CHAPTER -10 THE NERVOUS SYSTEM

Progress Check 1

Question 1

Write one word for each of the following:

(i) The structural and functional unit of nervous system.

(ii) Wave of electrical disturbance that sweeps over the nerve cell.

(iii) Long thread-like part of the nerve cell.

(iv) Point of contact between two nerve cells.

(v) A bundle of axons enclosed in a tubular sheath.

(vi) The kind of nerve carrying impulses from the brain to a gland or muscle.

Answer

(i) Neuron

(ii) Impulse

(iii) Axon

(iv) Synapse

(v) Nerve

(vi) Motor Nerve

Question 2

Categorise the following under stimulus and response.

(i) Withdrawal of hand on touching a hot plate.

(ii) Seeing a green light turning into red at a road crossing before applying the brakes.

(iii) Pain in the eye if something falls into it.

Answer

(i) Stimulus — Touching a hot plate.
Response — Withdrawal of hand.

(ii) Stimulus — Seeing a green light turning into red at a road crossing.
Response — Applying the brakes.

(iii) Stimulus — Something falling into the eye.
Response — Pain in the eye.

Progress Check 2

Question 1

Fill in the blanks by choosing the correct alternative given for each.

(i) Brain and spinal cord are the parts of ..... nervous system. (central/peripheral/autonomous)

(ii) ..... is the largest part of the brain. (Cerebellum/cerebrum/medulla oblongata)

(iii) White matter consists mainly of ..... . (axons/dendrites/cytons)

(iv) The part of the brain concerned with body balance is ..... .(cerebrum, cerebellum, medulla oblongata)

Answer

(i) Brain and spinal cord are the parts of ***central*** nervous system.

(ii) ***Cerebrum*** is the largest part of the brain.

(iii) White matter consists mainly of ***axons***.

(iv) The part of the brain concerned with body balance is ***cerebellum***.

Question 2

Given below are a few common reflexes in humans. Classify them as a simple or conditioned reflex.

(i) Knee-jerk.

(ii) Watering of mouth on seeing a favourite dish.

(iii) Tying of shoe laces while talking.

(iv) Closing of eyelids if a strong beam of light is flashed across.

Answer

(i) Simple reflex.

(ii) Conditioned reflex.

(iii) Conditioned reflex.

(iv) Simple reflex.

Question 3

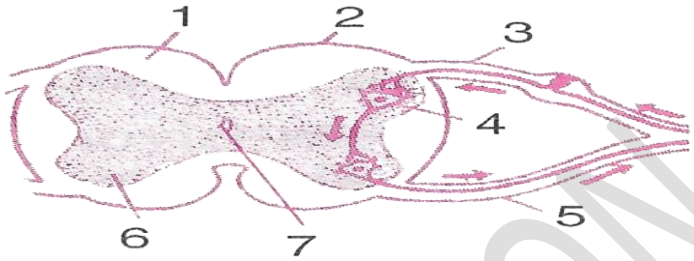
Given alongside is a partial diagrammatic representation of a certain phenomenon pertaining to the nervous system.

(i) Name the parts numbered 1-7

(ii) Name the phenomenon that the diagram depicts and define it.

(iii) Give the technical term for the point of contact between two nerve cells.

(iv) Name the parts not shown in the diagram that should be included to complete the pathway of the phenomenon.



Answer

(i) The parts numbered 1-7 are:

1 → White matter

2 → Spinal cord

3 → Dorsal root

4 → Association Neuron

5 → Ventral root

6 → Gray matter

7 → Central canal

(ii) The diagram depicts spinal reflex action.
It is defined as an automatic/quick/immediate, involuntary action in the body brought about by a stimulus.

(iii) Synapse

(iv) Receptor, sensory neuron, motor neuron, spinal nerve, effector muscles

Multiple Choice Type

Question 1

The basic structural and functional unit of brain is:

1. Cyton
2. Nephron
3. Axon
4. Neuron

Answer

Neuron

Reason — Neurons are the basic structure capable of transmission of impulse.

Question 2

Which of the following structures is absent in nerve cells ?

1. Nucleus
2. Cytoplasm
3. Centrosome
4. Neurilemma

Answer

Centrosome

Reason — Centrosome is absent in nerve cells because they lose their ability to divide (after differentiation).

