the dendrites of another neuron. How the message goes ? It is like this:

Organ → Message goes to dendrites → Cell body → Axon → Muscles or glands

### Question 2.

Briefly describe the structure of the cerebrum in human brain and mention its functions.

#### Answer:

Brain consists of main three parts and lies in the cranial cavity of skull.

1. The cerebrum
2. The cerebellum
3. The medulla oblongata

**Cerebrum:** It is very large and form two third of the whole brain. The two hemispheres are separated from each other by a deep longitudinal groove, the median fissure. The outer surface is folded with ridges and grooves. The hemispheres are hollow from inside and their walls have outer and inner portions. The outer portion has cell bodies of the neurons and it is called grey matter.

The wavy edges of the folded layer has large number of neurons to the extent of nine billion. The inner portion of the cerebrum has axons and it is called white matter.

### **Functions:**

1. It controls all the voluntary activities.
2. It is the seat of intelligence, consciousness and will power.

### **Question 3.**

Mention the three functions of spinal cord.

#### **Answer:**

Spinal cord has the following functions.

1. It is the centre of reflex actions below the neck.
2. It carries messages from the skin and muscles to the brain.
3. All the stimuli and responses are passed from and to the brain through the spinal cord.

### **Question 4.**

With the help of suitable example, describe reflex action.

#### **Answer:**

**Reflex action:** Reflex actions are automatic responses to stimuli. These actions are not under the control of the animal. They are of definite and mechanical type. Peripheral nervous system and spinal cord both control certain action and the brain is not in action. Some examples of reflex actions are:

1. Pupil becomes narrow when strong light falls on it.
2. The aroma of the food makes the mouth watering.
3. The hand is withdrawn as we touch the hot plate.
4. Flow of bile from the gall bladder into the duodenum.
5. A loud thud may lead to opening of the mouth.

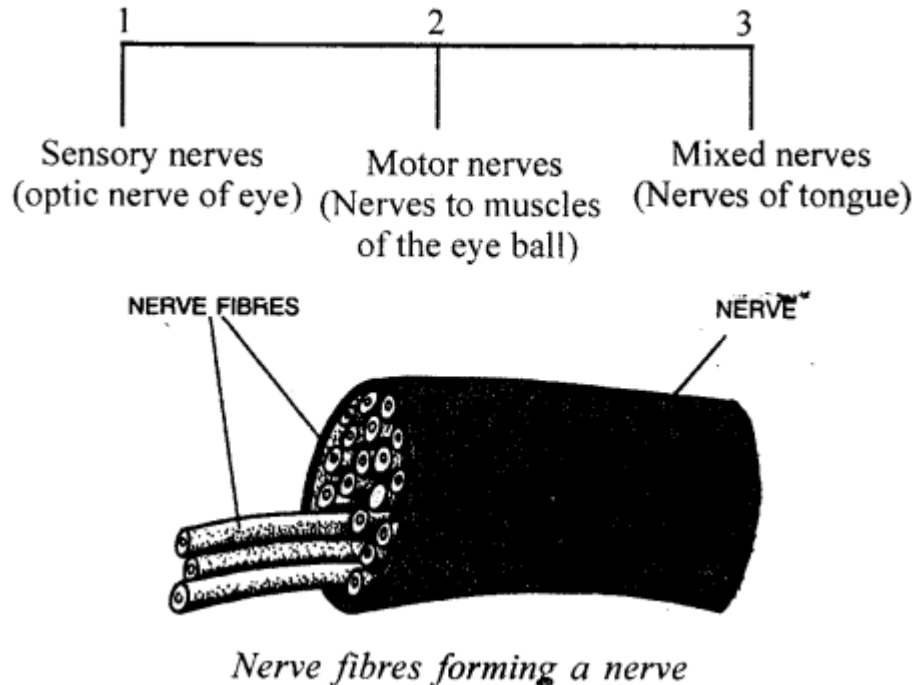
In a reflex action brain is not involved, removing the hand on touching a hot plate is a reflex action. The impulse of heat goes from the hand to the spinal cord and the order is sent back to the muscles of the hand to remove the hand from the hot plate.

