HAMAR BOARDING SCHOOL

CHAPTER ONE

THE NERVOUS SYSTEM AND SENSE ORGANS

The nervous tissue

1. Define Nervous system?

1. **Nervous system** is a highly organized network of cells that detects changes and controls metabolic process, mental and physical activities and maintains homeostasis.

2. What does the nervous system is made up of?

2. **The nervous system** is made up of billions of highly specialized cells calls called **neurons.**

3. State three main functions of Nervous system?

3. **The main functions of the Nervous system are:**

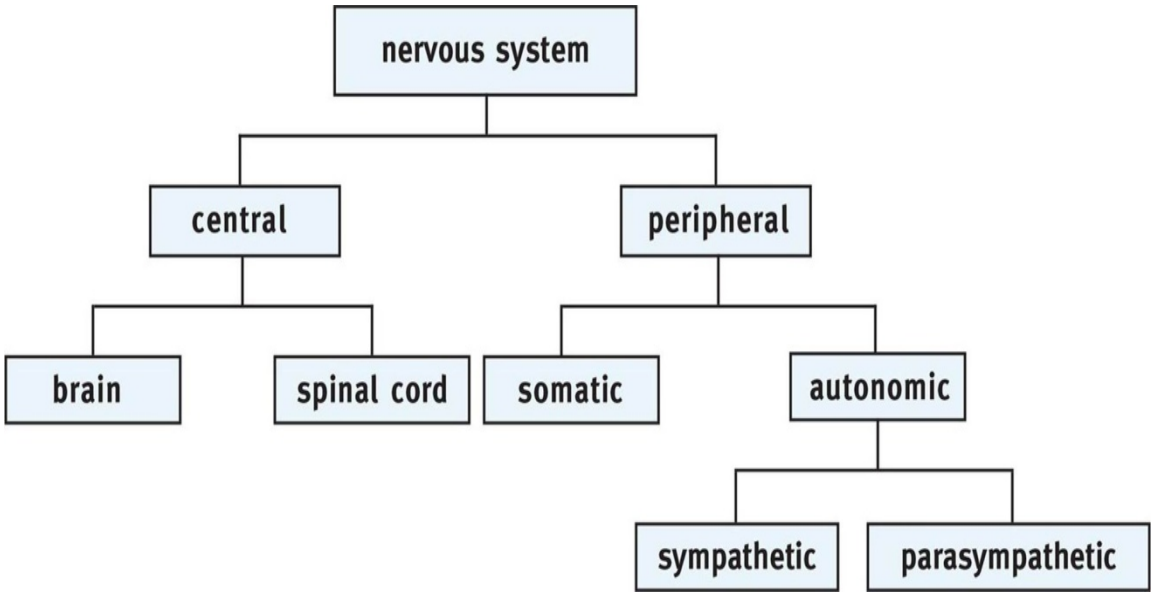
   - Respond to stimuli within the body in the external environment.
   - Transmits nerve impulses to and away from the central nervous system.
   - Assimilates experience as required in memory, learning and intelligence.

4. What are the parts of the Human nervous system?

4. **The human nervous system consists of:**

   - **Central nervous system.**

- **Peripheral nervous system.**



5. What does the nervous tissue is composed of?
5. **The nervous tissue** is composed of **neurons** and **neuroglia.**
6. State different between neurons and neuroglia?
6. **Neurons and neuroglia:**
   - **Neurons** generate and transmit nerve impulse. While---
   - **Neuroglia** do not conduct nerve impulse.
7. What is nerve cell?
7. **Nerve cells or neurons** are the working units of the nervous system.
8. Define myelin sheath or medullated sheath?
8. **Myelin sheath** is a fatty material that wraps around nerve cell projections.
9. What are the different b/w neurons with myelin and neurons without myelin?

9. **Neurons with myelin** carry impulses that are associated with sharp pain. While--------

   Neurons lack myelin carries impulses associated with dull, throbbing pain.

10. What does the nervous tissue is composed of?

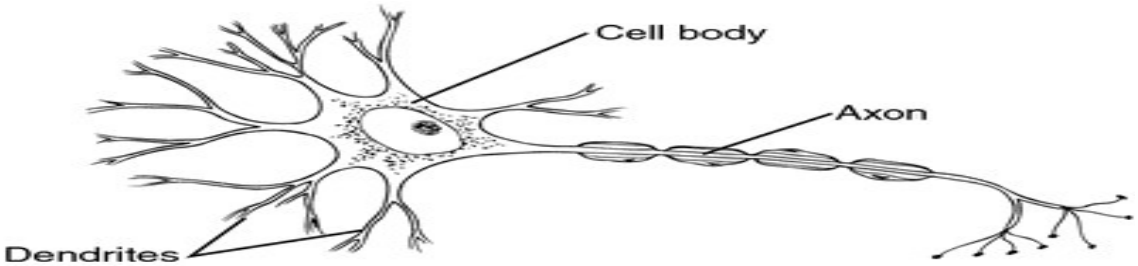
10. The nervous tissue is composed of **Neurons** and **Neuroglia.**