Question 3

The number of cranial and spinal nerves in a human being are respectively :

1. 31, 12 pairs
2. 32, 21 pairs
3. 12, 31 pairs
4. 31, 21 pairs

Answer

12, 31 pairs

Reason — There are 12 pairs of cranial nerves and 31 pairs of spinal nerve.

Question 4

Which part of the brain controls the posture of our body?

1. Cerebrum
2. Medulla oblongata
3. Cerebellum
4. Pons

Answer

Cerebellum

Reason — The cerebellum is primarily responsible for coordinating and controlling voluntary movements, including posture and balance.

Question 5

The fluid-filled cavities of the brain are termed as :

1. Thalamus
2. Ventricles
3. Hypothalamus
4. Atrium

Answer

Ventricles

Reason — The central cavity of the brain is called the ventricle. These ventricles are filled with cerebrospinal fluid (CSF), which helps protect and cushion the brain.

Question 6

Nissl's granules are found in the cytoplasm of :

1. Cyton of nerve cells
2. Neurilemma
3. Axon of nerve cells
4. Myelin sheath

Answer

Cyton of nerve cells

Reason — Nerve cell have many free ribosomes and many ribosomes associated with endoplasmic reticulum, giving granular appearance to the cytoplasm of cyton.

Question 7

The thin delicate middle layer of meninges is termed as :

1. Choroid
2. Dura mater
3. Arachnoid
4. Pia mater

Answer

Arachnoid

Reason — Arachnoid is the middle layer of the meninges.

Question 8

Any factor that can bring a change in the body of an organism is called:

1. Response
2. Stimulus
3. Reflex
4. Impulse

Answer

Stimulus

Reason — A stimulus is any agent or an environmental change which initiates a response in the body.

Question 9

Gyri and sulci are richly found in :

1. Renal cortex
2. Cerebral cortex
3. Spinal cortex
4. Adrenal cortex

Answer

Cerebral cortex

Reason — In the cerebral cortex, the folds of gray matter are called gyri and the grooves are called sulci.

Question 10

The white matter of cerebrum mainly consists of :

1. Cytons
2. Dendrons
3. Axons
4. Dendrites

Answer

Axons

Reason — Axons are covered with myelin sheath which gives it white colour.

Assertion Reason type

Question 11

Assertion. Effectors are the part of our body which, on receiving stimulus, set up waves of impulses towards the central nervous system.

Reason. The specialized epithelial cells of certain organs are capable of receiving stimuli which can be light, sound, heat, pain, hunger, etc.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True.

Explanation
Effectors are muscles or gland that responds to motor nerve impulse.

Question 12

Assertion. The aggregates of the cell bodies or perikaryons of neurons form the synapse.

Reason. Ganglia are the structures from which the nerve fibres may arise or enter into, whereas the synapse connects two neurons with a small gap in between.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False
4. A is False and R is True

Answer

A is False and R is True

Explanation
A synapse is a junction that allows communication between neurons (nerve cells) or between a neuron and a muscle cell or gland. The term perikaryon refers to the cell body of a neuron (or nerve cell).

Question 13

Assertion. The cerebellum is the largest portion of the brain.

Reason. Cerebellum is located just at the base of the cerebrum. It maintains body balance. Cerebrum is the seat of intelligence, consciousness and will power.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True

Explanation
The cerebrum is the largest portion of the brain, not the cerebellum.
The cerebellum is located at the base of the cerebrum and plays a crucial role in maintaining body balance and coordination. The cerebrum is responsible for higher brain functions, including intelligence, consciousness, and will power.

Question 14

Assertion. The protective membranous covering of the brain and spinal cord are the same, whereas the bony coverings of these are cranium and vertebral column respectively.

Reason. Since both are very delicate and sensitive organs of our body, they are protected by a three-layered membrane known as meninges.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

Both A and R are True.

Explanation
The meninges are three layers of membranes that envelop and protect the brain and spinal cord.

Question 15

Assertion. The arrangement of white and gray matter is the same in both brain and spinal cord.

Reason. Gray matter consists of cell bodies of the neuron, whereas white matter contains the axons of the nerve cells. One region is termed as the cortex and the other is medulla.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.

4. A is False and R is True.

Answer

A is False and R is True

Explanation
In the brain, the outer portion of cerebrum contains the gray matter and the inner portion of cerebrum contains the white matter. In the spinal cord, the arrangement is reversed. The gray matter lies on the inner side and the white matter on the outer side.

Question 16

Assertion. The sympathetic nervous system is stimulated by the hormone thyroxine which is secreted by the thyroid gland.

