

Extra Credit Critical Thinking Questions (2404; Intro to A&P)

Most of the following questions are designed to go a little beyond the specific knowledge you are actually accountable for in this class. You may have to search for additional information to answer some of them. There are textbooks in the library or a number of resources on the web that you can use to find answers to questions not discussed in your text. A few will require only a sentence or two, most will require some elaboration and explanation. On your answer sheet please include subject titles. Use the actual **number** given below for each question, you do not need to write out the question you are answering. The correct answer to each question is worth one point. Any points you receive from answering these questions will contribute toward your total EC points possible. Extra Credit answers are due on the test date covering those topics, they will not be accepted after that. Copying answers from a classmate will get both of you an "F" in the course.

The Human Body, an Orientation

1. When we begin to become dehydrated, we usually become thirsty, which causes us to drink fluids. On the basis of what you now know about control systems, decide whether the thirst sensation is part of a negative or a positive feedback control system and defend your choice.
7. People who are allergic to penicillin or aspirin often wear Medic Alert bracelets or necklaces that note this fact in case they need emergency medical treatment and are unable to communicate. Why would it be important for a person with **situs inversus** to have this noted on a Medic Alert bracelet.

Basic Chemistry & Biochemistry

3. Based on your own body weight, how much of each of the following elements do you have in your body IN GRAMS!!!
 - Oxygen
 - Carbon
 - Calcium
 - Sodium
 - Iodine
 - IronShow your work.
4. Mrs. Roberts, in a diabetic coma, has just been admitted to Noble Hospital. Her blood pH indicates that she is in severe acidosis, and measures are quickly instituted to bring her blood pH back within normal limits. Why, specifically, is severe acidosis dangerous?

Cells and Tissues

1. A "red-hot" bacterial infection of the intestinal tract irritates the intestinal cells and interferes with digestion. Such a condition is often accompanied by diarrhea, which causes loss of body water. On the basis of what you have learned about osmotic water flows, explain why diarrhea may occur.
5. Many athletes work to reduce their body fat to the lowest possible percent. What are some of the functional and structural consequences that could develop if too little body fat were present.

Skin and Body Membranes

2. A model is concerned about a new scar on her abdomen. She tells her surgeon that there is practically no scar from the appendix operation done when she was 16, but this new gallbladder scar is "gross". Her appendectomy scar is small and obliquely located on the inferior abdominal surface - it is very indistinct. By contrast, the gallbladder scar is large and lumpy and runs at right angles to the central axis of the body trunk. Can you explain why the scars are so different?
9. Marie Antoinette's hair supposedly turned white overnight after she heard she would be sent to the guillotine. Explain why you believe or disbelieve this story.

The Skeletal System

3. A babysitter is on trial for the death of a 10-month old infant. The prosecutor contends that the child died as a result of being violently shaken. The defense claims that the child's head became stuck in the slats of his crib and, in trying to twist free, the child broke his neck. The medical examiner testifies that the child died as the result of a compression of the spinal cord between the sixth and seventh cervical vertebrae. The superior articular processes of the seventh cervical vertebra and the inferior articular processes of the sixth cervical vertebra were fractured, and the processes on the right side were laterally displaced, causing the sixth vertebra to slide laterally across the seventh, damaging the spinal cord. On the basis of this evidence, whom do you believe, Why?
6. When a person develops Paget's disease, for unknown reasons the collagen fibers in the bone matrix run randomly in all directions. In addition, there is a reduction in the amount of trabecular bone. What symptoms would you expect to observe and why?

The Muscular System

2. When Eric returned from jogging, he was breathing heavily, sweating profusely, and complained that his legs ached and felt weak. His wife poured him a sports drink and urged him to take it easy until he could "catch his breath." On the basis of what you have learned about muscle energy metabolism, respond to the following questions:
 - Why is Eric breathing heavily?
 - What ATP harvesting pathway have his working muscles been using that leads to such a breathing pattern?
 - What metabolic product(s) might account for his sore muscles and his feeling of muscle weakness?
6. Propose an exercise that would benefit each of the following muscles specifically:
 - biceps brachii
 - triceps brachii
 - deltoid
 - pectoralis major
 - rectus abdominis
 - rectus femoris
 - gastrocnemius

The Nervous System

3. If neurons in the CNS lack centrioles and are unable to divide, how can a person develop brain cancer?
5. In some very severe cases of stomach ulcers, the branches of the vagus nerve that led to the stomach are surgically severed. How would this procedure help control the ulcers?