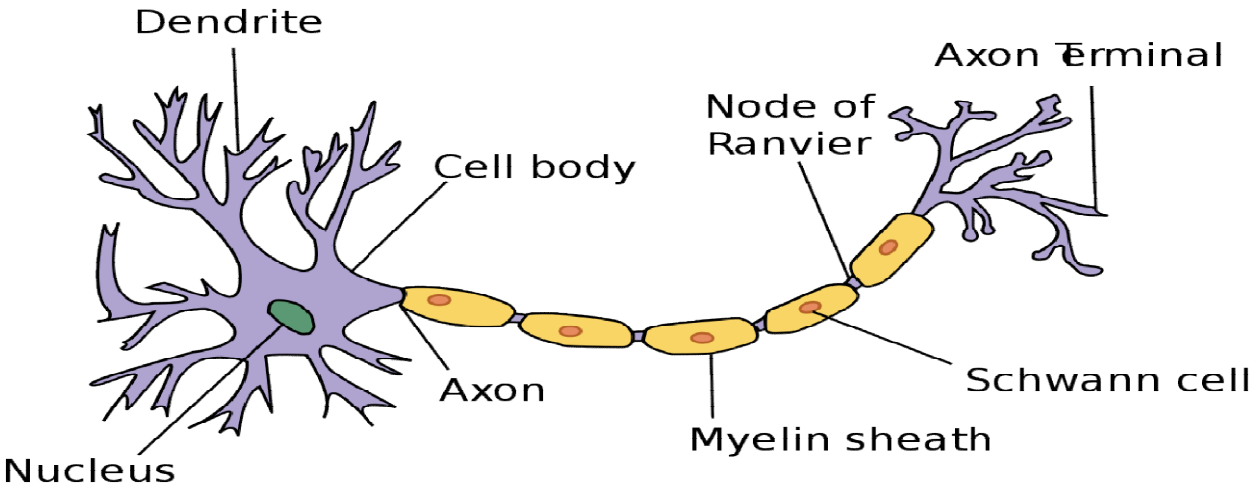
Types of neurons

11. State types of neurons according to structure?

11. Structure of neurone:

- **Cell body**
- **An axon**
- **Dendrites**

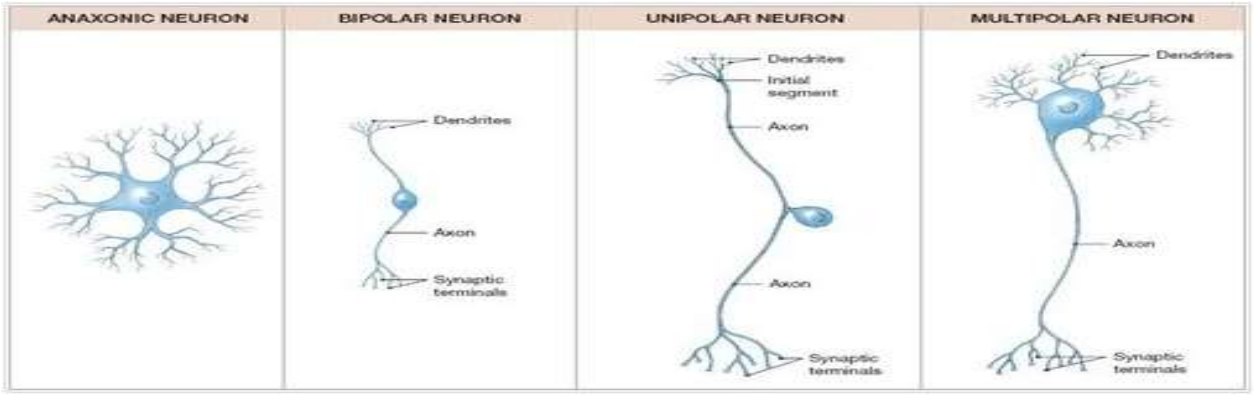




12. State types of neurons according to number of dendrites?

12. Types of neurons:

- **Anaxonic**
- **Unipolar**
- **Bipolar**
- **Multipolar**



13. State types of neurons according functionally?

13. Types of neurons:

- **Sensory neurons [Afferent neurons]**
- **Motor neurons [Efferent neurons]**
- **Relay neurons [Connector, Intermediate or Associative]**



14. What is cell body?

14.Cell body is the compact area of neuron that constitutes the nucleus and many of the cell organelles.

15. Define Axon?

15. Axon is a long, tail like structure that carry impulse from cell body.

16. What is **Axoplasm?**

16.Axoplasm is a specialized cytoplasm filled with each axon.

17. Define Dendrites?

17.Dendrites are fibrous roots that branch out from the cell body.

18. State main functions of **Cell body, Axon and Dendrites**?

18. The main functions are:

- **Cell body:** organizes and keeps the cell functional.
- **Axon:** Carry impulses away from the cell body.
- **Dendrite:** Carry impulses towards the cell body.

19. What is the main function of sensory neuron?

19. Sensory neurons these neurons get information about what is going on inside and outside of the body and bring the information into the brain and spinal cord.

20. What is the main function of motor neuron?

20.Motor neurons these neurons gets information from the brain and spinal cord and convey commands to the effectors organs.

