**LIFE SCIENCE 3B FET**

**CLASS TEST 1 – 2019 – THE NERVOUS SYSTEM**

**TIME: 1½ HOURSTOTAL: 100**

SURNAME: _____ STUDENT NR. _____

**QUESTION 1** **[20]**

*Choose the alternative that best answers the question or completes the statement. Only encircle the correct letter.*

1.1 The human nervous system is capable of a wide range of functions. What is the basic unit of the nervous system?

A. Glial cell

B. Meninges

**C. Neuron**

D. Cerebrospinal fluid

1.2 The neuron cell is made up of which of the following parts?

A. Axon

B. Dendrite

C. Nucleus

**D. All of the Above**

1.3 Neurons come in which different type(s)?

A. Sensory

B. Motor

C. Skeletal

**D. A and B**

1.4 How do neurons communicate with one another?

A. Electrically

B. Chemically

C. Through weak, radio-wave-like impulses

**D. A and B**

1.5 What are the components of the nervous system?

A. Neuron, axon, myelin sheath, organs

B. Neuron, axon, dendrite, myelin sheath, brain, feet

**C. Neuron, axon dendrite, myelin sheath, brain, spinal cord, sensory and motor nerves**

D. Neuron, axon, brain, outside world, organs

1.6 What are the two divisions of the nervous system?

**A. Central and peripheral**

B. Motor and sensory

C. Central and functional

D. Sympathetic and parasympathetic

1.7 What is the function of the nervous system?

A. Regulates the internal environment

B. Controls and organizes all body activities

C. Sends signals from one cell to the other or part of the body to another

**D. All of the above**

1.8 What do spinal cord injuries usually lead to?

A. Deep state of unconsciousness

B. Not enough dopamine

**C. Paralysis**

D. None of the above

1.9 What are the two effects of aging with the nervous system?

A. Slowed conduction times

B. Memory changes

**C. Both a and b**

D. Neither a or b

1.10 CNS refers to which of the following?

**A. <u>The central nervous system consisting of the brain and spinal cord</u>**
B. The cerebral nervous system consisting of the brain, spinal cord and retinas
C. The cerebral nervous system consisting solely of the brain
D. A technique used in neuroimaging
E. A component of the PNS
F. The central nervous system consisting of the brain and motor neurons.

1.11 What is the purpose of cerebral spinal fluid?

A. It protects the central nervous system

B. It reduces the weight of the brain

C. It fills the subarachnoid space

D. It reduces pressure at the base of the brain

E. It cushions the brain

**<u>F. All of the these</u>**

1.12 How many layers of meninges protect the brain?

A. 2

B. 4

C. 5

**<u>D. 3</u>**

E. 1

F. 0

1.13 What is the primary purpose of the spinal cord?

A. To facilitate the communication between the two hemispheres

B. To produce CSF

**<u>C. To transmit electrical signals between the brain and the rest of the body</u>**

D. To transmit electrical signals around the brain

E. To produce hormones and neurotransmitters

F. None of these

1.14 The corpus callosum separates and joins which two structures?

**A. <u>The corpus callosum separates and joins the left and right hemispheres of the brain</u>**

B. The corpus callosum separates and joins the autonomic and somatic nervous systems
C. The corpus callosum separates the meninges
D. The corpus callosum separates and joins the peripheral and central nervous systems
E. The corpus callosum separates and joins the sympathetic and parasympathetic nervous systems
F. The corpus callosum separates and joins the posterior and anterior sections of the brain.