Reason. Sympathetic nervous system prepares the body for violent action against abnormal conditions. Adrenaline is termed as emergency hormone.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is False and R is True.

Explanation
The sympathetic nervous system is stimulated by the hormone adrenalin which is secreted by the adrenal gland.

Question 17

Assertion. Reflexes are involuntary but all involuntary actions are not reflexes.

Reason. Reflexes and involuntary actions of our body are controlled by medulla oblongata and spinal cord respectively.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is True and R is False.

Explanation

Reflexes are controlled by spinal cord and involuntary actions are controlled by medulla oblongata respectively.

Very Short Answer Type

Question 1

Name the following:

(a) The fluid that is present inside and outside the brain.

(b) The junction between two nerve cells.

(c) The part of the brain which is concerned with memory.

(d) The central space of the brain.

Answer

(a) Cerebrospinal fluid

(b) Synapse

(c) Cerebrum

(d) Ventricle

Question 2

Note the relationship between the first two words and suggest the suitable word/words for the fourth place.

(a) Stimulus : Receptor :: Impulse : .....

(b) Cerebrum : Diencephalon :: Cerebellum : .....

(c) Receptor : Sensory nerve :: Motor nerve : .....

(d) Axons : Nerve :: Cytons : .....

(e) Cerebrum : Corpus callosum :: Cerebellum : ..... .

Answer

(a) Stimulus : Receptor :: Impulse : ***Effector***

(b) Cerebrum : Diencephalon :: Cerebellum : ***Medulla oblongata***

(c) Receptor : Sensory nerve :: Motor nerve : ***Effector***

(d) Axons : Nerve :: Cytons : ***Ganglia***

(e) Cerebrum : Corpus callosum :: Cerebellum : ***Pons***

Question 3

Given below are sets of four terms each. Choose the odd one and write the category of the remaining terms :

(a) Duramater, Gray matter, Piamater, Arachnoid

(b) Cerebrum, Cerebellum, Spinal cord, Medulla oblongata.

(c) Pons, Cyton, Axon, Dendrons

(d) Hypothalamus, Cerebellum, Pons, Medulla oblongata

(e) Sneezing, Blinking, Blushing, Knitting without looking

Answer

(a) **Odd term**: Gray matter
Category: Coverings of the brain and spinal cord (Meninges)

(b) **Odd term**: Spinal cord
Category: Parts of the brain

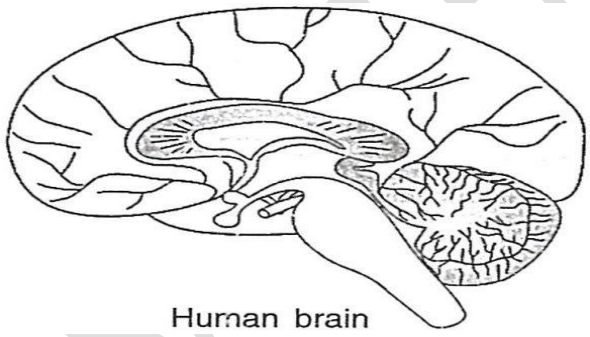
(c) **Odd term**: Pons
Category: Components of neurons

(d) **Odd term**: Hypothalamus
Category: Parts of the hind brain

(e) **Odd term**: Knitting without looking
Category: Natural reflexes

Question 4

Given below is a median (sagittal) section of the human brain. Read the information and fill in the blanks:



Human brain

Brain is an important organ of the nervous system, located in the head of the human body. It is protected by a hard, bony covering known as cranium. Most of the voluntary and involuntary actions of our body are regulated by the brain. Hence, it is considered as the 'control centre of the body.

Brain is a part of the (a) ..... system. It's membranous protective covering is termed as (b) ..... which consists of three layers. The thin delicate middle layer of the membranous covering is (c) ..... . The largest portion of the brain is (d) ..... . Brain contains the smallest endocrine gland named, (e) ..... which is considered as the 'Master gland' of the human body.

Answer

(a) Nervous

(b) Meninges

(c) Arachnoid matter

(d) Cerebrum

(e) Pituitary gland

Short Answer Type

Question 1

Mention where in human body are the following located and state their main functions:

(a) Corpus callosum

(b) Central canal

Answer

(a) **Corpus Callosum** — Corpus callosum ("hard body") is a sheet of fibres connecting the two cerebral hemispheres. It is located in the forebrain. It connects two cerebral hemispheres and transfers information from one hemisphere to other.