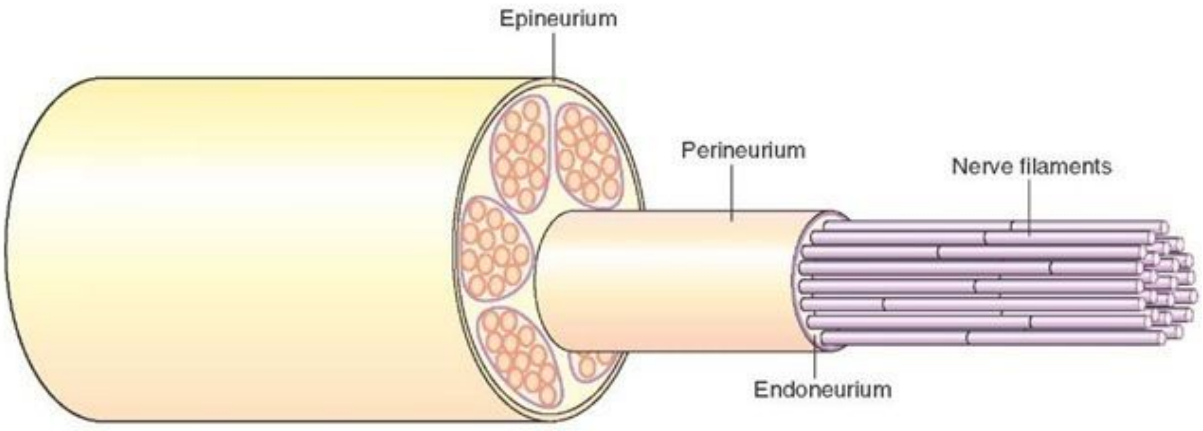
21. What is the main function of relay neurons?

21.Relay neurons which are found only in the brain and spinal connect one neuron to another.

22. List several covering of nervous systems?

22. The several covering of nervous systems are:

- ✧ **Endonerium**
- ✧ **Perinurium**
- ✧ **Epinureum**



23. Define the following Endonurium, Perinurium and Epinurium?

23. Definition of

- **Endonerium -** is a delicate tissue surrounding each individual fibre.
- **Perinurium -**is a smooth connective tissue surrounding each bundle of fibre.
- **Epinureum-** is the fibrous tissue which surrounds and encloses a number of bundles of nerve fibre.

Nerve Impulse

24. Define nerve impulse?

24.Nerve impulse is an electrical charge travelling the length of a neuron.

25. Define resting potential?

25.Resting potential is a non conducting nerve fibre.

26. Define action potential?

26.Action potential is a localized change in the resting membrane potential between the inside and outside of the nerve fibre.

27. State difference between resting potential and action potential?

27. Differences are:

Resting potential	Action potential
■ The state membrane is far more permeable.	⊙ The membrane state is more permeable.
■ Negatively charged ions	⊙ Positively charged ions
■ Sodium are actively pumped out	■ Sodium are temporarily ceases
■ Nerve cell membrane is polarized	⊙ Depolarized

28. Define threshold?

28.Threshold is the minimum stimulus to cause an action potential to be produced.

29. What are ions that involve transmission of nerve impulse?

29. The ions involved in impulse transmission are **sodium ions (Na^+)** and **potassium ions (K^+).**

30. Define sodium pump?

30.Sodium pump is mechanism that is actively pumped out or extruded sodium ion Na^+ in resting potential.

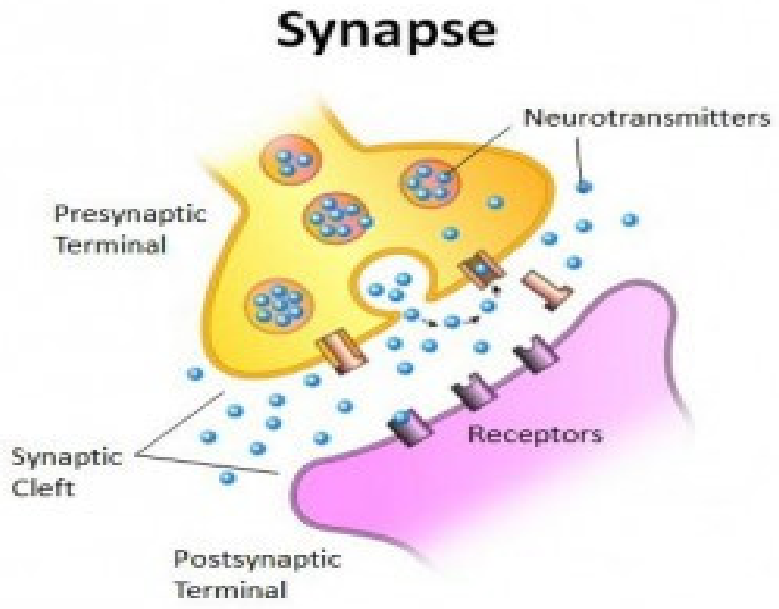
The Synapse and Neurotransmitters

31. Define synapse?

31.Synapse is the junction between dendrites of two adjacent neurons.

32. What is the function of **Synapse**?

32.The function of Synapse is to allow the transmission of nerve impulses from **neurone** to **neurone.**



33. What is a synaptic cleft?

33.Synaptic cleft- Are tiny gaps that separates neurons.

34. Define presynaptic neuron?

34.Presynaptic neuron is the point at which the nerve impulse passes from.