### Question 5.

Describe three kinds of nerves, giving the example of each.

#### Answer:

A nerve is formed by a group of nerve fibres (axons) encased by tubular medullary sheath. The medullary sheath acts as insulation and do not allow mixing up of impulses of the neighbouring axons (nerve fibres) We have three kinds of nerves:



1. **Sensory nerve:** It brings impulses from sense organs as these have sensory fibres. These nerve carry the impulses from the sense organs to the brain or to the spinal cord as optic nerve of the eye.
2. **Motor nerves:** These carry impulses to muscles or glands from the brain or spinal cord. These nerves have only motor fibres as nerves to the muscles of the eye ball.
3. **Mixed nerve:** It has both sensory and motors fibres as nerve going to the tongue.

### Question 6.

Differentiate between natural reflex and conditioned reflex. Give examples to illustrate your answer.

#### Answer:

**Natural reflex:** It is one in which no previous experience or learning is required. These reflexes are inborn i.e. inherited from the parents.

Examples are

1. Blinking, coughing, sneezing as these are protective reflexes
2. Salivation, swallowing, peristalsis as it provides functional efficiency.

3. Dilation of the eyes pupil to look in the dark and vice versa. It is muscular movement.
4. Pushing along of swallowed food through the food canal. It is muscular movement.

**Conditioned Reflex:** It is one which develops during lifetime due to experience or learning.

Examples are:

1. Watering of mouth (Salivation) at the sight of a tasty food.
2. Surfing the channels while watching the television.
3. Typing of a keyboard of a computer.
4. Playing a musical instrument.

### ADDITIONAL QUESTIONS

**I. Multiple choice questions. Tick (✓) the correct choice:**

**1. Nervous system in humans consists of**

1. brain and nerves
2. brain and spinal cord
3. **brain, spinal cord and nerves**
4. none of the above.

**2. Memory and intelligence are controlled by**

1. **cerebrum**
2. medulla oblongata
3. cerebellum
4. spinal cord

**3. Heartbeat and breathing are controlled by**

1. cerebrum
2. spinal cord
3. cerebellum
4. **medulla oblongata**

**II. Fill in the blanks:**

1. Basic structural unit of the nervous system is the **neuron**.
2. Central nervous system consists of **brain** and **spinal cord**.
3. A neuron consists of **cell body**, **dendrite** and **axon**.

4. The neurons carrying impulses from the brain to the muscles are called **motor or efferent neurons**.
5. Peripheral nervous system consists of **nerves**.
6. The three main parts of the brain are **cerebrum, cerebellum** and **medulla oblongata (brain stem)**.

### III. State whether the following statements are true (T) or false (F):

1. Each neuron consists of three parts called cell body, cyton and axon.  
**False.** Each neuron consists of three parts called cell body, dendrite and axon.
2. The largest part of the brain is the cerebrum.  
**True.**
3. Cerebellum maintains balance of the body,  
**True.**
4. There are 31 pairs of cranial nerves.  
**False.** There are 12 pairs of cranial nerves.

### IV. Find the odd-one out, giving reasons:

**Axon, cell body, dendrite, cerebellum**

**Answer:**

Cerebellum is the odd one out as it is apart of brain while rest three are parts of a neuron,

### V. Define the following:

1. Reflex arc
2. Sensory neuron
3. Motor neuron
4. Neuron

**Answer:**

1. **Reflex arc:** The path that an impulse takes in a reflex action is called a reflex arc.
2. **Sensory neuron:** The neurons which carry impulses from the body parts to the brain are called sensory or afferent neurons. For example, optic nerve of the eye.
3. **Motor neuron:** The neurons which carry impulses from the brain or spinal cord to the body parts are called motor or efferent neurons.
4. **Neuron:** A neuron or a nerve cell is the basic structural and functional unit of the nervous system. .



## VI. Answer the following:

### Question 1.

Describe the two parts of the nervous system.