(b) **Central Canal** — It is located in centre of the spinal cord. It is in continuation with the cavities of the brain. It is filled with cerebrospinal fluid and acts as shock proof cushion. In addition, it also helps in exchange of materials with neurons.

Question 2

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

(a) The main component of the white matter of the brain is perikaryon.

(b) The arachnoid layer fits closely inside the pia mater.

(c) A double chain of ganglia, one on each side of the nerve cord belongs to the spinal cord.

(d) Dura mater is the outermost layer of the meninges.

Answer

(a) False
Corrected Statement — The main component of the white matter of the brain is axon.

(b) False
Corrected Statement — The arachnoid layer forms web like cushion.

(c) True

(d) True

Question 3

State whether the following are simple reflexes, conditioned reflexes or neither of the two.

(i) Sneezing .....

(ii) Blushing .....

(iii) Contraction of eye pupil .....

(iv) Lifting up a book .....

(v) Knitting without looking .....

(vi) Sudden application of brakes of the cycle on sighting an obstacle in front .....

Answer

S. No.	Example	Type of Reflex
(i)	Sneezing	Simple
(ii)	Blushing	Simple
(iii)	Contraction of eye pupil	Simple
(iv)	Lifting up a book	Conditioned
(v)	Knitting without looking	Conditioned
(vi)	Sudden application of brakes of the cycle on sighting an obstacle in front	Conditioned

Question 4

State the functions of the following:

(a) Association neuron

(b) Myelin sheath

(c) Medullary sheath

(d) Cerebrospinal fluid

Answer

(a) **Association neuron** — Association neurons carry impulses from the motor neuron to the Central Nervous System (CNS) or a nerve cell found entirely within the central nervous system. It acts as a connecting neuron and interconnects the sensory and motor neurons.

(b) **Myelin sheath** — It acts like an insulation and prevents mixing of impulses in the adjacent axons.

(c) **Medullary sheath** — It provides insulation and prevents mixing of impulses in the adjacent axons.

(d) **Cerebrospinal fluid** — It acts like a cushion and protects the brain from shocks.

Question 5

Rearrange the following in correct sequence pertaining to what is given within brackets at the end.

(a) Effector — Sensory neuron — Receptor — Motor neuron — Stimulus — Central nervous system — Response (**Reflex arc**)

(b) Repolarization — Depolarization — Resting (polarsied) (during **conduction of nerve impulse** through a nerve fibre)

(c) Axon endings — Dendrites — Axon — Perikaryon — Dendron (**Neuron structure**)

(d) Diencephalon — Cerebellum — Medulla oblongata — Pons — Cerebrum — mid brain (**sequence of parts of human brain**).

Answer

(a) Stimulus — receptor — sensory neuron — central nervous system — motor neuron — effector — response.

(b) Resting — depolarization — repolarization.

(c) Dendrites — Dendron — perikaryon — nucleus — axon — axon endings.

(d) Cerebrum — diencephalon — mid-brain — cerebellum — pons — medulla oblongata.

Question 6

Name the following:

(a) Three types of neurons

(b) Three types of nerves

(c) Three main parts of the neuron

(d) Two major divisions of the nervous system

(e) Three layers of the meninges

(f) Three main parts of the brain

(g) Two parts of the autonomic nervous system

(h) Two types of reflexes.

Answer

(a) Three types of neurons —

1. Sensory neurons
2. Motor neurons
3. Association neurons

(b) Three types of nerves —

1. Sensory nerves
2. Motor nerves
3. Mixed nerves

(c) Three main parts of the neuron —

1. Cyton
2. Dendrites
3. Axon

(d) Two major divisions of the nervous system —

1. Central nervous system
2. Peripheral nervous system

(e) Three layers of the meninges —

1. Dura mater
2. Arachnoid
3. Pia mater

(f) Three main parts of the brain —

1. Cerebrum
2. Cerebellum
3. Medulla oblongata

(g) Two parts of the autonomic nervous system —

1. Sympathetic nervous system
2. Parasympathetic nervous system

(h) Two types of reflexes —

1. Natural (inborn) reflex
2. Conditioned (acquired) reflex.

Question 7

Write the full forms of the following abbreviations:

(a) CSF

(b) CNS

(c) PNS

(d) ANS

Answer

(a) CSF — Cerebrospinal fluid

(b) CNS — Central Nervous System

(c) PNS — Peripheral Nervous System

(d) ANS — Autonomic Nervous System

Descriptive Type

Question 1

Define the following terms:

(a) Neuron

(b) Nerve

(c) Stimulus

(d) Synaptic cleft

(e) Reflex action

(f) Corpus callosum

Answer

(a) **Neuron** — Neuron (nerve cells) are the fundamental units of the nervous system specialized to transmit information in the form of electrical impulses to different parts of the body.

