

Name: _____ KEY _____

Date: _____ Blk: _____

Nervous System Review Worksheet

Part A: Define the following terms in your own word. Be clear and concise!

myelin sheath	<i>fatty covering of long axons and dendrites, speeds up nerve impulses</i>
Schwann cell	<i>cells that produce myelin sheath</i>
node of Ranvier	<i>interruptions in myelin sheath that exposes axon membrane. Nerve impulse "jumps" from node to node</i>
PNS	<i>peripheral nervous system: the nerves leaving spinal chord and brain</i>
CNS	<i>central nervous system: spinal chord and brain</i>
ganglia	<i>collections of cell bodies</i>
nerve	<i>bundle of nerve fibers</i>
receptor	<i>receives and transmits sensory information to sensory neuron</i>
effector	<i>muscle or gland attached to motor neuron</i>
somatic nervous system	<i>Branch of PNS, consists of nerves that connect to skeletal muscles and sensory viscera</i>
reflex arc	<i>functional unit of nervous system</i>
autonomic nervous system	<i>branch of PNS, connects to smooth muscle, contains Parasymp. and Symp. branches</i>
spinal cord	<i>part of the CNS, relays information to brain and instruction to body</i>
cerebral cortex	<i>thin, gray, outer covering of cerebrum, most complex part of brain, consciousness resides here</i>

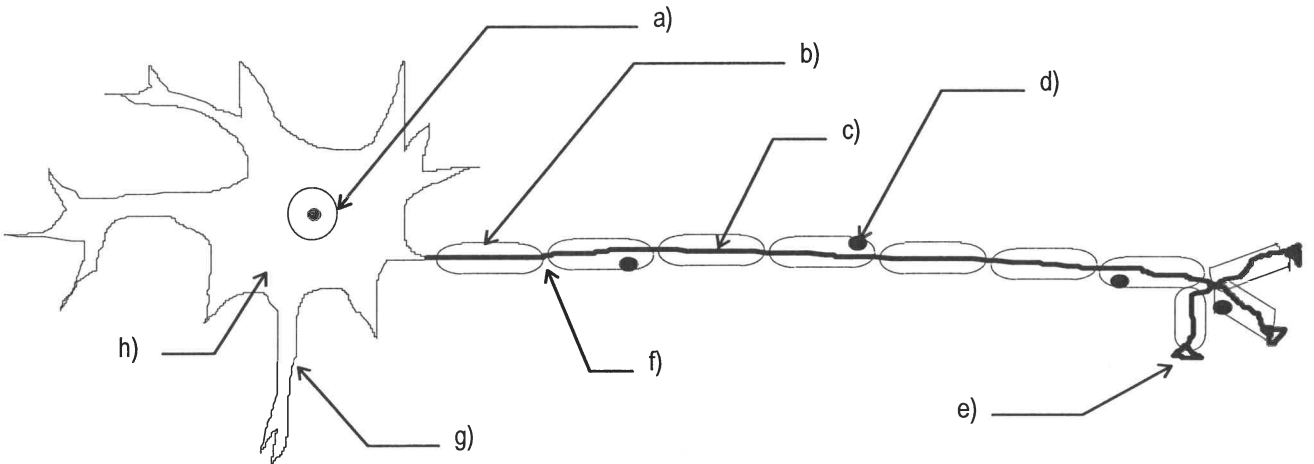
Part B - Short Answers

1. The peripheral nervous system may be divided into the somatic division and the autonomic division.
2. A motor neuron has a long axon and short dendrites.
3. In the first part of the nerve impulse, the ion sodium moves to the inside of the neuron.
4. The junction between one neuron and another is called a synapse.
5. Each division of the autonomic nervous system controls the same organs, but they generally have opposite effects.
6. The largest portion of the human brain is the cerebrum.
7. The parasympathetic nervous system causes the heartbeat to slow down.
8. The cerebral cortex can be mapped. There are sensory areas that receive impulses from sense organs and motor areas that initiate impulses that eventually cause muscles to contract.
9. The central nervous system contains the brain and spinal cord.
10. The peripheral nervous system contains nerves and ganglia.
11. The somatic nervous system controls skeletal muscles. The autonomic controls smooth muscle and glands.
12. The autonomic has two parts, the sympathetic for emergency situations, and the parasympathetic for everyday situations.
13. List three parts of neurons and their functions below.

Part	Function
------	----------

dendrite	take impulse to cell body
cell body	control center of neuron, contains nucleus
axon	take message away from cell body

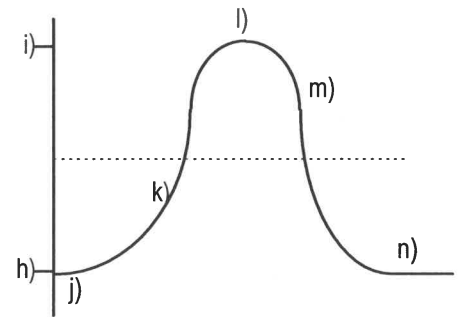
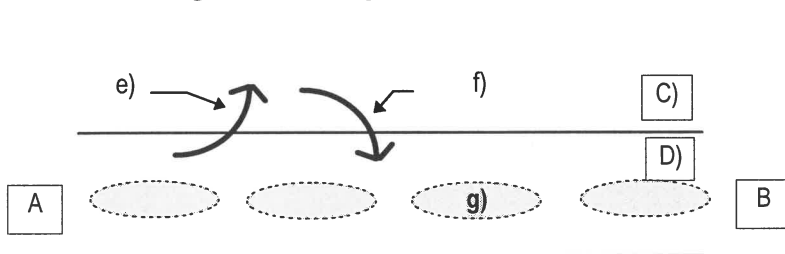
14. Label the neuron below.