1.15 The diencephalon consists of which structures?

**A. It consists of the thalamus, hypothalamus and pituitary gland**

B. It consists of the thalamus, hypothalamus, cerebellum and pons

C. It consists of the primary motor cortex and pons

D. It consists of the basal ganglia, fornix and medulla

E. It consists of the pituitary gland, primary visual cortex and insular cortex

F. It consists of the hypothalamus, limbic system and primary motor cortex

1.16 Which functions are associated with the pons?

**A. Sleep, arousal and the relay of information from the cerebral cortex to the cerebellum**

B. Pain perception, vision and audition

C. Problem solving, memory and somatosensory perception

D. Colour perception, depth perception and regulation of the medulla

E. Control of vital functions and homeostasis

F. Emotion, memory and audition.

1.17 What are the components of the autonomic nervous system?

A. The peripheral and central nervous systems

B. The central nervous system and glands

**C. The sympatric nervous system, parasympathetic nervous system and enteric system**

D. The cerebellum and limbic system

E. The brain, spinal cord, cranial nerves and motor neurons

F. The hypothalamus, thalamus and medulla.

1.18 Which of the following would not be produced by the sympathetic nervous system during the stress response?

**A. Slow heart beat**

B. Inhibited digestive system

C. Inhibited bladder contraction

D. Expanded airways

E. Reduced saliva

F. Increased levels of glucose.

1.19 The synapse is specifically responsible for communication between:

A. The central nervous system and the peripheral nervous system

B. Individual nerve fibers

C. The brain and the spinal chord

**D. Individual neurons**

E. Axons and muscles

1.20 What are dendrites?

A. The electrical impulses between neurons

**B. The branches of the main cell body of a neuron**

C. The connection between neurons and muscles

D. The connection between nerve fibers

E. The nerves inside of the brain

**QUESTION 2** **[12]**

*Give the correct biological term for each of the following statements or definitions.*

2.1 The structure, whichpredominates in the white matter of the brain. **Myelinated axon**

2.2 The part of a neuron, whichtransmits an electrical signal to a target cell. **Dendrite**

2.3 The term that describes a bundle of axons in the peripheral nervous system. **Nerve**

2.4 An event in the external or internal environment that registers as activity in a sensory neuron. **Stimulus**

2.5 Animal Phylum, which include organisms with nerve nets. **Cnidaria**

2.6 The clustering of sensory organs at the front end of the body of an organism. **Cephalization**

2.7 Cerebral division integrating sight. **Occipital lobe**

2.8 Part of the CNS which contains bundles of axons traveling between the cerebellum and the rest of CNS. **Pons**

2.9 Nerves extending from the brain to the ears. **Cranial nerves**

2.10 The minimum change in polarity across the axon membrane that is required to generate an action potential.**Threshold**

2.11 The structure connecting the two halves of the cerebellum. **Vermis**

2.12 The ions needed to conduct a chemical impulse across a synapse. **Calcium**

**QUESTION 3** **[5]**

3.1 What is a conus medullaris? (1)

**The terminal part of the spinal cord**

3.2 The enteric division forms part of which PNS? (1)

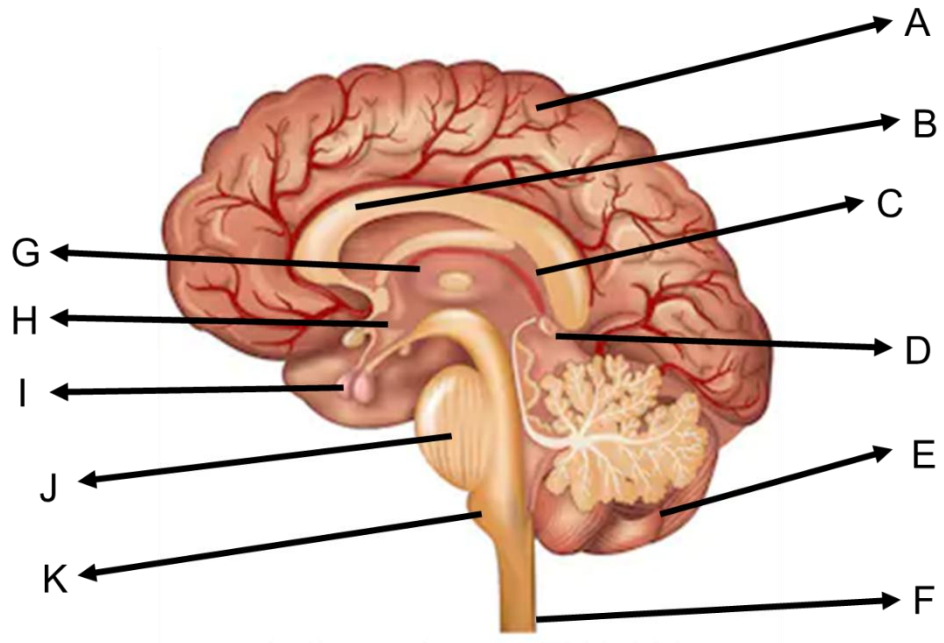
**Autonomic nervous system**

3.3 What is the function of the enteric division of the PNS? (3)

- **The enteric division controls activity of the**
  - **digestive tract,**
  - **pancreas, and**
  - **gallbladder**

**QUESTION 4** **[49]**

Examine the diagram below and answer the questions, pertaining to the diagram that follow.




