1. In a recent issue of “Wired Science”, an article entitled “Absorbing CO2 by Dumping Urea into Ocean Pisses off Activists” describes a plan by an Australian company to absorb excess CO2 by dumping massive amounts of urea into the Sulu Sea. The idea is that the urea will fertilize green algae and allow them to grow profusely. Environmental activists are angry saying that the plan is risky, bad science and that there should be geo-engineering regulations that prevent it. They consider “urea dumping” a bad idea because:
   a. Urea is toxic
   b. Urea takes energy to produce
   c. Uric acid would be a better choice and it is readily available
   d. Ocean fish already produce ammonia
   e. All of the above are correct

2. In a particular autoimmune disease the capillaries can become damaged. Which region of the nephron contains capillaries that, if damaged, could cause blood cells and proteins to appear in the urine?
   a. nephron loop
   b. distal tubule
   c. proximal convoluted tubule
   d. reabsorption tubule
   e. glomerulus

3. Following the consumption of a highly salty meal, which of the following would be a likely consequence in a human?
   a. Increased glomerular filtration
   b. Increased secretion of aldosterone
   c. Decreased secretion of aldosterone
   d. Formation of hypotonic urine

1. Muscle cells that are not exercised will atrophy, or shrink in size. Lou Gehrig's disease affects nervous tissue but also causes muscle atrophy. What type of nerve cell must be affected to cause this muscle-wasting condition?
   a. Neuroglial cells
   b. Motor neurons
   c. Sensory neurons
   d. Interneurons

2. Inhaling or "huffing" is a way to achieve a high, usually by breathing in a fat-soluble substance. Which of the following structures would be most likely attacked first?
   a. Dendrites
   b. Axons
   c. Cell body
   d. Myelin sheath
   e. Neurotransmitters

3. A new drug interferes with the function of the dendrites of a neuron. What will happen to this neuron?
    a. **The neuron cannot be stimulated to send a signal along its axon**
    b. The neuron will adapt and receive information via the cell body directly
    c. The neuron will die off
    d. The neuron will sometimes send signals and sometimes not send signals.

***Not a great question!! Neurons typically receive info from dendrite, but can also receive info from synapse at cell body and sometimes other axons! So an argument could be made for d**

4. If you experimentally increase the concentration of Na+ outside a cell while maintaining other ion concentrations as they were, what would happen to the cell's membrane potential?
    a. The membrane potential would decrease.
    b. **The membrane potential would increase.**
    c. The membrane potential would be unaffected.
    d. The answer depends on the thermodynamic potential.

5. Between action potentials, a potential difference called the resting potential exists across the neuron cell membrane. All of the following help to establish the resting potential of a neuronal membrane except:
    a. Selective permeability of the cell membrane
    b. The Na+/K+ pump
    c. **The Na+ voltage gated channels**
    d. The electrochemical gradient of multiple ions

1. *Clostridium* botulinum is a bacterium that produces such a long lasting and powerful "neuromuscular junction neurotoxin" that it can kill people who ingest contaminated food. Today, in our bizarre world, people willingly sign up for "Botox injections" to relax face wrinkles and frown lines. It is likely that "Botox" works:
    a. To prevent the release of acetylcholine into the synapse
    b. To activate the voltage-gated sodium channels on the post-synaptic membrane
    c. To enhance the release of acetylcholine from the presynaptic membrane
    d. To inhibit the activity of the acetylcholinesterase
    e. To release Ca++ from the sarcoplasmic reticulum

2. It was recently announced that a researcher at Columbia had found a drug that prevents Ca++ ions from leaking out of skeletal muscle cells via a membrane protein. A drug company thinks that this may be a moneymaker for them. What practical effect do you think this drug could have?
    a. It would help relieve the symptoms of anemia
    b. **It would allow soldiers and athletes to work longer**
    c. It would be a therapy for heart disease
    d. It would help reduce the risk of inappropriate clot formation in the limbs
    e. It would prevent inappropriate muscle contraction

1. Which gas directly contributes to the maintenance of the normal pH in body fluids?
   a. CO2
   b. O2
   c. H2
   d. N2
   e. CO

2. To a patient you have prescribed a course of antibiotics for several weeks because of a long-term infection. Now this patient has turned up in your office complaining that he bleeds easily, even showing signs of anemia. Why? The antibiotics may have:
   a. have selected resistant bacteria in the body
   b. enhanced perforin production by killer T cells
   c. inhibited vitamin-producing gut bacteria
   d. interfered with heme incorporation into the hemoglobin
   e. interfered with B cell function