- a) nucleus b) myelin sheath c) axon d) Schwann cell nucleus
e) synaptic ending f) node of Ranvier g) dendrite h) cell body

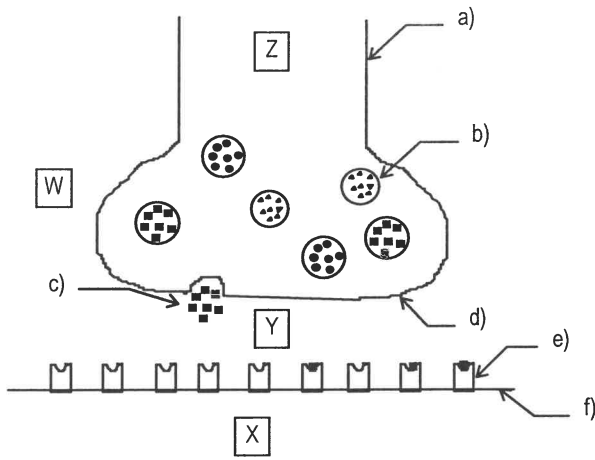
- What type of neuron is this? motor neuron
- What would the structures at e) be right next to? muscle or gland
- Which structure above is most responsible for the fast speed of nerve transmission? Myelin sheath
- Which structures above would contain acetylcholine? E
- Across which "spaces" do nerve impulses "jump"? E
- List the structures, in order, that a nerve impulse would travel through this neuron.
Dendrite, cell body, axon, synaptic ending
- Nerve impulses travel from neuron to neuron in one direction only, yet it is know that an impulse can be started in both directions in the middle of an axon. Which structure above is most responsible for nerve impulse transmission to be unidirectional? E

15. Observe the diagrams below: The diagram on the left shows a section of an axon during nerve transmission. The diagram on the right shows what this would look like on an oscilloscope screen.



- In which direction is the impulse moving: from A to B or B to A? A to B

- b. In the first diagram, which number corresponds to moving Sodium ions? F
- c. In the second diagram, which number corresponds to moving Sodium ions? k
- d. In the first diagram, which number corresponds to moving Potassium ions? e
- e. In the second diagram, which number corresponds to moving Potassium ions? m
- f. Which letter corresponds to the molecules responsible for the axoplasm having a polarity? G
- g. Which region, C or D, has a higher concentration of Sodium ions? C
- h. What is the reading on the oscilloscope, in millivolts, at h? -60 mV
- i. What is reading on the oscilloscope at I? +40 mV
- j. Which letter best corresponds to resting potential? j
- k. What is happening from j to I? depolarization (sodium ions flood into axon)
- l. What is happening at I? sodium gates close, potassium gates open
- m. What is happening at m? repolarization (potassium ions diffuse out of axon)
- n. What is happening at n? recovery phase; sodium ions and potassium ions returned to resting potential concentrations
16. Prozac[®] is a drug that selectively blocks the reuptake of the excitatory neurotransmitter Serotonin. Explain why this drug has been used successfully to treat many people suffering from the serious disorder, clinical depression.
By blocking the reuptake of Serotonin, more of the neurotransmitter will be present in the synaptic cleft at any one time. As depression can be caused (it is hypothesized) by a lack of serotonin in emotional centers of the brain, increasing the amount of serotonin in these areas should relieve the symptoms of depression.
17. Fill in the blanks to indicate what happens during a spinal reflex arc. A stimulus is received by a sensory organ, which initiates an impulse in sensory neuron. The neuron takes the message to the cord and transmits it to the interneuron. This neuron passes the impulse to the motor neuron, which takes the message from the cord and innervates a muscle causing a reaction to the stimulus.
18. Observe the diagram of a synapse below.
- a. Label the following parts:



- a) axon
- b) synaptic vesicle
- c) neurotransmitter
- d) presynaptic membrane
- e) receptor
- f) postsynaptic membrane
- Y) synaptic cleft
- X) dendrite

- b. Which region above will contain higher amounts of Calcium ions when the neuron is at rest? W
- c. What direction will nerve impulses travel across this synapse? Z to Y to e to x
- d. Suppose "c" is an inhibitory neurotransmitter in one case, and an excitatory neurotransmitter in another case. What will be the effect of the following?

Condition	If C is inhibitory n.t.	If C is excitatory n.t.
A drug is given that blocks the receptors for c	<i>stimulation</i>	<i>depression</i>
A drug is given that blocks the reuptake of c by the presynaptic membrane	<i>depression</i>	<i>stimulation</i>
A drug that looks just like c is administered	<i>depression</i>	<i>stimulation</i>
A drug is given that destroys an enzyme that degrades c	<i>depression</i>	<i>stimulation</i>
A drug is given that irreversibly binds to c is given	<i>stimulation</i>	<i>depression</i>
A drug is given that decreases the amount of c that is produced	<i>stimulation</i>	<i>depression</i>

22. Fill in the table below to indicate the functions of the parts of the brain.

Part	Function
cerebrum	<i>consciousness, will, memory, judgment, higher mental abilities etc.</i>
thalamus	<i>gatekeeper to cerebrum - integrates sensory data and decides what goes to cerebrum</i>
hypothalamus	<i>homeostasis, controls pituitary, produces hormones ADH and oxytocin</i>
cerebellum	<i>motor coordination</i>
medulla oblongata	<i>control of internal organs e.g. heart rate, breathing rate</i>