(b) **Nerve** — Nerve is a bundle of nerve fibres (axons) of separate neurons, enclosed in a tubular sheath.

(c) **Stimulus** — An agent or the sudden change of the external or internal environment that results in a change in an organism or any of its body parts is called a stimulus.

(d) **Synaptic cleft** — The gaps between the axon terminals and the dendrites of another one or more neurons are called synaptic clefts.

(e) **Reflex action** — Reflex action is an automatic or quick or immediate involuntary action in the body brought about by a stimulus.

(f) **Corpus callosum** — Corpus callosum is a sheet of fibres connecting the two cerebral hemispheres.

Question 2

Distinguish between the following pairs:

(a) Cerebrum and cerebellum (function)

(b) Sympathetic nervous system and parasympathetic nervous system (location and role)

(c) Sensory nerve and motor nerve (direction of impulse carried)

(d) Cerebrum and spinal cord (arrangement of cytons and axons of neurons)

(e) Cranial nerves and spinal nerves (number in pairs)

(f) Nerve impulse and flow of electricity (transmission and speed)

(g) Medulla oblongata and cerebellum (function)

Answer

(a) Difference between cerebrum and cerebellum (function)

Cerebrum	Cerebellum
The cerebrum is the seat of intelligence, consciousness and will-power. It controls all voluntary actions. It enables us to think, reason, plan and memorize.	The cerebellum maintains balance of the body and coordinate muscular activity.

(b) Difference between sympathetic nervous system and parasympathetic nervous system (location and role)

Sympathetic Nervous System	Parasympathetic Nervous System
Sympathetic nervous system is located between the neck and the waist region.	Parasympathetic nervous system is located in the head and neck region and in sacral region.
It prepares the body for violent action against the abnormal condition.	It is concerned with re-establishing normal conditions after the violent act is over.

(c) Difference between sensory nerve and motor nerve (direction of impulse carried)

Sensory Nerve	Motor Nerve
Sensory nerve brings impulses from the receptors i.e. sense organs to the brain or spinal cord.	Motor nerve carries impulse from the brain or spinal cord to effector organs such as muscles or glands.

(d) Difference between cerebrum and spinal cord (arrangement of cytons and axons of neurons)

Cerebrum	Spinal Cord
The grey matter containing cytons lies in the cortex (outer region) while the white matter containing axons lies in the medullary region (inner region).	The grey matter containing cytons lies in the medullary region i.e. inner side while the white matter containing axons lies in the cortex i.e. the outer region.

(e) Difference between cranial nerves and spinal nerves (number in pairs)

Cranial Nerves	Spinal Nerves
There are 12 pairs of cranial nerves.	There are 31 pairs of spinal nerves.

(f) Difference between nerve impulse and flow of electricity (transmission and speed)

Nerve impulse	Flow of electricity
Here, neither any substance nor any electrons or ions move along the nerve fibre.	Here, electrons actually move along the wire.
Nerve impulses travel at a speed of about 100 metres per second.	Electricity is conducted at a speed of about 150,000 km per second.

(g) Difference between medulla oblongata and cerebellum (function)

Medulla Oblongata	Cerebellum
Medulla oblongata controls the activities of internal organs, for example, peristaltic movement of the alimentary canal, movement of breathing and many other involuntary actions.	The cerebellum maintains balance of the body and coordinates muscular activity.

Question 3

While watching a scary movie, mention its effects on the following organs by the autonomous nervous system, in the table given below: (one has been done for you as an example).

Organ	Sympathetic System	Parasympathetic System
e.g. Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
(1) Heart		
(2) Pupil of the eye		
(3) Salivary gland		

Answer

Organ	Sympathetic System	Parasympathetic System
e.g. Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
(1) Heart	Accelerates heartbeat	Retards heartbeat
(2) Pupil of the eye	Dilation	Constriction
(3) Salivary gland	Inhibits secretion of saliva (dryness of the mouth)	Stimulates secretion of saliva.