4.1 Supply a complete detailed heading for this diagram. (4)

**Diagrammatic representation (1) of a longitudinal section (1) through the human brain (1), showing the internal structure (1).**

4.2 Label parts A to K. (11)

A – **Cerebrum**

B – **Corpus callossum**

C - **Epithalamus**

D – **Pineal Gland**

E - **Cerebellum**

F – **Spinal cord**

G - **Thalamus**

H - **Hypothalamus**

I – **Pituitary gland**

J - **Pons**

K – **Medulla Oblongata**

4.3 Give the letter (A-K) of the structure which: (10)

4.3.1 name means “bridge” in Latin. **J**

4.3.2 has grey matter on the outside edge and white matter on the inside. **A and E**

4.3.3 sends impulses to the correct part of the cerebrum. **G**

4.3.4 regulates involuntary vomiting. **K**

4.3.5 secretes cerebrospinal fluid. **D**

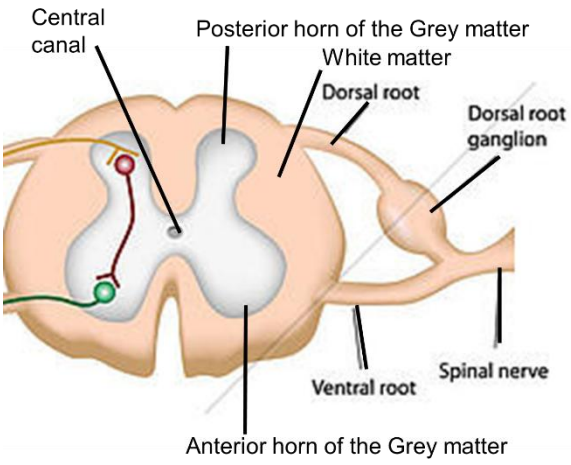
4.3.6 maintains homeostasis in the body. **H**

4.3.7 coordinates voluntary muscle movement. **E**

4.3.8 consists of parallel grooves. **E**

4.3.9 secretes FSH. **I**

4.4 Draw a cross section through structure F, excluded nerve cells associated with this structure. (8)




4.5 Fill in the missing words to describe the electric transmission of an impulse through the CNS.(16)

- When an axon is not conducting an impulse the membrane potential is **-65mV** and it is said to be in a **resting potential** state.

- This indicates that the inside of the axon is more **negative**therefor hasmore **K-ions** and less **Na+** ions than the outside.
- As the impulse begins there is a rapid change in polarity across a part of the axon membrane, this is because an **action potential** has been generated.
- The **Na+ gates** open and **Na+** moves **inside** the axon, **depolarization** take place.
- The membrane potential changes from to **+40mV.**
- The **Na+** gates close and **K- gates** open and **K-leave** the axon
- The membrane potential change from to **-65mV**, **repolarization** occurred.

**QUESTION 5**

Choose the option in column B that best fits the structure or term in column A. Only write down the correct letter of column B next to the number in column A. (14)

| Column A | Answer from Column B | Column B |
|---|---|---|
| 5.1 Dopamine | **N** | A. Apneustic centre |
| 5.2 Locust | **M** | B. Secrete melatonin |
| 5.3 Serotonin | **L** | *C. Arbour vitae* |
| 5.4 Platyhelminthes | **K** | D. Cerebral cortex |
| 5.5 Nor Epinephrine | **J** | E. Planning and learning dance moves |
| 5.6 Alzheimers | **I** | F. Regulate smooth muscle movement |
| 5.7 Endorphins | **H** | G. Major depressive disorder |
| 5.8 Prozac | **G** | H. Neuromodulator |
| 5.9 PNS | **F** | I. Amyloid plagues |
| 5.10 Basal nuclei | **E** | J. Important in dreaming |
| 5.11Sulci and Gyri | **D** | K. Nerve cord and Eye spots |
| 5.12 White matter | **C** | L. For thermoregulation |
| 5.13 Pineal gland | **B** | M. Segmental ganglia and a Nerve cord |
| 5.14 Pons | **A** | N. Neurotransmitter involved in being in love |

Total : 100