

# READ THE DIRECTIONS

**BIOLOGY: A HUMAN APPROACH EXAMINATION I** NAME \_\_\_\_\_

**EBIO 1040, SECS. #0001 & #0002**

**19 February 2007**

**INSTRUCTIONS:** Use a **SOFT-LEAD** pencil (#1 or #2) for writing in and mark-sensing your name, CU I.D. number, lecture section and answers on the exam answer sheet, erasing completely when necessary. For the lecture section, use either 0001 or 0002 in the “1,2,3,4” slot on the top left of the sheet. An answer key and test scores will be posted in the glass cabinet at the foot of the stairway in Ramaley across from room **N1B54 (=N.E. corner basement)**, hopefully, by Wednesday noon. Be sure to guess any time you don’t know an answer. There are no deliberately tricky questions, so if something doesn’t make sense to you, ask one of the proctors. On the bottom of your **answer sheet** you may defend your answer to any question you feel is ambiguous, but you must **FIRST** mark-sense your best guess among the choices. To ensure your not running out of time, complete the entire exam before defending a specific answer. Expect to have the equivalent of one question deducted from your exam score if you are **not** taking the exam in the proper location!

You are **not** to use any iPods, computers of any type or cell phones during the exam. Your cell phone is to be turned off and if you must wear a hat, turn the bill to the back. There cannot be any ear phones, ear pieces, *etc.*, in or around your ears at any time. Any answers you have put on your answer sheet or exam are to be covered in such a way that no one can see them.

---

**STOP – MAKE SURE YOU ARE SITTING IN THE PROPER LECTURE HALL.**

**The 9:30 a.m. TR LECTURE SESSION should be in CHEM 142 = Sec. #0001**

**The 12:30 p.m. TR LECTURE SESSION should be in CHEM 140 = Sec. #0002**

**KEEP YOUR ANSWERS AND ANSWER SHEET COVERED AT ALL TIMES.**

- Which of the following organisms would be **best** adapted to spending its life in cold, alpine regions or in the northern latitudes?
  - Hoofed mammals with long legs
  - Large mammals with small appendages
  - Small mammals with long appendages
  - Slender mammals with large surface areas relative to their volumes
  - Arctic terns (small birds)
- Jackrabbits’ ears, red blood cells, capillary beds, whales, and alveoli (air sacs in the lungs) all provide examples of:
  - The continuity of life
  - Homeostasis
  - Adaptive surface-to-volume ratios
  - Negative feedback systems
  - None of the above
- One of the main **disadvantages** of being an **endotherm** is the need for:
  - Fat
  - Sweat glands
  - Hair
  - The large amount of food it needs
  - High blood pressure

4. **Counter-current heat exchange** helps maintain a constant internal body temperature through all of the following **EXCEPT**:
- A. Heat exchange between artery and vein
  - B. Lowering the temperature of extremities to prevent heat loss
  - C. Sacrificing warmth of extremities to maintain core temperature
  - D. Shifting blood away from the body surface into the deep tissues
  - E. Warming blood returning to the heart from the extremities
5. The high-pressure, closed, double circulatory system of mammals and birds is advantageous in:
- A. Maintaining a high metabolic rate
  - B. Maintaining a constant body temperature
  - C. Maintaining a high level of physical activity
  - D. All of the above
  - E. None of the above
6. Endotherms exhibiting a large surface relative to their volume generally display a:
- A. Greater metabolic rate
  - B. Lower metabolic rate
  - C. Smaller body size than endotherms with a low surface-to-volume ratio
  - D. Larger body size than endotherms with a low surface-to-volume ratio
  - E. Both A and C above
7. Design a mammal adapted for life in a **cold** climate by choosing the best body plan for size, shape and appendages:
- A. Large size, spherical shape, long ears
  - B. Large size, elongate shape, short ears
  - C. Large size, spherical shape, short ears
  - D. Small size, elongate shape, long ears
  - E. Small size, spherical shape, small ears
8. Which statement is **FALSE**?
- A. Basically, insulation equals thickness.
  - B. The sinking of the British ship, *Ladonia*, in 1963 caused us to realize the dangers of hypothermia.
  - C. Prime, northern, grey goose down is one of the best insulators.
  - D. In wet conditions, wool insulates better than cotton.
  - E. Most down marketed today in the U.S. comes from Asia.
9. As the surface-to-volume ratio of a warm-blooded animal in a cold environments **increases**:
- A. Heat loss increases (per gram of body weight).
  - B. Heat loss decreases (per gram of body weight).
  - C. Cooling efficiency decreases.
  - D. Neither heat loss nor cooling efficiency is affected.
  - E. Metabolism decreases (per gram of body weight).

