CBSE Class 11 Biology

Important Questions

Chapter 21

Neural Control and Coordination

1 Marks Questions

1. How does an impulse travel across a synapse?

Ans. The impulse travel across a synapse from the axons to the cell body and dendrites to the next neuron.

2.How many pairs of cranial nerves are present in man?

Ans. 12 pairs.

3.What is saltatory conduction?

Ans. Saltatory conduction refers to the type of conduction of nerve impulse by a myelinated nerve fibre, where the action potential jumps form one node of Ranvier to the other.

4.Name the band of nerve fibers that joins the two cerebral hemisphere in mammals.

Ans. Corpus callosum.

5.What is threshold stimulus for nerve cell?

Ans. The minimum intensity / strength of a stimulus required to initiate depolarization of neuron is called threshold stimulus.

6.What is a compound eye?

Ans. In insects the eye is composed of many independent visual elements called commatidia such an eye is called compound eye.

7.What types of neurons are found in dorsal root of spinal nerve?

Ans. Sensory neurons.

8.What is the basic unit of neural system?

Ans. Neuron.

9.Why is blind spot devoid of the ability for vision?

Ans. Blind spot has no photoreceptor cells – rods or cones.

10.Name the fluid present in membranous labyrinth.

Ans. Endolymph.

11.Name the area of ratina where only cones are densly packed.

Ans. Fovea.

12.Name the inner most meanings of the brain.

Ans. Piamater.

13.To which part of the brain communication and memory arc associated?

Ans: Cerebrum.

14.Name the bundle of fibers that connect two cerebral hemisphere in human being.

Ans. Corpus callosum.

15.Name the photo pigment present in the rod cells.

Ans. Rhodopsin.

16.Why can impulses flow only in one direction?

Ans. Because each synoapse allows impulse to cross it in a single direction.

17.Where is hypothalamus located in the brain?

Ans. At the base of thalamus.

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2 Marks Questions

1.What is a reflex?

Ans. Reflex is an involuntary action performed by muscle under the direction of spinal cord in response to the stimulus. It is an automatic response to a stimulus which is not under conscious control. A large number of activities of animals are conducted by reflexes e. g. Respiration, peristalsis, watering of the mouth, secretion of saliva in the mouth, etc.

2.What happens when the membrane of a nerve cell carries out a sodium pump?

Ans. When the membrane carries a sodium pump, it carries three sodium ions from the axoplasm to the cell exterior:

- It transfers two potassium ions exchange from the ECF to the cell interior.

- The exterior is positively charged.

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

Ans. At the point of stimulation the membrane permeability changes; it becomes freely permeable to Na^+ ions.

There is a rapid inflow of Na^+ ions and the interior / axoplasm becomes positively charged and the exterior becomes negatively charged.

This condition is known as depolarized state and the potential difference across the membrane is known as action potential.

Now the current flows through the axoplasm from the depolarized region to due next polarised region and through the ECF from the polarised region to the depolarised region.

4.Give parts of neuron.

Ans. Neuron is a microscopic structure made up of 3 parts-

a) Cell body – In contains cytoplasm with typical cell organelles and some granular bodies called Nissl's granules.

b) Dendrites – The short fibers that branch repeatedly and project out of the cell body. They transmit impulse towards the cell body or cyton.

c) Axon – It is a long fibre. Its distal end is branched. Each branch terminates into bulblike structure called as synoptic knob.

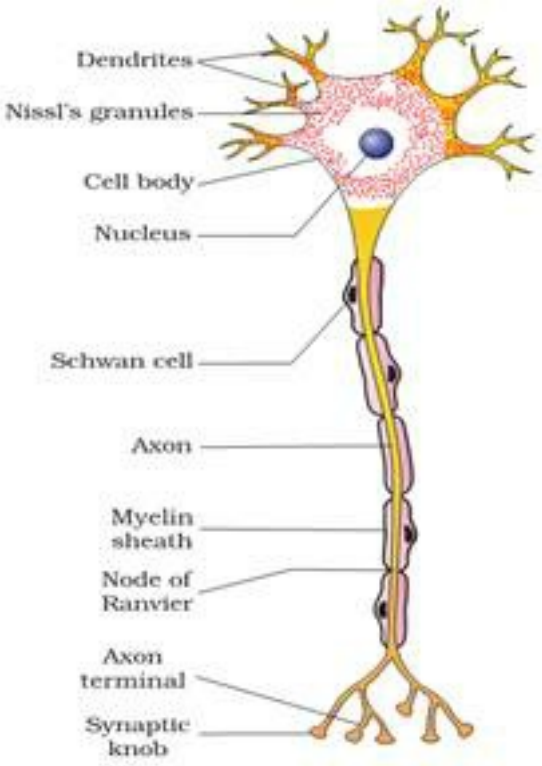

Figure 21.1 Structure of a neuron

5.Describe the role & location of ciliary body in human eye.

