Lecture 1

1.) What are the definitions or disciplines within Neuroscience?

2.) What does Biopsychology/Behavioral Neuroscience have in common to the sub-disciplines within Neuroscience?

3.) If all behaviors (human) are mediated by the CNS (i.e. Brain/spinal cord), then can these behaviors be explained by neuroscience and how so?

4.) If there is a physiological basis for behavior is there any difference between Neuroscience and psychology?

5.) What is the Psychological approach (research model) to study behavior?

6.) What is the Neurological (Biopsychology) approach to study behavior?

7.) What does the Psychological approach (research model) to study behavior lack in comparison to the Neurological approach?

8.) True/False - Does the psychological approach truly explain what components constitute behavior?

9.) There are several problems associated with studying the system-cellular-molecular components that constitute behavior, what are the ones discussed in class?

10.) What are the Basic methods to study the Brain?

11.) What do CAT, MRI, fMRI, PET, MEG etc. all lack when studying brain activity?

12.) What is the spatial and temporal resolution of the CAT, MRI, fMRI, PET, MEG, EEG?

13.) Can the CAT, MRI, fMRI, PET, MEG or EEG detect structure and/or function?

14.) What can we concluded about ADHD patients prefrontal cortex using an fMRI?

15.) We talked about how to study the brain via disengagement or damage, what are some methods?
16.) What is the benefit from a research design aspect to using animals versus humans subjects to explain behavior? There are several! Particularly when it comes to designing a research question.

17.) What is a Dependent variable (DV) compared to an Independent variable?

18.) Using the Neurological approach (model) to study behavior what would be an example of the IV and an example(s) of DV.

19.) What experimental research design advantages do we gain with the Neurological approach compared to the Psychological approach (think in terms of IV and DV).

20.) There is a 3D Coordinate system we use to target specific regions of interest in the brain for surgical and micro manipulations to study neurobiological associations to behavior. What are the tools and/or land marks we use for accuracy? Hint there is a Rat-Brain______, and an Instrument called ________, and land marks on the dorsal part of the skull called ________.

21.) What is the difference between a jugular catheter and micro-guide cannula placed in the brain (think in terms of drug delivery abilities and sampling abilities)? Hint one of them is systemic and the other is __________?

22.) What is an Immunohistochemistry (IHC) assay used to detect ______? 

23.) What is an in-situ hybridization (ISH) assay used for? And What is the probe in an ISH?

24.) We use IHC and ISH to measure experience _______ changes of ______ and_______? These changes take place within ____________?

25.) IHC and ISH assay give information about Neurological ________, ________, and_________ mechanisms that participate in a particular behavioral response.

26.) What is the difference between ex-vivo and in-vivo?

Lecture 2
1.) Know the anatomical reference points Dorsal, Ventral, Anterior, Posterior, Medial and Lateral. These terms can appear on a diagram or figure. Or these terms will appear in questions.

2.) What is the CNS composed of and what is the PNS composed of?

3.) What is the difference between the Autonomic and Somatic Nervous system?
4.) What is the preganglionic neurotransmitter used by both the Sympathetic and Parasympathetic nervous system? And what is the post-ganglionic neurotransmitter?

5.) Why do the Sympathetic and Parasympathetic nervous system use different neurotransmitters? Why is this important i.e. What is the functional consequence that these two different systems impose over target organs?

6.) Know what a projection, track, nerve, ganglion, nucleus, efferent and afferent terminology refers to. These maybe questions or used in questions.

7.) In the PNS, does the Somatic, Sympathetic and Parasympathetic have Sensory and Motor projections?

8.) What are the three cranial nervous I want you to know?

9.) Somatic sensory and/or motor information is composed of what type of information? The sensory neural projections have cell bodies located where? Is sensory neural projections tracts or nerves? And are these nerves or tracts considered afferent or efferent projections?

10.) A dermatome is what?

11.) The Spinal Cord grey matter is composed of ______ and is medial or lateral to white matter which is composed of________?

12.) Dorsal portion and Ventral portion of the spinal cord is composed of what type of projections? And What type of information is conveyed by these projections?

