Question-1

Why do cerebral hemisphere possess many gyri?

Solution:

Cerebral hemisphere possess many gyri, because gyri increases the surface area of the cortex for accommodating more nerve cells in it.

Question-2

Where is cerebrospinal fluid present in our body? Mention any two of its functions.

Solution:

Cerebrospinal fluid is present in the meninges and ventricles of the brain. It keeps the brain moist and protects it from injury and shocks.

Question-3

What is night blindness? What causes night blindness? How can it be remedied?

Solution:

Night blindness is a condition in which vision is incomplete or totally lost temporarily in darkness. In the eyes, there are specialized rod cells, which contain purple coloured photosensitive pigments, called rhodopsin. These pigments are formed from vitamin A. Thus, vitamin A deficiency causes night blindness. This can however, be remedied by taking oral pills or a diet rich in vitamin A.

Question-4

How is the shape of the cornea maintained?

Solution:

An aqueous fluid called aqueous humour supplies nutrients to the cornea and thus maintains its shape.

Question-5

Which mechanism in your body makes your mouth water at the sight of tasty food?

Solution:

The mouth usually waters at the sight of tasty food due to reflex action. Reflex is an involuntary action performed by muscles under the direction of the spinal cord in response to a stimulus. In short, reflex actions are automatic responses to stimuli.

Question-6

What is the function of Eustachian tubes?

Solution:

To maintain the balance of the air pressure on both sides of the eardrum and allows it to vibrate freely.

Question-7

What type of striated muscles constitute the muscles of the eye ball. How is the specific type of muscle advantageous?

Solution:

White muscles. They have less mitochondria, less myoglobin, less oxygen, less energy, fast and strenuous work for short duration.

Question-8

Why do you soon stop smelling the perfume on your dress while persons approaching you still perceive its smell?

Solution:

If a person is continuously inhaling a substance, he or she soon gets adapted to the olfactory sensation. This olfactory adaptation is due to the change in both, the olfactory cells and olfactory centres of the brain. As a result, the olfactory sensation for a particular substance weakens and ultimately disappears.

Question-9

Name the parasympathetic nerve from the brain that innervates most of the visceral organs. List any four functions of this nerve.

Solution:

Vagus nerve. It slows down heart beat, constricts bronchioles, accelerates muscle action in the stomach, dilates blood vessels, lowers arterial blood pressure, increases intestinal movement, contacts urinary bladder

Question-10

Why does a nerve impulse flow more rapidly in myelinated nerve fibres than in non-myelinated fibres?

Solution:

In non-myelinated fibres, the myelin sheath is absent and ionic changes take place all along the length of the nerve fibres. On the other hand, in myelinated nerve fibres, depolarization of ionic changes takes place only in the myelin free areas called nodes of Ranvier, because the myelin sheath insulates the nerve fibres and prevents its depolarization. So action potential jumps from one node to another. This is known as saltatory conduction. Thus, nerve impulses flow more rapidly in myelinated nerve fibres than in non-myelinated nerve fibres.

Question-11

What do you understand by binocular vision?

Solution:

In man the eyes are placed in front of the head. Both the eyes form an image of an object simultaneously. Thus our eyes can see only one object at a time but the image formed clear and not blurred. While in case of insects it is not so. The phenomenon of observing only one object by both the eyes is known as binocular vision.

Question-12

Why is conduction in a nerve called an electrical phenomenon?

Solution:

The conduction in a nerve is called an electrical phenomenon because it can be compared to the transmission of messages through a telephone cable. It travels very fast just like an electric current. However, its speed is not as fast as that of electric current through a wire. Thus, the passage of a stimulus in a nerve is called an electrical process.

Question-13

What is the significance of grey matter present in the spinal cord?

Solution:

In a spinal cord grey matter shows a butterfly shape i.e., it is produced into two dorsal horns and two ventral horns. Grey matter contains cells bodies of thousand of neurons and dendrites. It helps in interpretations of impulses during reflex action.

Question-14

How do rods and cones of human eye differ from each other chemically and functionally?

Solution:

Rods	Cones
Rods contains a brown pigment called rhodopsin formed of vitamin A.	Cone cells are sensitive to bright light and enable us to see the three primary colours, red, green and blue.
These are sensitive to dim light.	There are different kinds of cone cells, each with different pigments. If any one of these pigments is absent, then it becomes difficult to see and identify the corresponding colour.
With the help of rods we can see shades of grey and white in dim light as well as in darkness. If our food does not contain vitamin A we cannot see things in dim light. This condition is termed as night blindness.	Persons having no cones in retina suffer from a disease called colour blindness. They are unable to see any colour.