Ans. Location:- The choroid becomes thick where the cornea & sclera meet; It is called ciliary body.

Function: The ciliary body continues in front of the lens to form an opaque structure called iris.

6.What is mosaic vision?

Ans. This type of vision is found insects due to compound eye. A complete image of the object as seen by the compound eye is formed by a number of small lineages each of which is contributed by an ommatidium. Such an image formed by many bits of images is called a mosaic image and the vision as the mosaic image vision.

7.Where does cerebrospinal fluid occur in our body? Mention two if its function.

Ans. Cerebrospinal fluid is found in the subarachnoid space between arachnoids and parameter of the menings around the brain and spinal cord and also in the cavities of the brain.

Functions –

1) It protects brain and spinal card by acting as a cushion to absorb shocks.

2) It helps in removing harmful metabolites drugs etc. away from the brain.

8.What is the chemical and difference between rods & cones?

Ans.

	Rods	**Cones**
1.	These are more secretive to light and are meant for vision in dim light.	These are meant for vision in bright light.
2.	They do not have the ability to make colored image	They have ability to make colored image.
3.	They contain the visual pigment rhodopsin.	These contain the pigment iodopsin.

9.Why are gray matter and white matter contained in human nervous system named so?

Ans. Gray matter contains spindle, pyramidal, cell bodies with grayish brown appearance and hence called as gray matter.

White matter contains millions of myelinated axons; the large amount of myelin gives this tissue an opaque white appearance and hence called white matter.

10. Fill in the blanks in the different columns A to D:

Part/Organ	**Function**
Pinna	**....(a)....**
....(b)....	Equalise the pressure on either sided of ear drum.
Cone cells	**.....(c).....**
....(d)....	Regulate amo9un of light to pass into the eye.

Ans. (a) To collect sound waves

(b) Eustachian tube

(c) Colour vision

(d) Iris

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3 Marks Questions

1.Differentiate between dorsal spinal roots and ventral spinal roots.

Ans.

	Dorsal spinal Roots	**Ventral spinal Roots**
1.	They are made of sensory (afferent) nerves.	They are made of motor (efferent) nerves.
2.	They have dorsal root ganglia.	They have no ganglia.
3.	Their cell bodies are located in dorsal root ganglia.	The cell bodies of ventral spinal nerve root is located in ventrolateral horn of grey matter.

2.Describe human neural system.

Ans. It is divided into two parts-

1) Central Neural system (CNS) – CNS includes brain and spinal cord. This is the site of information processing and control.

2) Peripheral neural system (PNS) – PNS consists of all nerves of the body associated with the CNS. Nerve fibers of PNS are of two types i.e. afferent fibers and efferent fiber.

(a) Afferent nerve fibers transmit impulses from tissues / organs to CNS.

(b) Efferent nerve fibers transmit impulses from CNS to concerned peripherel tissues / organs.

PNS is further divided into –

(1) Somatic neural system – It relays impulse from CNS to skeletal muscles.

(2) Autonomic neural system – ANS transmits impulses from CNS to involuntary organs as well as the smooth muscles of body It is again divided into two parts -

a) sympathetic neural system

b) Para sympathetic neural system.

3.Why do giant squids have very thick nerve fiber?

Ans. The velocity of a nerve impulse in a nerve fiber depends on two factors i. e. on its myelinated and also on the thickness of the fibers. The impulses travel faster in thicker nerve fibers since giant squids are very large sized aquatic animals they have thick nerve fibers.

4.Where are synaptic vesicles found? Name their chemical contents? What is the function of these contents?

Ans. Synaptic vesicles are found in the bulbous expansion called synaptic knob, at the nerve terminal-

Each synaptic vesicle contains as many as 10,000molecules of a neurotransmitter substance that is responsive for transmission of nerve impulse across the synapse.

When a wave of depolarization reaches the presynaptic membrane, the voltage gated calcium channels concentrated at the synapse open & Ca^{++} ions diffuse into the terminal form the surrounding fluid.

- The Ca^{++} = ions stimulate the synaptic vesicles to move to the terminal membrane, fuse with it and then and then rupture by exocytosis into the cleft.