#### Answer:

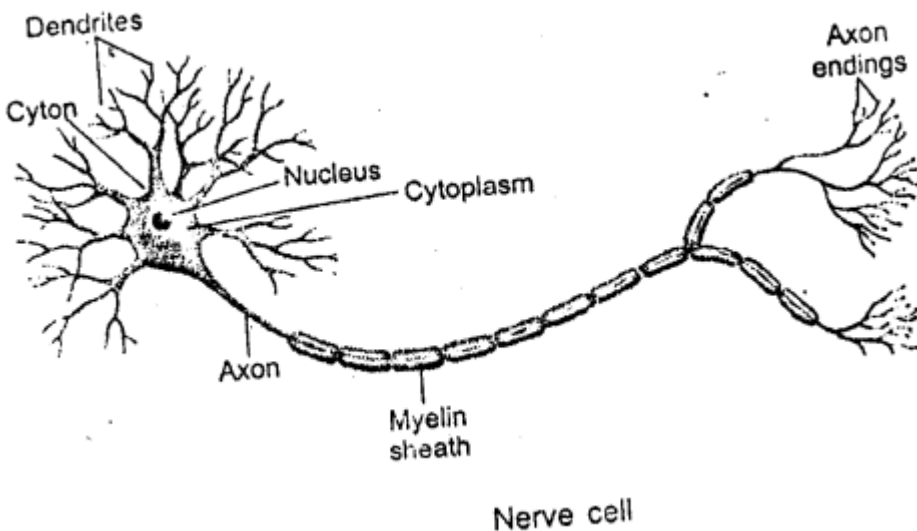
The nervous system of human has two parts:

1. **Central Nervous System (CNS):** It consists of the brain and the spinal cord. The brain lies protected inside the skull while the spinal cord is protected within the vertebral column.
2. **Peripheral Nervous System (PNS):** It consists of nerves arising from the spinal cord (spinal nerves) and the brain (cranial nerves). These nerves link the central nervous system with the various body organs.

### Question 2.

Draw a labelled diagram showing the structure of a neuron.

#### Answer:



### Question 3.

What are nerves? Mention the types of nerves found in humans.

#### Answer:

A bundle of nerve fibres joined together as a tubular sheath that transmits impulses between brain or spinal cord and other body parts is called a nerve. The nerves constitute the peripheral nervous system. Nerves are of two types in humans:

1. **Cranial nerves:** They emerge from the brain. There are 12 pairs of cranial nerves.

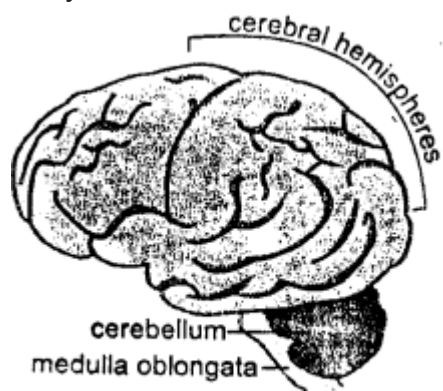
2. **Spinal nerves:** They emerge from the spinal' cord. There are 31 pairs of spinal nerves.

#### Question 4.

Explain the structure of brain.

#### Answer:

The brain is the main control centre of the nervous system. It is enclosed within the bony shell of cranium. It consists of three main parts:



Parts of human brain

1. **Cerebrum:** It is the uppermost and largest part with many ridges and grooves. It is divided into right and left halves called cerebral hemispheres. It controls our thinking, reasoning, intelligence, memory and perception of pain, sound, touch, taste and smell.
2. **Cerebellum:** It is located under the cerebrum at the back of the head. It maintains balance of the body and coordinates muscular activity.
3. **Brain stem (medulla oblongata):** It joins the brain to the spinal cord. It controls the activity of internal organs i like heartbeat and breathing.

#### Question 5.

Compare the nervous system and the endocrine system.