35. Define synaptic knobs?

35. Synaptic knobs Are minute branches that terminate in small swelling called **synaptic knobs.**

36. What are synaptic knobs contain?

36.The synaptic knobs contain Spherical membrane bound by synaptic vessels, which store a chemical called **the neurotransmitter.**

37. Give examples of neurotransmitter?

37. Examples of neurotransmitter are:

- **Acetylcholine.**
- **Gammaaminobutyric acid (GABA).**
- **Dopamine**.

Structure of the Nervous System

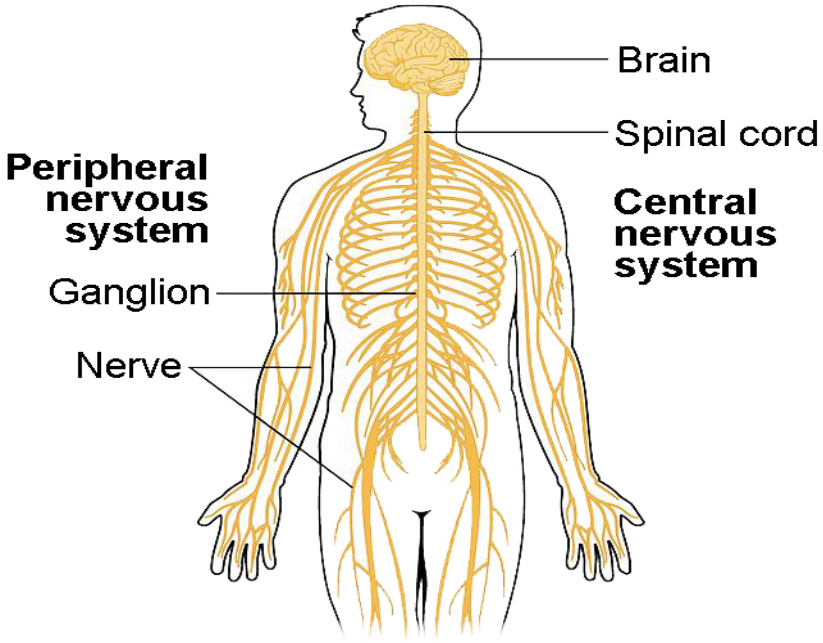
38. What are the types of nervous system?

38.Types of nervous system are:

- **Central nervous system (CNS).**
- **Peripheral nervous system (PNS).**

39. What is central nervous system consist of?

39. The central nervous system consist **brain** and **spinal cord.**



The Central Nervous System

40. State protection of the brain and spinal cord?

40. The **brain** protected by **skull** and **spinal cord** is protected by **vertebrae column.**

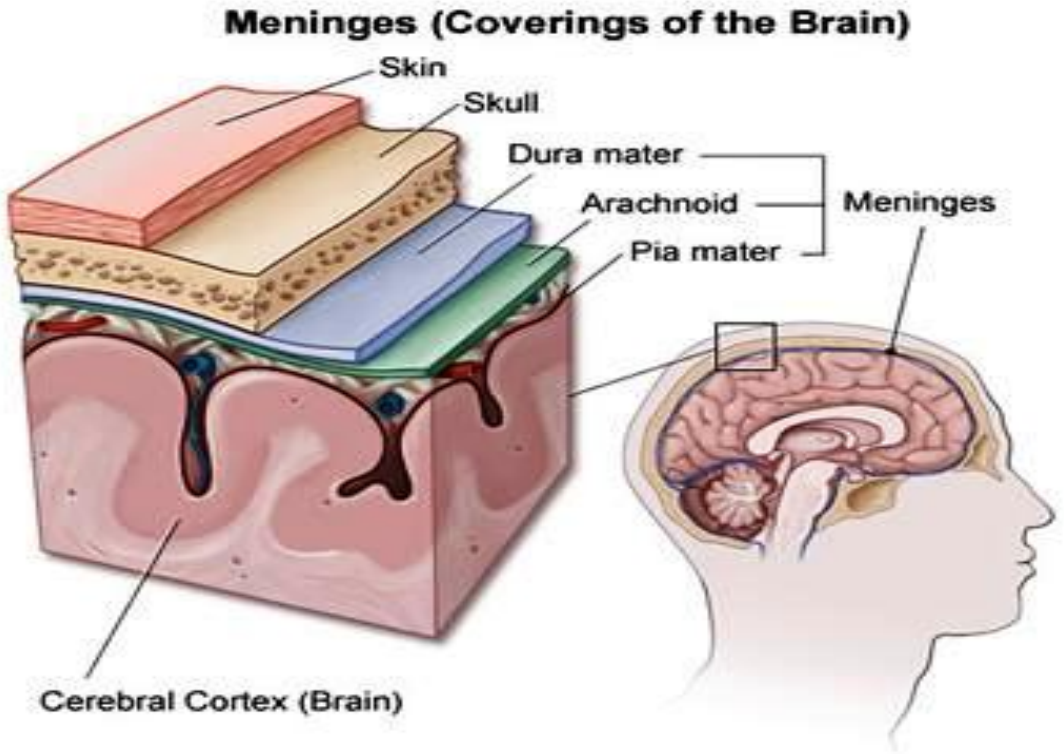
41. Define meninges?