3. The mother of Senior Rambo, the llama, lived at the top of a high mountain where the atmospheric pressure was only half its normal value of 760 mmHg. Which of the following values best approximates the partial pressure of oxygen at this altitude?
   a. 760 mm Hg
   b. 0 mm Hg
   c. 80 mm Hg
   d. 380 mm Hg
   e. 160 mm Hg

1. Hormone Boagiden produces an effect on target cells via the cAMP second messenger system. If you exposed a target cell to only a single molecule, which one of the following would produce the greatest effect?
   a. A molecule of activated, cAMP-dependent protein kinase injected into the cytoplasm of the cell.
   b. A molecule of cAMP injected into the cytoplasm of the cell.
   c. A molecule of cAMP applied to the extracellular fluid surrounding the cell.
   d. A molecule of Boagiden applied to the extracellular fluid surrounding the cell.
   e. A molecule of Boagiden injected into the cytoplasm of the cell.

2. This type of hormone characteristically requires a second messenger.
   a. Prostaglandin
   b. Lipid-soluble
   c. Steroid
   d. Water-soluble

1. You have just been bitten by a scorpion that produces a peptide toxin that blocks the cystic fibrosis transmembrane conductance regulator. Since you obtained an A in

Biology 103, you know just what to do. You quickly call 911 and ask them to send an ambulance and a syringe loaded with one item that could save your life. It is:

a. Complement
b. A vaccination for this scorpion toxin
c. Perforin
b. Antibodies to the peptide
c. Interleukin

2. If a disease attacked this type of white blood cell, a person would no longer be able to mobilize his or her specific defenses.
   a. Plasma cells
   b. B lymphocytes
   c. Cytotoxic T-cells
   d. Helper T cells

3. The eye is a warm, moist environment favored by many harmful bacteria. Nevertheless, eye infections are relatively rare. Why is this?
   a. Tears contain the antibacterial enzyme lysozyme
   b. The eyes are constantly exposed to UV light, which inhibits bacterial growth
   c. The enzyme tearase inhibits bacterial growth
   d. Antibodies, particularily IgM, are secreted in abundance in the tears

4. Ivonna, 15, was exposed to the measles virus 13 days ago but doesn't seem to be getting sick. She was sick from the disease when she was 10, so her body has most likely activated this reaction.
   a. Anabasic
   b. Final response
   c. Secondary response
   d. Primary response

5. A child may be given the vaccine for chickenpox. If the child goes to school and plays with other children who have the chickenpox virus, the vaccinated child will not get sick. Why is this?

a. Vaccines produce a primary response in which memory cells are generated that respond rapidly in a second exposure.
b. Vaccines act like antibiotics, so that any organism in the body will be destroyed before the immune system has to respond.
c. Vaccines introduce a friendly virus into cells so they cannot be infected with a second virus.
d. Vaccines stimulate macrophages to work extra hard to fight infections.

QUIZ 1

CATEGORY A: from the textbook

During a study session about evolution, one of your fellow students remarks, “The giraffe stretched its neck while reaching for higher leaves; its offspring inherited longer necks as a result.” Which response will be most helpful to the student?
A) If the giraffes did not have to compete with each other, longer necks would not have been passed on to the next generation.
B) You are quite right: Those animals that could reach the higher leaves because of exercise also had more energy to produce offspring.
C) Your idea is Lamarkian: traits acquired in the individual lifetime are not transmitted to offspring.
D) Everyone knows that the giraffe got its long neck because one day at the watering hole a crocodile grabbed it by the nose and it got stretched.

Charles Darwin was the first person to propose
A) that evolution occurs.
B) a mechanism for how evolution occurs.
C) that Earth is older than a few thousand years.
D) a mechanism for evolution that was supported by evidence.
E) that population growth can outpace the growth of food resources.

An environmental stress causes some individuals to die based upon body size. Which of the following statements is true if all of the variation between individuals in body size is due to environmental factors?
A) Natural selection will not occur.
B) Evolutionary change will not occur.
C) If the population size is large enough the population will adapt.
D) The population is doomed to extinction because of the lack of genetic variation.
E) Both (A) and (B)

During an individual organism’s lifetime, which of these is most likely to help the organism respond properly to changes in its environment?
A) microevolution
B) change in allele or gene frequency
C) change in gene expression
D) change in average heterozygosity

How did the writings of Thomas Malthus influence Darwin? He realized that …
A) Populations are capable of exponential growth and will outgrow their resources creating a struggle for existence.