Question-15

What are the events that take place at the point of stimulation of an axon?

Solution:

Stimulation of an axon immediately enhances manifold its membrane permeability to Na^+. As a result, Na^+ ions diffuse across the membrane from the extracellular fluid when their concentration is higher, to the interior of the fibre where the concentration is much lower. But the membrane permeability of K^+ starts rising later. So there is simultaneous rise in the outward diffusion of K^+ from the cell interior, which has a higher K^+ concentration. These effects lower the overall cation concentration outside the membrane. The membrane is thus depolarized, with its interior becoming electropositive to the exterior.

Question-16

Describe in brief the organ of olfactory in man.

Solution:

Nose is the sense organ for olfaction in human beings. The nasal cavity is lined by modified form of pseudostratified epithelium covering a part of a nasal mucosa. This epithelium is called as olfactory epithelium. It covers about 5 cm2 in the roof of the nasal cavity near nasal septum. Olfactory epithelium consists of three types of cells, olfactory receptor cells, supporting cells and basal cells. The olfactory receptor cells pick up the particular odour and carry it to the olfactory nerve. This, in turn, transmits the impulse to the brain.

Question-17

What are neurotransmitters?

Solution:

Neurotransmitters are chemicals, which help to transmit nerve impulses across the synapsis. E.g. acetylcholine.

Question-18

Write the difference between polarized and depolarized membrane.

Solution:

The difference between polarized and depolarized membranes are listed below:

Polarized membrane	Depolarized membrane
(i) Its outside is electropositive while the inner side is electronegative.	(i) Its outside is electronegative while the inner side is electropositive.
(ii) There are more cations outside this membrane than inside.	(ii) There are less cations outside this membrane than inside.

Question-19

How does an impulse travel across a synapse?

Solution:

An impulse travels across a synapse in one direction only. Impulses always travel from the axons to the cell body and dendrites of the next neuron. Acetylcholine prevents its back flow.

Question-20

What is autonomic nervous system? Give the major anatomical and physiological difference between the two kinds of autonomic nervous systems.

Solution:

Autonomic nervous system is the system which regulates the activity of visceral organs by regulating the activities of their involuntary muscles and glands, it regulates autonomic activities of the body. Two kinds of autonomic nervous system are

(i) sympathetic nervous system and

(ii) Parasympathetic nervous system.

Question-21

What are the events that take place on the point of stimulation of an axon?

Solution:

Stimulation of an axon immediately enhances manifold its membrane permeability to sodium. As a result, sodium ions diffuse across the membrane. The concentration of fluid in the membrane is higher than the concentration of the fluid in the fibre. But the membrane permeability of potassium starts rising somewhat later only and so there is simultaneous rise in the outward diffusion of potassium from the cell interior having a higher potassium concentration. These effects lower the overall cation concentration outside and enhance that inside the membrane. The membrane is thus depolarized, with its interior becoming electropositive to the exterior.

Question-22

Describe the histological structure of spinal cord in human.

Solution:

Histology of spinal cord in human: It is a cylindrical structure which is connected with the brain at medulla oblongata. The spinal cord runs through the length of vertebral column inside its cavity. The spinal cord is a hollow structure containing a cavity called the central canal. It has H-shaped central core of grey matter made up of nerve cell bodies, dendrites and synapses enclosing the central canal. The white matter provides is outer layer. The gray matter is divided into horns. Close to front of spinal cord is ventral (anterior) gray horn and close to back are dorsal (posterior) gray horn. Between ventral and dorsal gray horns are lateral gray horns.

The nervous matter of the spinal cord is divisible into central grey and peripheral white matter. The grey matter contains interneurons, motor neurons, cell bodies and dendrites. The peripheral region of the spinal cord forms the white matter. It contains nerve axons which transmit nerve impulses between different levels of the spinal or between cord and the brain.

The fibres are grouped into bundles, called pathways or tracts, which are organised according to their functions and consist of nerve-cell processes. These transmit the same type of information. For example, those nerve fibres which transmit information about the light and pressure to the brain are all in the same pathway. The spinal white matter contains many tracts, some descending to convey information from the brain to the spinal cord, others ascending to transmit impulses in the opposite direction.

Groups of afferent fibres enter the spinal cord on the dorsal side of the body. These groups (dorsal roots) are sensory in nature.