#### Answer:

##### Nervous system

1. Messages are sent through nerve fibres.
2. It consists of brain, spinal cord and nerves.
3. No hormones are secreted. Messages are sent as impulses.
4. Transmission of impulse is quick.

##### Endocrine system

1. Messages are sent through blood in the form of hormones.
2. It consists of endocrine glands.
3. Hormones secreted by glands regulate the body activities.

4. Transmission takes time.

**Question 6.**

Name three parts of brain.

**Answer:**

Three parts of brain are cerebrum, cerebellum and medulla oblongata (brain stem).

## **VOLUNTARY AND REFLEX ACTIONS, SENSE ORGANS**

### **I. Multiple choice questions. Tick (✓) the correct choice:**

#### **1. Reflex actions occur under the control of**

1. brain
2. medulla oblongata
3. spinal cord
4. cerebrum

#### **2. The coloured part of the eye is called**

1. retina
2. **iris**
3. lens
4. pupil

#### **3. Pinna is a part of**

1. inner ear
2. **external ear**
3. middle ear
4. tongue

#### **4. The brown pigment melanin is present in \_\_\_\_ of skin.**

1. **Epidermis**
2. Fat cells
3. Dermis
4. Hair follicles.

### **II. Fill in the blanks:**

1. Sense organs have special cells called **receptors** for picking up information and transmitting it to the nerves.

2. Outer protective layer of skin, called epidermis is made up of **epithelial** tissue.
3. The coloured part of eye is called **iris**.

**III. State whether the following statements are true (T) or false (F):**

1. The dermis of the skin is made up of epithelial cells.  
**False.** The epidermis of the skin is made up of epithelial cells.
2. The pigment melanin is present in inner layers of skin epidermis.  
**True.**
3. The sound waves from the outer ear are carried by the middle ear to the inner ear.  
**True.**
4. Cochlea is a part of middle ear.  
**False.** Cochlea is a part of inner ear.
5. Retina is present on the outer surface of the eye.  
**False.** Retina is present on the inner surface of the eye.

**IV. Find the odd-one out, giving reasons:**

**Pinna, eardrum, cochlea, ear canal**

**Answer:**

Cochlea is the odd one out as it is a part of inner ear while the rest three are parts of outer ear.

**V. Name the following:**

**Question 1.**

Five sense organs of human beings and the sensation perceived by each one.

**Answer:**

1. Eyes for sight.
2. Ears for hearing.
3. Nose for smelling.
4. Tongue for taste.
5. Skin for touch, heat, cold and pressure.

**Question 2.**

Flap like structure of outer ear.

**Answer:**

Pinna.

**VI. Answer the following:**

**Question 1.**

1. Define voluntary and reflex actions. Give examples of each.

**Answer:**

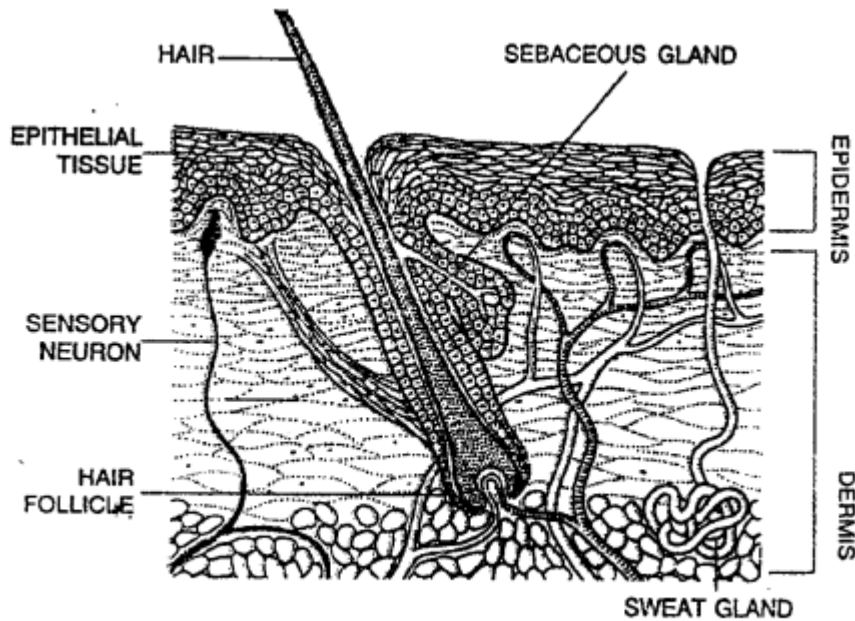
The actions which are controlled by the brain are called voluntary actions. For example, riding a bicycle, dancing or playing soccer.

