PRELIMINARY Study Guide for Biological Psychology Test #2

Chapter 3: What is anatomy? physiology? Layout of the nervous system: peripheral, central, autonomic (afferent, efferent nerves), somatic (afferent, efferent nerves), sympathetic and parasympathetic: What are the basic functions of each? What are nerves? efferent nerves? afferent nerves? What are the 5 conventional functions of the sympathetic and parasympathetic nervous systems? What are cranial nerves? How many pairs? (Answer: 12) Emotions: What is the common-sense view of emotions? the James-Lange view? (proposes that different emotion- arousing stimuli result in different autonomic system activity) the Cannon-Bard view? Schacter-Singer view? the modern biopsychological view? (textbook, 7th ed.: pp. 443-444; 8th ed.: pp. 444-445; 9th ed.: p. 426) Central Nervous System (CNS) (brain and spinal cord): Protection for CNS: (1) skull and backbone (2) 3 meninges (dura mater, arachnoid membrane, pia mater) (3) Cerebral spinal fluid (CSF) system: What is it? What are ventricles? the central channel? What is a lumbar puncture (spinal tap)? What is its most common use? (Answer: to diagnose meningitis) CSF made in choroids plexuses (type of capillaries) What is hydrocephalus? How can it be alleviated in childhood? (Answer: remove the blockage, implant a valve in ventricle that shunts CSF through a tube to the gut); What are the functions of the CSF system? (4) Blood-brain barrier: What is it? (Answer: tightly packed cells covering blood vessels, and sealed by glial cells) What is its function? (oxygen and carbon dioxide pass through it, glucose is actively transported across it, big molecules are blocked) Why does it break down at the area postrema? (Answer: to allow the brain to detect toxic substances that have been consumed) Know these directions: anterior, posterior, dorsal, ventral, medial, lateral, superior, and inferior; Slices of brain: horizontal, frontal, sagittal, and midsagittal planes; Spinal cord: What is gray matter? white matter? Where is the gray matter in the spinal cord? (Answer: in cross section – makes up the “H”) white matter? (Answer: in cross section – surrounds the “H”) dorsal neurons are sensory, ventral are motor; What is the stretch reflex (e.g., knee jerk)? What is the function of the stretch reflex? (Answer: allows us to compensate for sudden changes in our bodies’ orientation) Brain: Overview: Forebrain controls midbrain, midbrain controls hindbrain; Hindbrain (medulla): Involved in what functions? reticular formation, cerebellum: Makes ups 10% of the brain’s mass but contains half of the brain’s neurons. involved in fine motor control Affected soon after drinking alcohol. Consequences of damage? Midbrain: Functions of superior colliculus and inferior colliculi? Substantia nigra involved in Parkinson’s disease. Forebrain: largest division of the human brain; Functions of thalamus (relays sensory information) and hypothalamus (controls pituitary, sexual behavior, eating), What is the corpus callosum? What are tracts? neocortex What is a fissure? sulcus? gyrus? What is the advantage of convolutions? (Answer: can pack more brain tissue into the skull), longitudinal fissure? (divides 2 hemispheres), central and lateral fissures (help mark out the 4 lobes of the brain) What are the functions associated with each of four lobes (frontal, temporal, parietal, occipital)? Which lobe contains the primary visual cortex? (Answer: occipital) the primary auditory cortex? (Answer: temporal) the somatosensory cortex? (Answer: parietal) the motor cortex? (Answer: frontal) Wernicke’s area? (temporal) Broca’s area? (frontal) What is the corpus callosum? Functions of limbic system, (including amygdala, hippocampus)? basal ganglia? nucleus accumbens? What is aphasia? Broca’s aphasia? (an expressive aphasia) Wernicke’s aphasia? (a receptive aphasia) (textbook, 7th ed.: pp. 402, 417; 8th ed.: p. 429; 9th ed.: pp. 410-411)

Chapter 4: What are neurons? (Answer: basic building blocks of the nervous system) Parts of neuron (know locations and functions): cell body (including nucleus, cytoplasm), dendrites, axon, axon hillock, myelin (multiple sclerosis (MS): deterioration of myelin), nodes of Ranvier, buttons, neurotransmitter, synapse, synaptic cleft (gap) synaptic vesicles; Neuron membrane: lipid bilayer (Answer: makes up the membrane of neurons), lipid molecule: head – hydrophilic, tail - hydrophobic unipolar (helps keep lipids lined up, and molecules from crossing membrane), channel proteins, signal
proteins; Classes of neurons: By structure: unipolar, bipolar, and multipolar neurons? (In humans, which is the most common? - Answer: multipolar) By function: sensory, motor, interneurons (interneurons make up most of human brain) What are support cells? (glial cells? satellite cells?). What are their functions? What is a Golgi stain? Nissl stain? myelin stain? tracing techniques? What does each type of stain show? What is a membrane potential? Why was it originally measured in squids? (Answer: Squids have neurons with large diameter axons – easier to get an electrode inside these axons) What is the potential difference between the inside and outside of a neuron at rest? Cause of this difference: What are ions? positive ions? negative ions? sodium and chloride ions outside the membrane, potassium and protein ions within the neuron; What is the charge on sodium ions (Na+)? on potassium ions (K+)? on chloride ions (Cl-)? Why don’t protein ions rush out of the resting neuron? (Answer: too big to fit across through the channels in the neuron’s membrane) Why don’t chloride ions rush into the resting neuron? (Answer: have the same charge as the inside of the neuron, so are repelled from entering) What is the function of sodium-potassium pumps? (Answer: pump sodium ions out of the neuron, pump potassium ions into the neuron) Neural signaling: (1) Postsynaptic potentials: What are EPSPs? IPSPs? These are graded potentials - What does that mean? What is integration? (Answer: combining a number of individual EPSP and IPSP into one overall signal) At which part of the neuron does integration occur? (Answer: axon hillock) What is a neurotransmitter? a synaptic vesicle? What is exocytosis? What are the steps involved in exocytosis? What is a receptor? What do receptors receive? (Answer: different types of neurotransmitters) Lock and key analogy: lock = receptor, key = neurotransmitter; What are the differences between ionotropic and metabotropic receptors? There are more metabotropic receptors than ionotropic receptors in human brain; How do metabotropic effects compare to ionotropic effects? (Answer: metabotropic effects have a slower onset and longer-lasting effects) What are the functions of G proteins? What are second messengers? What are first messengers? (Answer: neurotransmitters) How do they function? What are autoreceptors? Where are they located? (Answer: on the presynaptic neuron) What is their function? Caffeine: How does it work- (Answer: blocks the effects of adenosine) competes for autoreceptors; What are caffeine’s physiological and psychological effects? Caffeinism: What are the symptoms? How much coffee must be consumed? What is the cure? (Answer: stop consuming caffeine) Stopping neurotransmitters effects: (1) enzymatic deactivation (2) reuptake - Which process is most common in brain? (Answer: reuptake) Neurotransmitters (NT): acetylcholine: NT at the neuromuscular junction; endorphins What is their effect? (Answer: relieve pain) What is the most common excitatory NT in the human brain? (Answer: glutamate) the most common inhibitory NT? (Answer: GABA) What NT does Prozac affect? (Answer: serotonin) How does Prozac affect it? (Answer: blocks its reuptake) What NT does cocaine affect? (Answer: dopamine) How does cocaine affect it? (Answer: blocks its reuptake) What are agonists? (e.g., Black Widow Spider venom and acetylcholine) antagonists? (e.g., curare and acetylcholine, botulism toxin and acetylcholine, naloxone and endorphins)