13.) Meninges and blood-brain-barrier (BBB) protect the brain from what?

14.) What Meninges layers hold cerebral-spinal-fluid (CSF)?

15.) The BBB is important because __________, but does not do __________?

16.) Where is CSF produced in __________ and produced by ______________, which are a type of ______________?

17.) CSF is important for many reasons what are some and which are not?

Lecture 3
Again know the directional terminology of the brain (e.g. Ventral/dorsal, anterior/posterior etc.) Also, know what each lobe is (e.g. Frontal, occipital ect.). Possibly could be a diagram/figure for you to label on the exam.

1.) What is the difference between a fissure and a Sulcus?
2.) The Brain is Divided into 3 divisions what are they?

3.) The three divisions of the brain are further divided into subdivisions what are they?

4.) The Medulla not only contains Cranial nerves but also contains what sensory relay projections?

5.) The medulla is part of what sub division? And part of what major division?

6.) The medulla controls many important behavioral and physiological functions such as?

7.) Cerebellum is important for what type of behaviors?

8.) Pons do what? And what sub region are they apart of?

9.) Substantia Nigra is important for many reasons which are some?

10.) What is the difference between the tegmentum and tectum?

11.) Periaqueductal Grey is involved with what?

12.) The thalamus receives what type of information _________ and relays this to were ____________?

13.) Is the thalamus and hypothalamus apart of the Telencephalon?

14.) The hypothalamus is located where (below what structure)? And is important for?

15.) The Forebrain is composed of what subdivisions and what Brain regions?

16.) The Telencephalon contains a general brain region important for movement what is this called?

17.) What brain region in the Telencephalon is important for fear ________ and reward _________?

18.) The Substantia Nigra sends axon projections (tracts) to where in the Forebrain?

19.) 4 lobes of the Cortex are what? What are the functions of these lobes?

20.) 75% of the Cortex is association, what is meant by association?

21.) 25% of the Cortex are considered primary regions for what type of specific processing?
22.) Damage to the posterior association cortex interferes with what?

23.) What is contralateral neglect mean?

24.) What brain area is slow to develop in children, in other words which area is underdeveloped in children and teenagers?

25.) What brain is responsible for autopilot?

26.) What was the first case study that documented the importance of the prefrontal cortex? And what does this region of brain control?

Lecture 4

1.) What is the Golgi stain? And what is unique about it?

2.) What are the parts of a basic neuron?

3.) What is the function of these parts?

4.) Neurons can be classified by structure why? And what are they?

5.) What are the function of the neurons according to shape?

6.) Neurons can be classified by function, what are the classifications?

7.) At this point you probably hate this class :) But this stuff will pay off in other classes ;).

8.) Where can a synapse occur? And what type of synapses are there?

9.) Some synapses are reference not only location of connection, but also by the post-synaptic receptor and neurotransmitter. What are they?

10.) The Cortex is primarily composed of grey matter or cells and neurons organized into layers, what are the important functions of these layers?

11.) What type of **functional** (according to definition) neurons are located in the layers of the Cortex?

12.) Why are some layers of the cortex thicker than others?

13.) The neuron like all cells is composed of what intracellular (inside) organelles? There are many

14.) What is the function of these intracellular components?
15.) What is the cell membrane composed of?
16.) What do Chromosomes/DNA control?
17.) What is the central dogma of biology?
18.) What are motor molecules used for?
19.) The anatomy of a synapse consists of what components?
20.) There are three type of glial in the CNS, what are they.
21.) Which glial is not in the CNS?
22.) True or False, Neurons and glial are specialized to conduct and transmit electrochemical signals.
23.) True/False Glial can influence neurotransmission if not why of so how?
24.) How are Oligodendrocytes different from Swan cells?
25.) Astrocytes regulate the functional state neurons in the CNS by what means.
26.) Do astrocytes modulate synaptic activity?
27.) I listed in class 4 basic neural systems specific for a certain neurotransmitter, what are they, what behaviors are they implicated in, and what is the location of the neuronal cell bodies?