41. Meninges are the membranous covering of the **brain** and **spinal cord.**

42. List and define three layers of menings?

42.Types of meninges are:

- **Dura mater**
- **Arachnoid mater**
- **Pia mater**

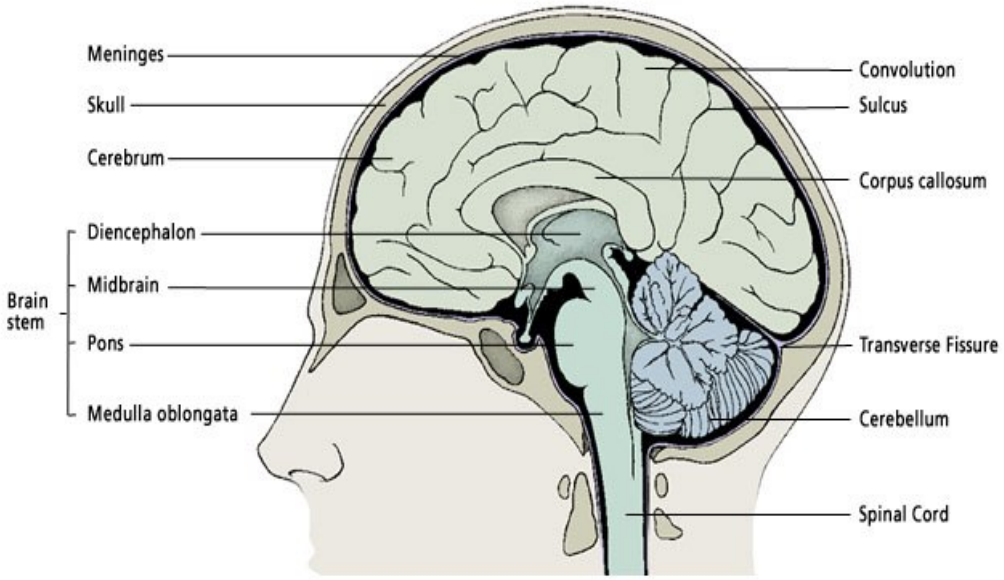


- **Dura mater-** is the tough outer membrane covering the brain and spinal cord of vertebrates.
- **Arachnoid mater-** is a layer of fibrous tissue that lies between the dura and pia mater.
- **Pia mater-**is the innermost membrane covering the brain and spinal cord.

43. What is brain?

43.Brain is one of the most important organs of the human body.

The Major Portions of the Brain Include the Cerebrum, Cerebellum and Brain Stem



44. State the mass of the brain in adult human?

44. The mass of the brain in adult human is **1.4 kg**

45. List types of human brain?

45. They are four types and they are:

- **Cerebrum**
- **Diencephalon**
- **Brain stem**
- **Cerebellum**

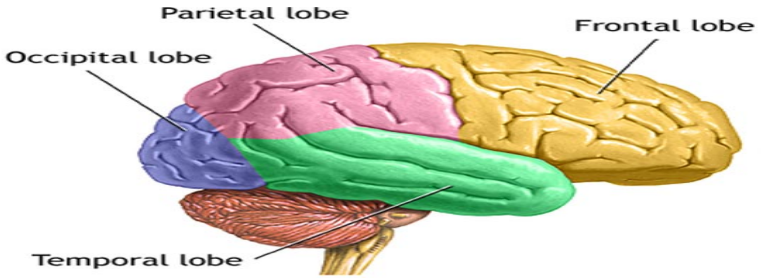
46. Define cerebrum?

46.Cerebrum is the largest and most complex parts of the brain.

47. List lopes that the cerebrum consists of?

47.The cerebrum consists of four lopes and they are:

- **Frontal lope**
- **Parietal lope**
- **Temporal lope**
- **Occipital lope**



48. State main function of diencephalon?

48.Diencephalon this connects the cerebrum and midbrain.

49. What does diencephalon consist of?

49.Diencephalon consists of **thalamus** and **hypothalamus.**

50. What does thalamus consist of?

50.Thalamus consists of two masses of **grey** and **white matter.**

51. Define hypothalamus?

51. Hypothalamus is a small but important structure it is situated below and in front of the thalamus.

52. What does the brain stem consist of?

52. The brain stem consist of three parts and they are :

- **Mid brain**
- **Pons**
- **Medulla oblongata**

53. Define mid brain?

53.Mid brain is the area of the brain situated between the cerebrum above and the pons below.

54. State function of mid brain?

54.Mid brain it processed in visual and auditory information such as **moving the eye , neck** and **head.**

55. Where pons does located?

55.Pons is located is situated in front of the cerebellum below the midbrain and above the medulla.

56. Define medulla ablongata?

56.The medulla is the most interior region of the brain stem.

57. Where the cerebellum does is located?

57.The cerebellum is satiated behind the pons and immediately below the posterior portion of the cerebrum.

58. List functions of cereblum?

58.Functions of cereblum are:

- It controls and coordinates the movement of varoius groups of muscles ensuring smooth.
- It coordinates activates associated with the maintenance of posture, balance and equilibrium.

59. What is a spinal cord?

59.Spinal cord is the elongated almost cylindrical part of the central nervous system that is protected by the **vertebral column**.

60. List functions of spinal cord?

60.Functions of spinal cord are:

- Transfer of nervous information between the brain and other parts of the body except the head region.
- It controls the simple reflex actions.

61. Define reflex actions?

61.Reflex action is a rapid autonomic response to a certain stimulus.