Question 4

Give reason:

(a) The brain and the spinal cord are referred to as the central nervous system.

(b) Neurotransmitters are broken down by an enzyme just after passing an impulse from one neuron to the other.

Answer

(a) Central nervous system includes the brain and the spinal cord contained within the vertebral column. They have an important role to play because all bodily activities are controlled by them. A stimulus from any part of the body is always carried to the brain or spinal cord for the correct response. A response to a stimulus is also generated in the central nervous system. Therefore, the brain and the spinal cord are called the central nervous system.

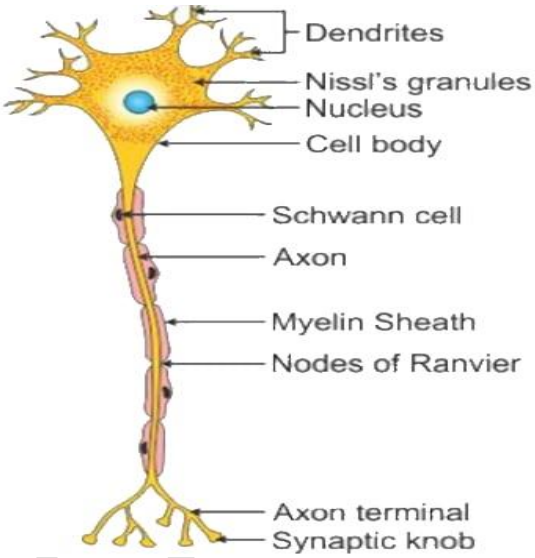
(b) Neurotransmitters are broken down by an enzyme just after passing an impulse from one neuron to the other to make the synapse ready for the next transmission of impulse.

Question 5

Draw a labelled diagram of a myelinated neuron.

Answer

Labelled diagram of a myelinated neuron is shown below:



Question 6

What are the advantages of having a nervous system?

Answer

The advantages of having a nervous system are as follows:

1. Keeps us informed about the outside world through sense organs.
2. Enables us to remember, think and reason out.

3. Controls and harmonizes all voluntary muscular activities such as running, holding, writing.
4. Regulates involuntary activities such as breathing, beating of the heart without our thinking about them.

Question 7

What is the difference between reflex action and voluntary action?

Answer

Reflex Action	**Voluntary Action**
Initiated by some stimulus (touch, pain, pressure, heat, light)	Initiated by a willing thought.
Mainly self-protective due to environment.	Fulfilment of a desired goal.
Commands originate mostly in the spinal cord and autonomic nervous system and a few in the brain as well.	Commands originate in brain.
Involve muscles and glands.	Involve only muscles.

Structured / Application / Skill Type

Question 1

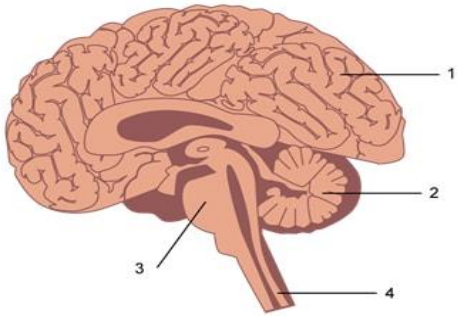
Two hungry boys (A and B) enter a restaurant and see the menu. Boy B starts salivating but not A. Explain the reason for this difference.

Answer

Salivation can occur as a conditioned reflex simply at the sight or by the smell of a familiar tasty food. This means that if we have not eaten that food earlier, the response will not occur. Boy B starts salivating because he has tasted the foods in the menu earlier, so his brain remembers the tastes of those foods and salivation occurs as a conditioned reflex for him. On the other hand, boy A has not tasted those foods earlier, his brain does not know the taste of those foods hence no conditioned reflex occurs for him.

Question 2

The diagram alongside shows a section of the human brain and its associated parts. Answer the questions that follow:



(a) Name the parts labelled 1, 2, 3 and 4.

(b) Name the protective membranous covering of the brain. Also mention its three layers.

(c) Name the basic unit of the brain.

(d) Write the important role of the part mentioned as 2.

