

Due at the start of the final exam. Bring a hard copy to class.

On a separate sheet, answer **ALL** the following questions your **own words and images**. Because of the need to complete grades, only complete assignments will be graded – late work cannot be accepted.

You must do your own work in your own words – do not copy from outside sources without proper citation. You may not copy and use other images in your responses – all figures and graphs must be generated by you. Your goal is for your responses to be complete and clear enough so as to be understood by a non-biology major.

A) Make and label the following three events on a single graph using correct axes:

1. an antibody response to a new foreign antigen
2. an antibody response to a second exposure by the same foreign antigen
3. an antibody response to a different new foreign antigen.

B) Write a description of all the factors that stimulate the B cell to proliferate and develop into clonal populations of plasma cells and memory B cells.

Be sure to include:

- What the role of the T helper cell is.
- What plasma B cells produce that help fight infections.

You can use drawings to help but **you must label** your drawings and **you must have explanatory text**.

C) Write a description of all the factors that stimulate the CD8+ T cell to proliferate and develop into clonal populations of cytotoxic T cells (CTLs) and memory CD8+ T cells.

Be sure to include:

- What the role of the T helper cell is.
- What cytotoxic T cells (CTLs) do to help rid the body of infections.

You can use drawings to help but **you must label** your drawings and **you must have explanatory text**.

D) Describe what:

- an antigen is
- an antibody is and what it does
- an antibiotic is and what it does
- is the difference between all three.

E) Diagram and label a graph of an action potential of a stimulate neuron.

Label the parts of the graph that are the **resting membrane potential (RMP)**, the **threshold potential** and the **action potential (AP)**. Describe what each of those mean.

Describe the complete molecular mechanisms involved that result in the generation of the AP (i.e., what are the events that are happening to cause the neuron to depolarize and repolarize? Why are they occurring?).

In addition to you graph, you may draw and label a figure to help explain and clarify your graph.

F) Draw and label an image of a synapse showing the transmission of a signal from one neuron to another neuron. Indicate and name the cellular features on the membrane at the axon region that enables it to be the “transmitting” portion. Indicate and name the cellular features on the membrane of a neuron at the dendrite region that enables it to be the “receiving” portion of the neuron.

G) If a drug was administered to a stimulated pre-synaptic neuron that blocked the release of its inhibitory neurotransmitter, what would be the effect on the post-synaptic neuron?

Extra credit: (5 points)

Biology 100 is a challenging course requiring students to absorb a great deal of information and apply that information during the tests. An added challenge to this Biology 100 course is that it meets only once a week for nearly three hours per class. Give two pieces of advice you would give to future students to help them learn the material and be better students using strategies you have used (or would have like to have used).