62. Define parts of reflex action?

62.Types of reflex action are:

- **Simple reflex action** is a specific single and autonomic response to a particular stimulus.
- **Conditional reflex action** is an autonomic response which can be evoked from by unrelated stimulus.

63. Give some examples of simple reflex action?

63.Examples of simple reflex action are:

- ⊙ Withdrawal of finger from a hot or sharp object.
- ⊙ Blinking the eye when an object passes close to it.
- ⊙ Coughing and sneezing.

64. Give some examples of conditional reflex action?

64.Examples of simple reflex action are:

- ⊙ Walking and Playing.
- ⊙ Cycling and Writing.
- ⊙ Swimming and Driving.

Peripheral Nervous System

65. List parts of nerves of peripheral nervous system?

65.Parts peripheral nervous system are:

- **Cranial nerves** are nerves that arise from the brain and innervate areas in the head and face these are **12 pairs.**
- **Spinal nerves** are nerves that arise from the spinal cord and innervate the limbs and the trunk and there are **31 pairs**.

66. What is the deference between somatic nervous system and autonomic nervous system?

66.Differences are:

- **Somatic nervous system** relay information from external sensory receptors to the central nervous system.
- **Autonomic nervous system** carries impulses from the central nervous system to the heart and other internal organs.

67. What is the deference between sympathetic nervous system and parasympathetic nervous system?

67.Differences are:

- **Sympathetic nervous system** is most active in times of emergency or stress.
- **Parasympathetic nervous system** is most active when the body is relaxed.

Health problems of the nervous system

68. List some of health problems of the nervous system?

68.Health problems of the nervous system are:

- **Dementia**
- **Alzheimer disease**
- **Bacterial meningitis**

69. What is caused dementia?

69.Dementia is caused by progressive irreversible degeneration of the cerebral cortex.

70. What is Alzheimer disease?

70.Alzheimer disease is condition which is commonest from dementia in developed countries.

71. Define Bacterial meningitis?

71.Bacterial meningitis is the inflammation of the meninges.

72. List common microbes of bacterial meningitis?

72.Common microbes include:

- **Haemophilus influenzae -** in children between age of **2 and 5** years.
- **Neisseria meningitis –** is common type and between age **5 and 30** years.
- **Streptococcus pneumonia –** in people over 30 years.

The Senses

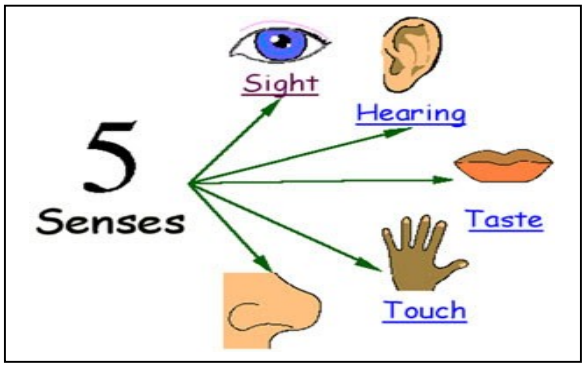
73. Define sense organ?

73.Sense organ is a specialized body structure that is sensitive to internal or external stimuli.

74. List five main sense organs and their function?

74.Five main sense organs and their function:

- **Eye For sight**
- **Ear For hearing**
- **Nose For smelling**
- **Skin For touch**
- **Tongue For taste**



75. Define human eye?

75.The human eye is a spherical, fluid-filled structure.

76. Where does the eye is located?

76.The eye is located in a socket in the skull called **orbit.**

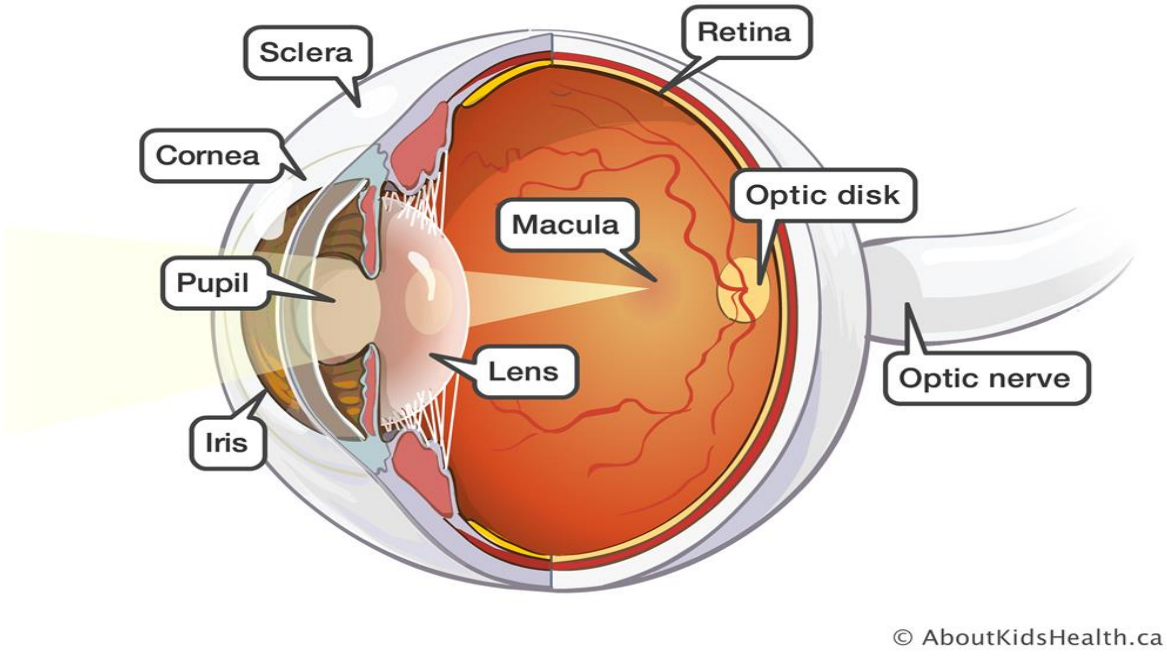
77. List structural parts of human eye?