The efferent fibres leavs the spinal cord on the front side via the ventral roots. These are motor in nature. The two roots ventral and dorsal immediately after leaving the cord join at the same level to form a spinal nerve. In man 31 spinal nerves originate from the spinal cord.

Question-23

The membrane of a resting nerve fibre is said to be in a polarized state. What is meant by this statement?

Solution:

Nerve fibres become excited by a stimulus and conduct the stimulus for the required and appropriate response. In conducting a stimulus it has to pass through from resting phase to the active phase and then recovery phase. In resting phase the membrane is 30 times more permeable to potassium ions than the sodium ions. As a result of which inside the axon there is more potassium and like wise more sodium on the outside of the membrane. The inner side of polarized membrane is electro negative while the outer side is electropositive

Question-24

What are the common defects of the eye in humans? How would you correct them?

Solution:

Common defects of eye: The following are the common defects of eye:

(i) Near-sightedness (Myopia). It occurs when the image of a distant object is focused in front of the retina. This may be due to one of the following reasons:

1. Lengthening of the eyeball from the front to the back.

2. Due to the increased convexity of the lens.

3. It can be corrected by using appropriate lenses.

(ii) Far-sightedness (Hypermetropia). It is due to the opposite conditions of the above and can be corrected by wearing suitable convex lenses.

(iii) Astigmatism. It is due to irregularities in the shape of the lens and the cornea. This condition can be corrected by wearing cylindrical glasses.

(iv) Old-age sight. It is due to the loss of flexibility of the lens and one feels difficult in focusing on closely objects. This defect starts appearing after the age of about forty and is corrected by the use of convex lenses.

(v) Cataract. In this case lens becomes opaque due to several causes and requires the help of an eye- specialist.

Question-25

Enumerate the different types of nerve fibres according to their nature and function.

Solution:
According to their nature and function, nerves are of two types,

(i) Sensory or afferent nerve fibres enter the spinal cord from the dorsal side of the body. They conduct messages from the receptor organ to the brain or spinal cord for necessary action.

(ii) Motor or efferent nerve fibres leave the spinal cord on the ventral side. They carry nerve impulses from the brain or spinal cord to the effector organs such as muscles or glands for performing specific function or activity. The afferent and efferent nerve fibres combine together to form the spinal nerves.

Question-26

Describe the cavities of human brain.

Solution:
The cavities of brain are called ventricles.

Ventricles of brain: Four cavities lie within the brain. They are called cerebral ventricles. Each of the two lateral ventricles is found in each hemisphere. Third ventricle is vertical slit at the mid line between the lateral ventricles. Fourth ventricle lies between the brain stem and the cerebellum. Extracellular fluid (ECF) is circulated constantly through the subarachnoid space between the arachnoid and pia mater around the brain and the spinal cord and through all cavities within the brain. This fluid is known as cerebrospinal fluid (CSF). CSF is a clear, colourless, fluid.

Question-27

Give the technical names of the auditory ossicles in their natural sequence.

Solution:
Auditory ossicles are three small bones in the cavity of middle ear. Their technical named are:

(i) hammer like malleus,

(ii) anvil-like Incus; and

(iii) Stirrup and stapes.

Question-28

Explain the eye defect - myopia. How can it be corrected with the help of a lens?

Solution:

This eye defect is called short sightedness or near sightedness. It occurs when the image of a distant object is focused in from to the retina. This may be due to one of the following reasons.

(i) Lengthening of eyeball from the front of the back.

(ii) Due to increased convexity of the lens. It can be corrected by using appropriate biconcave lenses.

Question-29

Name one animal that can see ultraviolet rays.

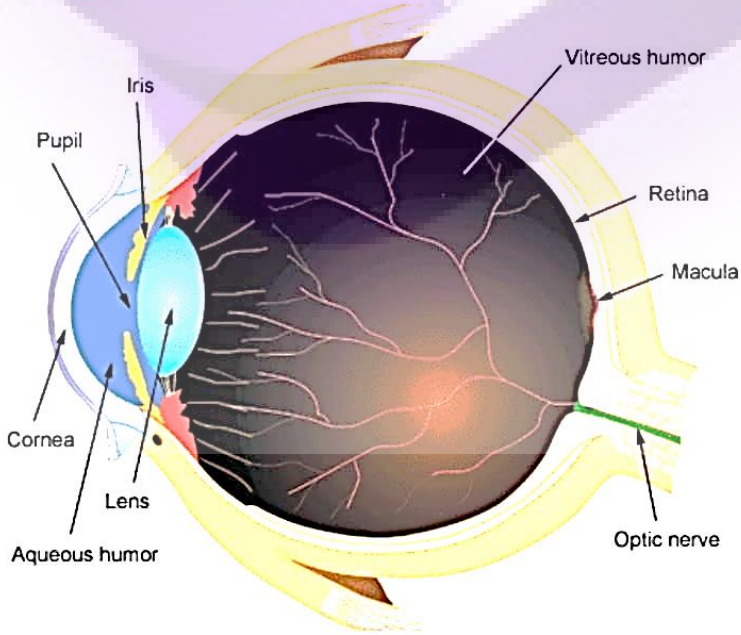
Solution:

Ants.

Question-30

Draw a diagram of a section of human eye and label its parts.

Solution:



Question-31

Name one animal that has mostly rods in its retina.

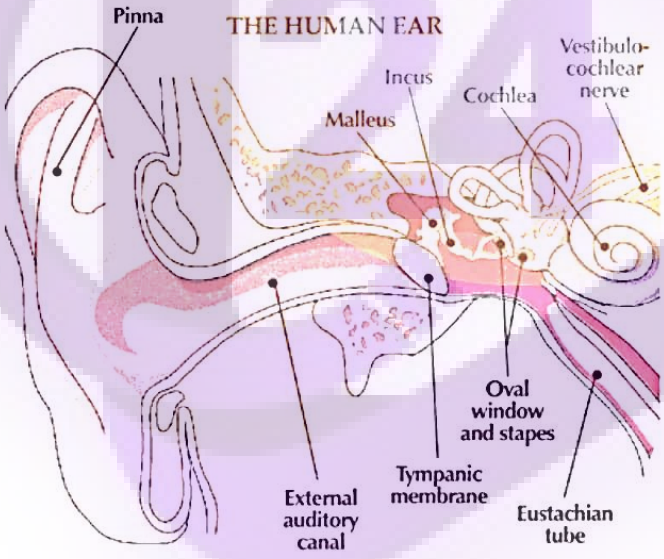
Solution:

Owl.

Question-32

Draw a labelled diagram to show the structure of human ear.

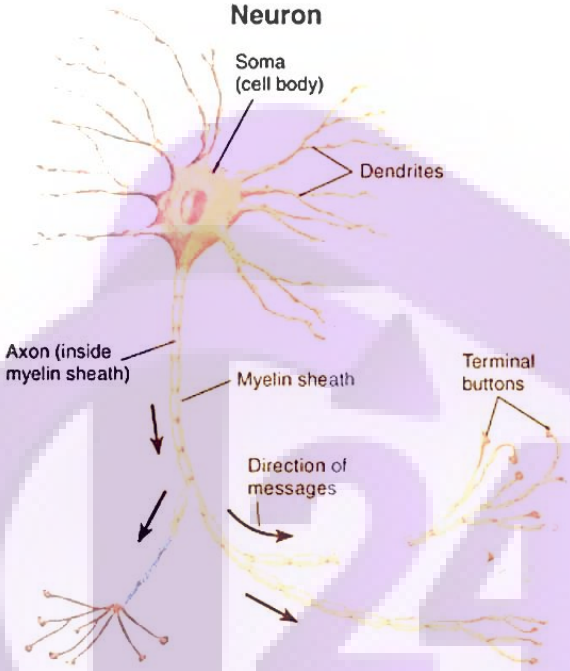
Solution:



Question-33

Draw a labelled diagram of a nerve cell.

Solution:



Question-34

Name one animal that has mostly cones in its retina.

Solution:

Sparrow.

Question-35

What is motor end-plate?

Solution:

It is specialized structure that is formed when an axon of a motor neuron terminates in a muscle fibre.

Question-36

What are the neuroglia cells?

Solution:

These are the cells which holds the neurons together.

Question-37

Human heart is myogenic. Yet a parasympathetic nerve can reduce the heart rate. Name the nerve.

Solution:

Post –ganglionic nerve fibres.

Question-38

Name the calcareous particles present in the endolymph of membranous labyrinth.

Solution:

Ear stones or otoliths.

Question-39

Name any one cranial nerve that controls eyeball movement. Is this nerve a sensory, a motor or a mixed nerve?

Solution:

Oculo-motor nerve- a motor nerve.

Question-40

Name the band of nerve fibre that joins the cerebral hemisphere.

Solution:

Corpus callosum.