- This neurotrarmitter diffuses across the synapse and stimulates the membrane of the next neuron.

5.Give the location and function in the human eye, of the following –

(i) cornea (ii) Iris (iii) Vitreous humor

Ans. 1) Cornea – It is the dome – shaped part of sclera that is transparent and more curved.

Function – It refract light towards retina.

2) Iris – It is the colored (pigmented) at front and formed by choroid.

Functions :- **(i)** It encloses pupil.

(ii) Iris contains cilliary muscles which regulate the size of pupil and controls the amount of light.

3) Vitreous humor – It is present in posterior chamber of eye.

Functions:- **(i)** It helps in shape to the eye & supports retina & lens.

(ii) It refracts the light rays.

6.Why are nerve impulses conducted more rapidly in myelinated nerve fiber than in a non – myelinated one? Explain.

Ans. In a myelinated nerve fiber, the lipid rich myelin acts as an insulator and depolarization occurs in the nodes of Ranvier where myelin sheath is absent. Since the action potential jumps from one node of Ravines to another, the conduction becomes faster and such a type of conduction is called saltatory conduction.

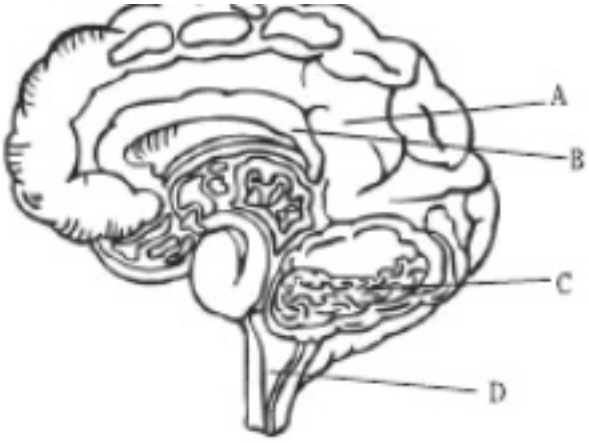
In a non–myelinated fiber, the depolarization occurs all along its length and hence conduction becomes slower.

7. Observe the diagram given right and answer the following questions :

(i) Label the parts A and B

(ii) Give the function of C and D.

(iii) Name the layers which wrap this organ.



Ans. (i) A : Cerbrum

B : Corpus callosum

(ii) C : Balancing of body and maintain posture

D : Vomiting, coughing, breathing, salivation or any other correct answer (any one).

(iii) Piameter, arachnoid and duramater.

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5 Marks Questions

1.Draw a labeled diagram to show the structural view of human ear in the sectional view.

Ans.