Special Senses

2. Janie is referred to the eye clinic by her teacher, who suspects a need for glasses. Examination demonstrates that Janie is myopic. Will she need concave or convex lenses? Explain.
12. If a vibrating tuning fork is placed against the mastoid process the vibrations are perceived as sound, even if the external acoustic meatus is plugged. Explain how this happens.

The Endocrine System

2. Johnny, a five year old boy, has been growing by leaps and bounds. His height is 100% above normal for his age group and recently he has been complaining of headaches and vision problems. A CT scan reveals a large pituitary tumor. What hormone is being secreted in excess? What name is given to the condition that Johnny will exhibit if corrective measures are not taken? and, What is the probable cause of his headaches and visual problems?
8. In some cultures eunuchs were responsible for guarding harems (the collective wives of one male). Eunuchs were males who, as boys, were castrated, (i.e., the testes, were removed). Since testosterone is responsible for the sex drive in males, the reason for castration is obvious. As a side effect of this procedure, the eunuchs grew to greater than normal heights. Can you explain why this happened?

The Circulatory System

2. Heather, a newborn baby, needs surgery because she was born with an aorta that arises from the right ventricle and a pulmonary trunk that issues from the left ventricle, a condition called transposition of the great vessels. What are the physiological consequences of this defect?
7. Most of the ATP produced in cardiac muscle is derived from the metabolism of fatty acids. During times of exertion, cardiac muscle cells can also use lactic acid as an energy source. Why would this adaptation be advantageous to cardiac function?

Blood & Hematology

2. A young child is diagnosed as having acute lymphocytic leukemia. Her parents cannot understand why infection is a major problem for Janie when her WBC count is so high. Can you provide an explanation for Janie's parents.
6. Explain, specifically, how liver dysfunction can cause bleeding disorders.

The Lymphatic System

1. Compare and contrast the structure of a lymphatic capillary with that of a blood capillary. Explain

how their structural differences are related to their functional differences.

3. Explain the symptoms that might arise if lymphatic vessels in the legs become blocked. What might cause such a condition?

Body Defenses

2. Mr. James, an 80 year old man, is grumbling about having to receive a flu shot every year. Flu viruses have a high mutation rate which results in the appearance of new proteins on the flu virus' outer covering. How do these factors help to explain the need to get a flu shot each year?
3. An investigator at a crime scene discovers some body fluid on the victim's clothing. The investigator takes a sample and sends it to the crime lab for analysis. On the basis of the analysis of antibodies, could the crime lab determine whether the sample is blood plasma, mucus or semen?

The Respiratory System

3. A patient has an infection in the nasal cavity. Name seven organs or places to which the infection could spread if not treated.
9. You and your A&P instructor are trapped in an overturned ship. To escape you must swim underwater a long distance. You tell your instructor it would be a good idea to hyperventilate before making the escape attempt. Your instructor condescendingly replies, "What good would that do since your alveolar capillaries are already 100% saturated with oxygen?" Assuming you fight the urge to punch him in the nose for his snotty attitude, what would you do and say (based on your knowledge of respiratory physiology)?

The Digestive System

3. Why, specifically, does a vegetarian usually have to be more careful about his/her diet than a person who eats meat?
5. Sometimes a gallstone can move to the pancreatic duct and block or impair the flow of pancreatic juices, thus causing pancreatitis. What symptoms would you expect to see if this occurred?

Nutrition, Metabolism, and Body Temperature Regulation

3. What is meant by "body energy balance" and what happens if the balance is not precise?
8. Jack Keister says he frequently fasts for days at a time to cleanse and rebalance his system. Why could this be a bad idea?

The Urinary System

7. Drinking alcohol increases urine production. What is the mechanism for this fact, what hormone is involved?
15. Mannitol is a sugar that is filtered by the kidney but not reabsorbed. What effect would drinking a

solution of mannitol have on the volume of urine produced. Why?

The Reproductive System

1. A 36 year old mother of four is considering tubal ligation as a means of ensuring that her family gets no larger. She asks the physician if she will become "menopausal" after the surgery. How would you answer her question and explain away her concerns? Explain what a tubal ligation is.
3. Diane has peritonitis (an inflammation of the peritoneum), which her physician says resulted from a urinary tract infection. Why could this situation occur more readily in females than in males?

Human Development

1. *Oligohydramnios* is an abnormally low volume of amniotic fluid. Renal agenesis is a failure of the fetal kidneys to develop. Which of these do you think is most likely to cause the other? Explain why. What could be some consequences of oligohydramnios to fetal development?
2. Martha is showing a sonogram of her unborn baby to her coworkers. Her friend Betty tells her she shouldn't have sonograms made because X-rays can cause birth defects. Is Betty's concern justified? Explain.