77.Parts of the human eye are:

a. **Sclera**
b. **Cornea**
c. **Retina**
d. **Iris**
e. **Pupil**

f. **Lens**

g. **Optic nerve**



78. Define taste buds?

78.Taste buds are areas of specialized chemical receptors on the tongue that detects the tastes of **sweet, sour, salty,** and **bitter.**

79. Define cornea? And state its function?

79.Cornea is the layer cells of the eye and its function is to help to focus the light through an opening called **pupil.**

80. Define a vitreous humor?

80.Vitreous humor is a colorless, gelatin like liquid between the lens and the Retina.

81. What does the retina contains?

81.Retina contains numerous receptor cells called **Rods** and **Cones.**

82. What is the different between rods and cones?

82.Differences are:

- **Rods are** light sensitive cells that are excited by low levels of light.
- **Cones** are a bright light and provide information about color to the brain.

83. List common diseases of the eye?

83.Common eye diseases are:

a. **Short sightedness**
b. **Long sightedness**
c. **Astigmatism**
d. **Squintedness**
e. **Old sight**
f. **Colour- blindness**
g. **Cataracts**

84. Define human ear and state its function?

84.The ear is a complex sense organ whose functions are to perceive sound and maintain balance.

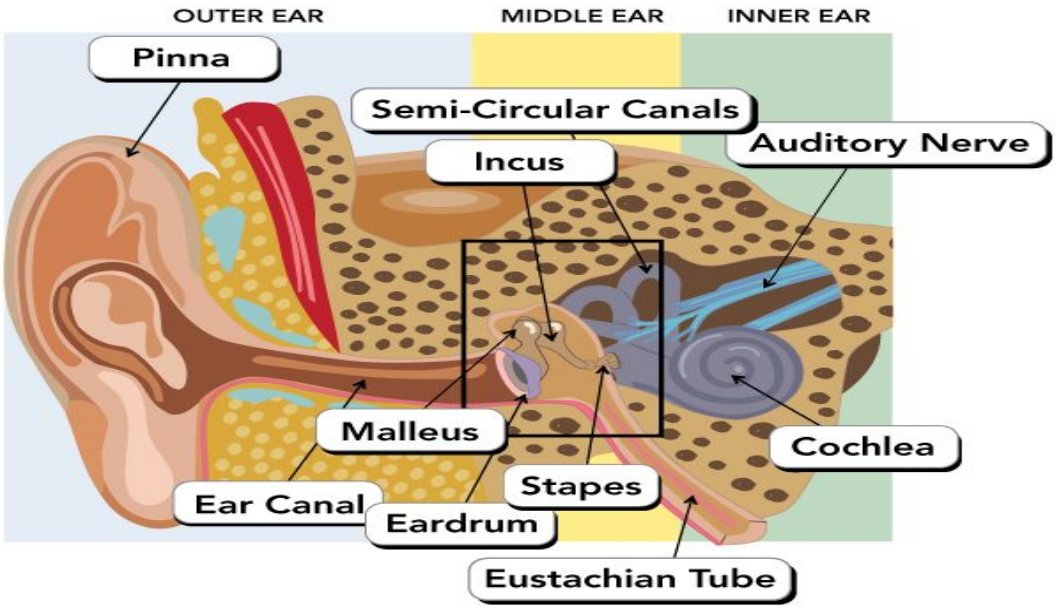
85. List parts of the ear?

85. The structure of the ear consists of three parts;

- **The outer ear-** consists of:
  a. **Pinna**.
  b. **Ear canal.**

- **The middle ear-** consisting of:
  a. **Tympanum.**
  b. **Malleus.**
  c. **Incus.**
  d. **Stapes.**
  e. **Semi circular canals**

- **The inner ear-** consists of:
  a. **Auditory nerve.**
  b. **Cochlea.**
  c. **Eustachian tube.**