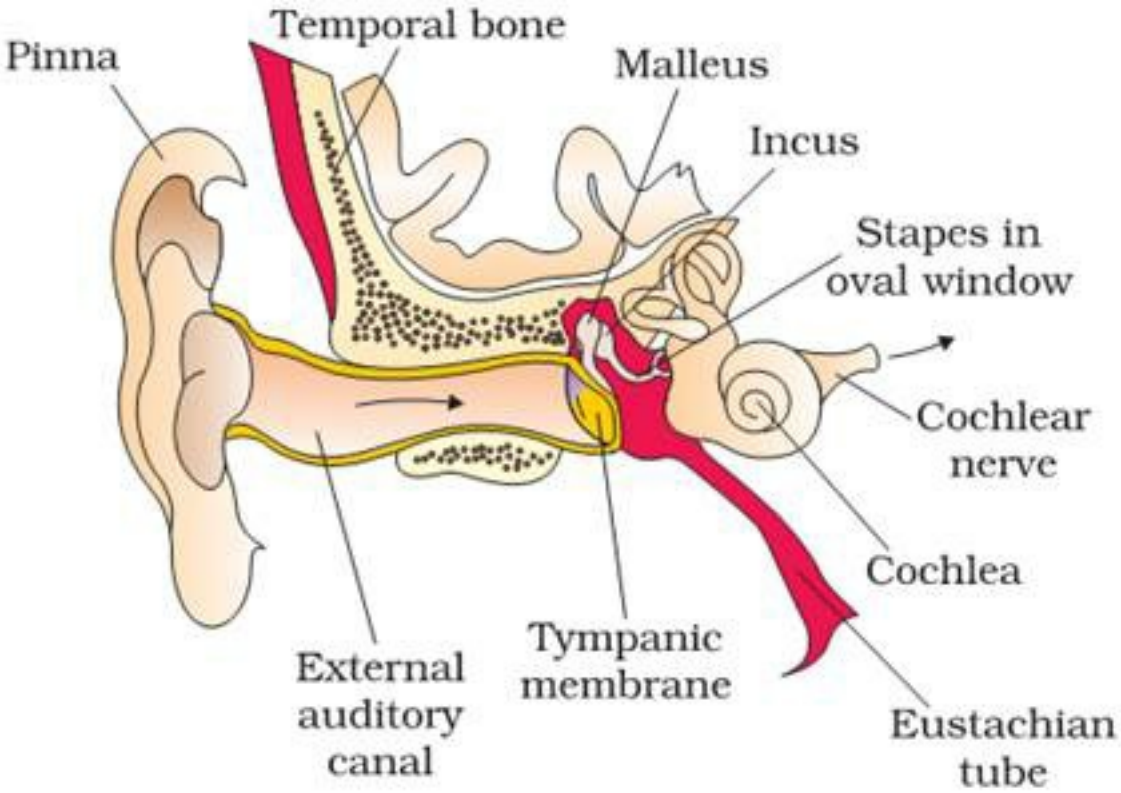

Figure 21.7 Diagrammatic view of ear

2.What is meant by the resting membrane potential of neuron. How do ion channels & sodium – potassium pumps contribute to the resting potential?

Ans. Resting membrane potential.

- The electrical potential difference across the membranes of a resting neuron is called resting membrane potential.

- The membrane is polarized, with a negative interior and positively charged exterior.

- The permeability of membrane to K^+ ions is greater than its permeability to Na^+ ions.

- The negatively charged protein molecules can cross the membrane.

- The sodium pump transports 3 Na^+ ions to the exterior, while in exchange only 2K+ ions comes inside.

- Hence the surface carries a positively charge, which the interior negatively charged.

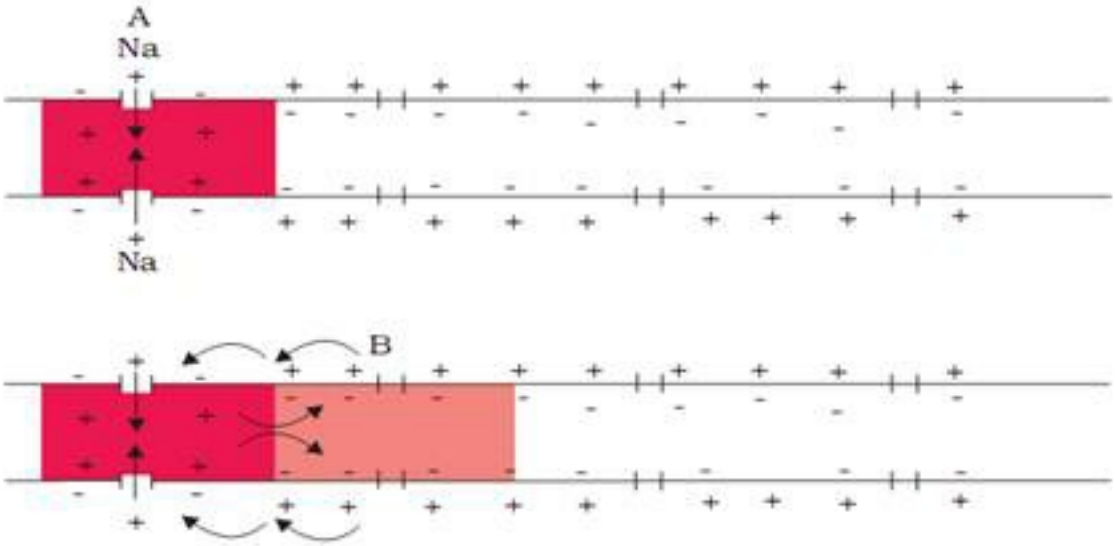

Figure 21.2 Diagrammatic representation of impulse conduction through an axon (at points A and B)

3.reflex arc. Taking one example, describe the functioning of the various components of a spinal.

Ans. A Reflex arc is the specific neural pathway from stimulus to reflex. Components of Reflex arc are –

(1) Receptors – These are the organs / tissues which receive the stimulus and send it as an impulse.

(2) Sensory or afferent nerves – These are neurons which conduct the impulse from the

receptor to the central Nervous system (spinal cord)

(3) Relay or intermediate neurons – They are neurons which conduct the impulse from the afferent neurons to the efferent neurons.

(4) Effectors / motor neurons – These neurons conduct the impulse from the spinal cord/ relay neurons to the effectors organ concerned.

(5) Effectors – It is the organ / tissue or gland that functions accordingly.