The actions which are under the control of the spinal cord are called reflex actions. For example, pulling away of hand from a hot object, blinking of eyes on dust getting into the eyes.

**Question 2.**

Draw a labelled diagram to show the structure of skin.

**Answer:**

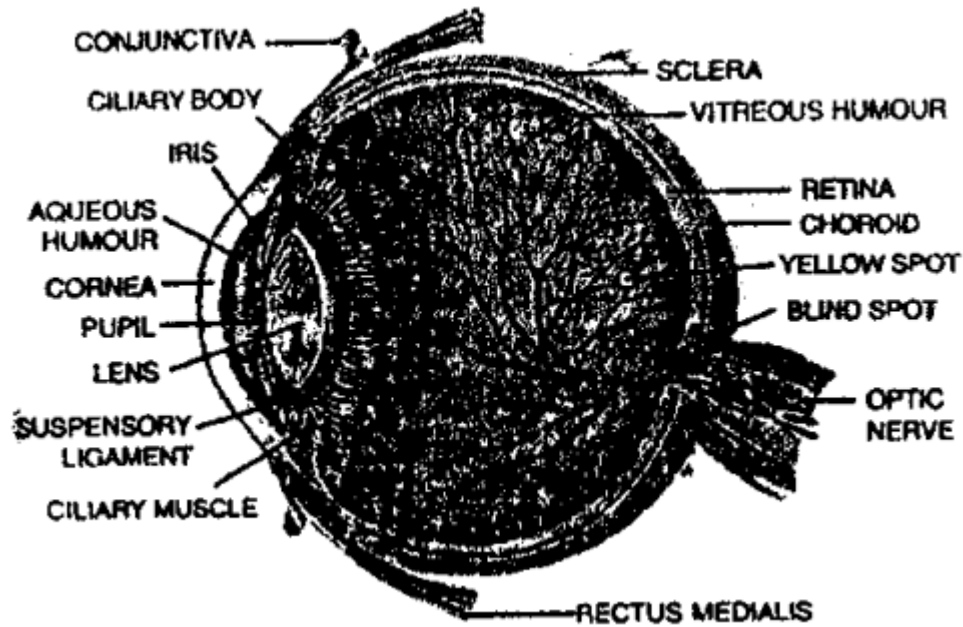


*Section of the skin*

**Question 3.**

Draw a labelled diagram of eye.

**Answer:**



#### Question 4.

What are sense organs?

#### Answer:

Sense organs are the parts of body which act as receptors that receive stimuli and send impulse to the brain. They help the body to know about the surroundings.

#### Question 5.

Give the functions of retina, pupil, and optic nerve.

#### Answer:

**Function of retina:** It has light sensitive cells called rods and cones. Cones are responsible for coloured vision and observation when the light is strong. Rods are receptors for seeing in dim light. Retina has cells that convert the light falling on it into chemical signals that go to brain and get interpreted as image.

**Function of pupil:** It controls the amount of light that enters the eye. It enlarges in dim light and becomes smaller in bright light.

**Function of optic nerve:** It carries the message of sight from retina to the brain.

#### Question 6.

Differentiate between rods and cones.

#### Answer:

Rods and cones are types of photoreceptors in the human eye.

#### Rods

1. It is responsible for detecting the dim light only with black and white.
2. Defects in rods cause night blindness.

#### Cones

1. It is responsible for detecting bright light with colors.
2. Defects in cones cause color blindness.