Answer

(a) The parts labelled 1-4 are:

- 1 → Cerebrum
- 2 → Cerebellum
- 3 → Pons
- 4 → Medulla oblongata

(b) The brain is protected by 3 membranous coverings called Meninges. The three layers of meninges are:

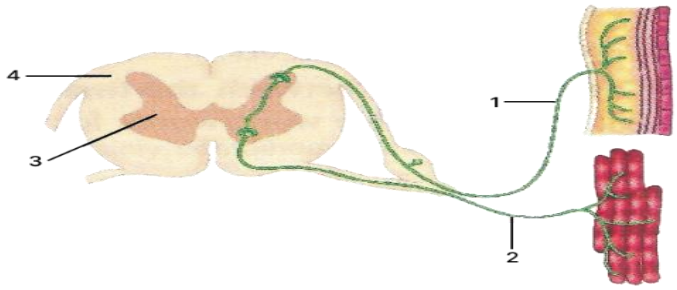
1. Dura mater
2. Arachnoid
3. Pia mater.

(c) Neuron/nerve cell.

(d) Cerebellum (part 2) is concerned with maintaining the balance of the body and the coordination of muscular activities.

Question 3

The diagram given below shows the internal structure of spinal cord depicting a phenomenon. Study the diagram and answer the following questions.



(a) Name the phenomenon shown in the figure and define the same.

(b) Identify the parts labelled as 1 and 2. Write one functional difference between these two.

(c) Name the bony protective covering and the membranous protective covering of the spinal cord.

(d) Label the guidelines 3 and 4.

(e) How is the labelled part 3 different from part 4 with respect to its composition (part of neuron)?

(f) Give the technical term for the point of contact between the two nerve cells.

(g) Name the fluid filled inside the central canal of spinal cord.

(h) Name the term used for a small gap between two neurons.

(i) Give one example of a neurotransmitter.

(j) Draw a neat diagram of a nerve cell and label the parts : Perikaryon, Node of Ranvier, Myelin sheath and Axon terminals.

Answer

(a) The phenomenon shown in the figure is **Spinal reflex**.

Spinal reflex is an automatic/quick/immediate, involuntary action in the body brought about by a stimulus.

(b) The parts labelled 1 & 2 are:

1 → Sensory nerve

2 → Motor nerve

One functional difference between Sensory & Motor nerve is:

Sensory nerve	**Motor nerve**
Brings impulse from receptors to brain or spinal cord.	Carry impulse from brain and spinal cord to effector organs.

(c) **Back bone** or **vertebral column** is the bony protective covering. **Meninges** (dura mater, arachnoid and pia mater) is the membranous protective covering.

(d) Guidelines 3 and 4 are:

3 → Gray matter

4 → White matter

(e) Gray matter is composed of cytons and white matter is composed of axons.

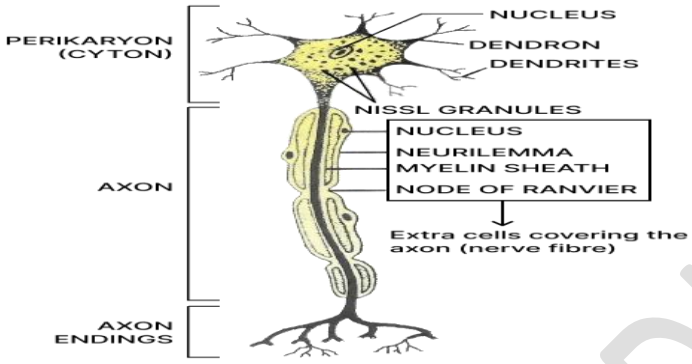
(f) Synapse

(g) Cerebrospinal fluid

(h) Synapse

(i) Acetylcholine

(j) Diagram of nerve cell with the parts labelled is shown below:



Question 4

The figure given below is the basic structural and functional unit of the human nervous system. Study the diagram and answer the following questions:

(a) Write the technical term for the diagram.

(b) Name two organs of our nervous system where these cells are richly found.

(c) How are these cells significant for us ?

(d) Name the cell organelle that is absent in these cells and how does it affect our body metabolism ?

(e) Redraw the same figure and label the following — Perikaryon, Axon, Dendrites, Myelin sheath and Node of Ranvier.