86. Define Semi-Circular Canals?

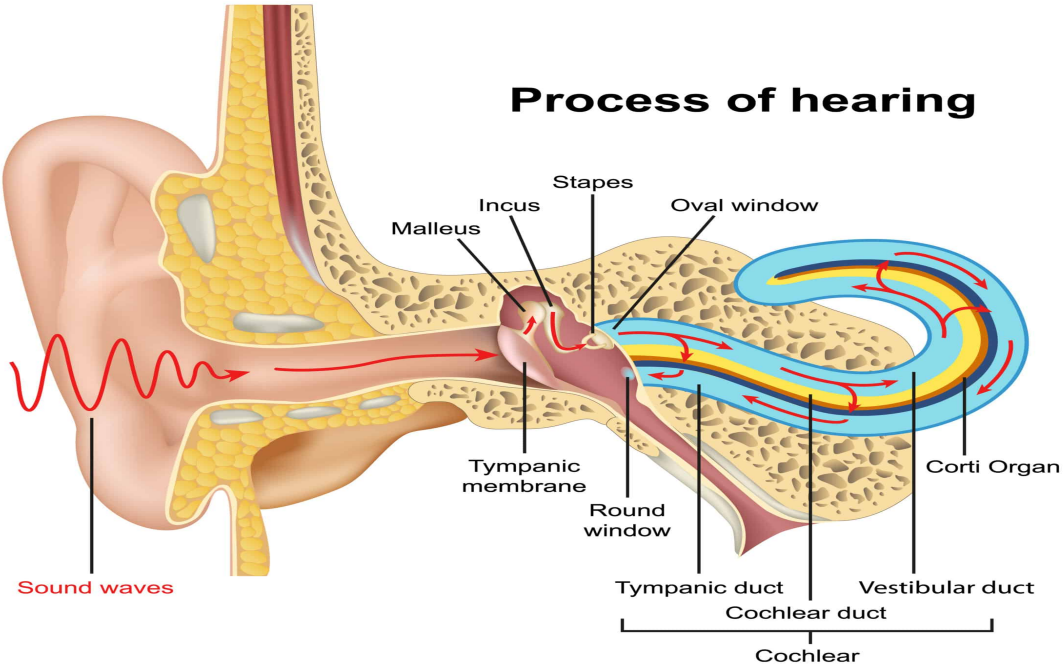
86.Semi-Circular Canals are three tubular cavities containing endolymph.

87. Define Eustachian tube?

87.The Eustachian tube is a tube connecting the middle ear with the pharynx.

88.How do the ears perceive sound?

88. Sound waves cause the tympanum to vibrate and the vibrations travel through the bones of the middle ear to the cochlea, hair cells in the cochlea generate nerve impulses which are sent to the brain through the auditory nerve.



89. Describe Deafness?

89.Deafness is a hearing defect which makes an individual unable to perceive sound.

90. State two categories of Deafness?

90. There are two categories:

- **Permanent deafness.**
- **Partial deafness.**

CHOOSE THE CORRECT ANSWER

91. Which number indicates the structure from which neurons receives information

91. **a.** 1

b. 2

c. 3

d. 4

92. Which characteristics of the sympatric division of the automatic nervous system ?

92. **a. stimulates digestion**

b. slow heart rate

c. dilates the bronchi

d. converts glucose to glycogen Use the diagram

93. What is occurring in diagram above

93. **a.** K+ ions are entering the neurons

b. Negatively charged proteins are leaving the neurons

c. Na+ ions are entering the neurons

d. The myelin coat has broken down , allowing into the free across the plasma membrane

94. If the portion indicated by the arrow was damaged due to trauma , what effects would this person most likely Experiences ?

94. **a. Partial or complete memory loss**

b. Trouble maintaining balance

c. body temperature fluctuations

d. Rapid breathing

95. Which nervous system is the hypothalamus most involved in regulating?

95. **a.** Voluntary

b. Peripheral

c. Sensory

d. automatic

96. If there were a power outage in movie theater and only a few dim emergency light were it , which cell of the retina would most important for the seeming your way to the exist ?

96. **a. Rods**

b. Peripheral

c. Rods and cones are equally important .

97. Which represents the correct sequence as sound waves travel in the ear to trigger an impulse?

97. **a.** Cochlea, incus , stape , eardrum .

b. Tympanum ,bones in the middle ear , cochlea , hair cell.

c. Auditory canal, tympanum , cochlea , malleus d.

d. Hair cell , auditory canal , cochlea , malleus .

98. With which sense are free nerve endings associated?

98. a. Taste

b. Hearing

c. touch

d. sight

99. Some rides at amusement parks cause a person to become dizzy when the rides stop .which structure in the diagram most likely involved with the dizzy feeling.

99. **a. A**

b. B

c. C

d. D

100. A functional Reflex action requires

100. **a. Only a sensory neurons and a motor neurons**

b. A sensory neurons , the thalamus , and a motor neurons

c. The cerebral cortex and a motor neurons

d. Only cerebral cortex and the thalamus .

101. As you sit Quietly reading this sentence , the part of the nervous system that is most active is the

101. **a.** Somatic nervous system

b. Sympathetic nervous system

c. Parasympathetic nervous system

d. None of the choice is correct

102. A fight – or – flight response in the body is controlled by the:

102. **a. Sympathetic division of the nervous system**

b. Parasympathetic division of the nervous system

c. Releases of acetylcholine from postganglionic neurons

d. Somatic nervous system

103. The _____ cannot be controlled by conscious thought.

103. **a.** Motor neurons

b. Somatic nervous system

c. autonomic nervous system

d. skeletal Muscles

104. White matter is , and gray matter is

104. **a.** Comprised of axons : comprised of cell bodies and dendrites

b. b. Myelinated : UnMyelinated

c. Found in the CNS: also found in the CNS.

d. All of the choices are correct

105. A functional Reflex action Requires

105. **a. Only a sensory neurons and a motor neurons**

b. A sensory neurons , the thalamus , and a motor neurons

c. The cerebral cortex and a motor neurons

d. Only cerebral cortex and the thalamus.

=====END=====