Control of Movement

1. On muscles –
   a. Describe skeletal muscles
      i. how are they attached?
      ii. flexion and extension – give an example
      iii. what is the function of extrafusal muscle fibers?
      iv. what is the function of intrafusal muscle fibers?
   b. what is the relationship between precision of movement and the number of muscle fibers served by a single axon of the alpha motor neuron?
   c. list the three components of a motor unit
   d. what are the events involved in muscular contraction?

2. On reflexes –
   a. explain the monosynaptic stretch reflex, the gamma motor system, and the contribution of the Golgi tendon organ
      i. patellar reflex
      ii. how do we know that this reflex does not involve the brain?

3. Describe the organization of motor cortex, and the role of the motor cortex in initiating, imitating, and comprehending movements.
   a. what is meant by saying that primary motor cortex shows somatotopic organization?
   b. why are some features of the motor homunculus exaggerated in size?
   c. describe the organization of primary motor cortex
      i. name the principal cortical input to the primary motor cortex
      ii. from which regions do the supplementary motor area and the premotor cortex receive sensory information? send information?
      iii. state the functions of the supplementary motor area and premotor cortex

4. Carefully outline the connections between the parietal, temporal, and frontal lobes to explain how sensory information is integrated with the control of movement.

5. Why did the response of particular neurons in the area F5 of the monkey brain lead researcher to name them mirror neurons?
   a. What might be their function? connections?
Emotion and Stress

1. Definitions
2. Theories –
   a. James-Lange
      i. spinal cord patients – does it support James-Lange theory?
   b. Discuss the Cannon-Bard theory of emotion – how does it differ from the James-Lange theory of emotion?
   c. Papez-MacLean –
      i. What is the Papez circuit? – know the connections and the anatomy as presented in your text and class.
      ii. Limbic System
         1. Why was the Papez circuit expanded?
         2. discuss the affect of lesions in the amygdala
   d. Damasio – primary and secondary emotion model
   e. Schachter’s Cognitive Model
      i. classic study – are you in love?

Language and Lateralization

1. On linguistics basics -
   a. structure
   b. rules
   c. meaning
2. On aphasias –
   a. Describe Broca’s aphasia – How does Broca's aphasia affect—
      i. speech production?
      ii. production of meaningful speech?
      iii. grammar (especially the use of function words and content words)?
      iv. comprehension?
   b. Wernicke’s aphasia –
      i. what are three characteristics deficits from damage to Wernicke’s area?
3. On lateralization -
   a. commissures
   b. Concerning the analysis of sounds, what do most researchers believe is the function of the auditory association cortex of the – left hemisphere? right hemisphere?
   c. What hemisphere is involved in the comprehension of abstract aspects of speech?
   d. Split brains –
      i. language
      ii. spatial perception and abilities
      iii. emotion
   e. Describe hemispheric damage in children as compared to adults.
   f. handedness and hemispheric language dominance
Psychoneuroimmunology (PNI):

1. Discuss the concept of conditioning the immune system –
   a. Explain the study cited in lecture with saccharin and rats. –
2. Discuss how the immune system and brain communicate with each other.
   a. what are the receptors or agents that are involved in the communication process
   b. where is the information exchanged?
3. On placebo –
   a. provide a definition and examples of placebos discussed in lecture
   b. Discuss top-down vs. bottom up processing – and provide two examples.
   c. Discuss the findings on placebo and Fluoxetine.
   d. what are the common regions in the brain that activated with placebo?
   e. What do you think accounts for specific effects of placebo?
   f. Discuss the attributes and conditions that would make a placebo more likely to work or be successful.

Learning and Memory: -

1. On learning -
   a. What is the capacity and duration of short term memory?
   b. What is the capacity and duration of long term memory?
   c. What is the role of memory formation of rehearsal?
   d. What is the role in memory formation of consolidation?
2. Discuss the physiology of the classical conditioning – (eyeblink)
   a. Be able to identify CS/US/UCR/CR
   b. What kinds of changes take place in the brain during classical conditioning
3. Discuss Hebbian learning
4. Discuss the distinction between declarative memories and nondeclarative memories.
   a. What about the distinction in relation to anterograde amnesia?
5. On H.M. -
   a. Explain the difference between anterograde amnesia and retrograde amnesia.
   b. Why did patient H.M. undergo bilateral removal of the medial temporal lobe?
   c. After studying H.M. what conclusions did Milner and her colleagues make about the role of the hippocampus in memory formation?