Answer

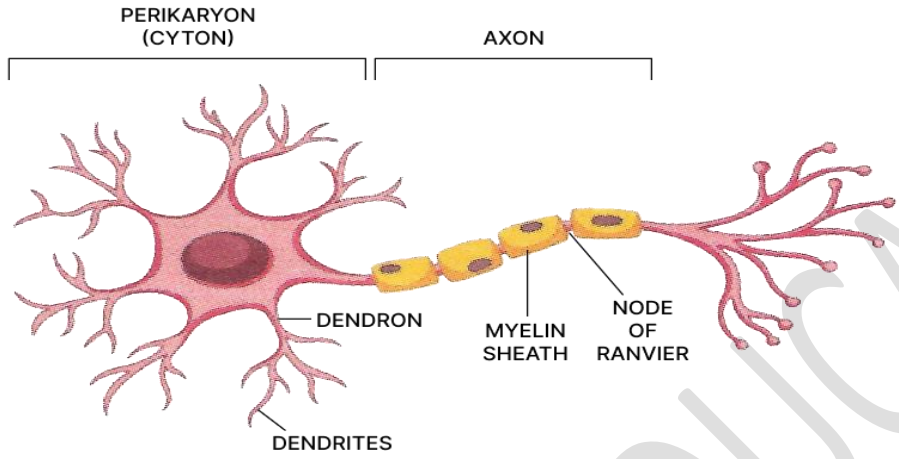
(a) Neuron

(b) Brain and spinal cord

(c) Neurons are the fundamental building blocks of the nervous system. They help us to process information, control our movements, allow us to perceive the world around us, and are involved in learning and memory.

(d) Centrosome is the cell organelle absent in these cells. It is absent because the nerve cells have lost the ability to divide.

(e) Below is the labelled diagram of neuron:



Question 5

It was a pleasant dark evening when Anuj saw a person clumsily walking towards him. The person, in his nonsensical and slurred speech, started talking to Anuj and Anuj realised he was possibly intoxicated. Answer the following questions:

(a) How does alcohol consumption affect the brain ? State the part of the brain affected resulting in uncoordinated movements and speech.

(b) In which part of the brain does the impulse for walking or speaking arise ?

(c) How does part (a) differ with part (b) structurally?

Answer

(a) Alcohol slows down brain activity, which leads to delayed responses, poor coordination and slower thinking. It also affects hippocampus part of brain which can lead to blackouts.

The part of brain which is affected resulting in uncoordinated movements and speech is **Cerebellum**.

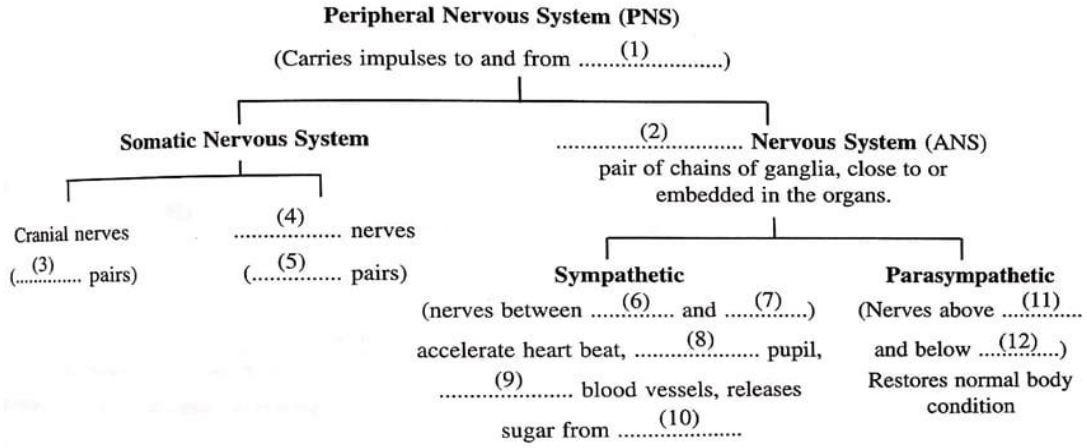
(b) Cerebrum

(c) Differences between Cerebellum and Cerebrum:

Cerebellum	Cerebrum
It is a small, egg-shaped lobe located at the base under the cerebrum.	It is the uppermost, largest and the most prominent part of the brain.
It does not have convolutions, but has many furrows.	It is highly convoluted in appearance with ridges and grooves.
It coordinates the movement of voluntary muscles and maintains the balance of the body.	It controls mental activities such as thinking and reasoning, memory, intelligence and perception of taste, pain and touch etc.

Question 6

Given below is the partially incomplete scheme of the components of peripheral nervous system. Fill up the blanks numbered (1) - (12).



Answer

1 - Central Nervous System

2 - Autonomic

3 - 12

4 - spinal

5 - 31

6 - neck

7 - waist

8 - dilates

9 - constricts

10 - liver

11 - neck

12 - sacrum