10. Which of the following is an adaptation of endothermy in cold climates?
- High surface-to-volume ratios
  - Positive feedback control mechanisms
  - Counter-current heat exchange mechanisms
  - Open circulatory systems
  - Integument (skin) covered with scales
11. Fat (blubber) is a better insulating material in whales than in terrestrial mammals because:
- The vast size of whales enables them to carry a huge load without excessive energy expenditure.
  - Whales have more predators; blubber can protect them from serious injury when attacked.
  - Fat thickness is more variable on a short-term basis.
  - Undersea water pressures reduce the thickness of trapped air by hair or fur.
  - Both C and D are correct.
12. Which of the following statements is **FALSE**? During hibernation:
- The thermostat's set point will remain above freezing.
  - The overall metabolic processes may be reduced by 20 times or more.
  - The animal tends not to age as it does when it is active.
  - The animal can conserve large amounts of energy at a time when food is otherwise hard to obtain.
  - The hibernating chamber (or nest) generally stays constant at about 29-30 degrees F.
13. Insulin causes a decrease in the amount of sugar in the blood, and the decrease in blood sugar causes a decrease in insulin secretion. This is an example of:
- Bergmann's rule
  - Positive feedback
  - Chemical inhibition
  - Negative feedback
  - Hypothalamic inhibition
14. Which of the following is/are involved in temperature regulation in the human body?
- Negative feedback control
  - Positive feedback control
  - The hypothalamus
  - Both A and C
  - Both B and C
15. A person suffering from **heat stroke** (hyperthermia):
- Will typically sweat profusely
  - Will be losing large amounts of body fluids and salts
  - Will have an abnormally high body temperature
  - Is not in a life-threatening situation.
  - All of the above
16. If one suffers from heat exhaustion:
- His/her "thermostat" is set too high.
  - His/her "thermostat" is set too low.
  - The medulla oblongata is functioning improperly.
  - There is a salt and/or water imbalance.
  - He/she has probably been lying on a hot beach too long.

17. Disorientation, poor judgment and irrational behavior could be symptoms of all of the following **EXCEPT**:
- A. Hypothermia
  - B. Exposure to very high altitudes
  - C. Heat stroke
  - D. Drunkenness (from alcohol)
  - E. Cardiovascular overload
18. Wearing layers of wool clothing (rather than cotton) when hiking or skiing is a good step toward preventing hypothermia for all of the following reasons **EXCEPT**:
- A. Wool provides some insulation when it is wet.
  - B. Layers trap air which provides more insulation.
  - C. Sweating is minimized while wearing wool.
  - D. Layers can be shed one at a time to reduce sweating.
  - E. Cotton loses most of its insulating capacity when it is wet.
19. Symptoms of hypothermia include all of the following **EXCEPT**:
- A. Shivering during the early stages
  - B. Irrational behavior
  - C. Loss of coordination
  - D. Continuous nasal drainage
  - E. The extreme feeling of cold
20. In-vitro fertilizations using frozen embryos has resulted in:
- A. Lower than normal birth weights
  - B. Lower than normal metabolic rates
  - C. Delayed birth dates
  - D. No identifiable changes at birth
  - E. Higher than normal metabolic rates
21. The **hematocrit** is defined as the:
- A. Plasma portion of the blood
  - B. Plasma portion minus the cellular portion of the blood
  - C. Number of red blood cells in a milliliter of blood
  - D. Total number of all cells in a milliliter of blood
  - E. Percent of the cellular component of the blood
22. Platelets:
- A. Contain a clotting enzyme
  - B. If in excess can cause leukemia
  - C. Release a vasoconstrictor when damaged
  - D. Are larger than red blood cells
  - E. More than one of the above
23. Which of the following statements about circulatory fluid is **FALSE**?
- A. Blood is composed of cells (RBCs, WBCs, + platelets) and plasma.
  - B. Plasma is about 92% H<sub>2</sub>O; 1% salts, nutrients, and wastes; and 7% proteins.
  - C. White blood cells are **not** confined to the cardiovascular system, but can get out.
  - D. Large plasma proteins freely move between the plasma and the lymph.
  - E. Red blood cells are larger than the platelets.
24. White blood cells:
- A. Are smaller than red blood cells
  - B. Outnumber red blood cells by about 700 to 1
  - C. Are variable in size and shape and function
  - D. Always stay inside blood vessels
  - E. Unlike red blood cells, do not have nuclei

25. Regarding the circulatory system, which of the following is **FALSE**?
- Some veins carry oxygenated blood.
  - Valves in the major arteries keep blood flowing in the proper direction.
  - Movement of the body organs and muscles is helpful in returning blood to the heart through the veins.
  - Blood velocity in capillaries is much less than blood velocity in veins and arteries.
  - There is not enough blood in the body to fill all the blood vessels at the same time.
26. Which statement concerning the cardiovascular system is **FALSE**?
- The arteriole is the last branch before reaching the capillaries.
  - The diameter of the arteriole can change drastically.
  - The medulla of the brain can influence blood flow.
  - The heartbeat originates in the medulla oblongata.
  - Coronary arteries branch off the aorta and supply the heart itself with blood.
27. Which vessel listed below has the highest blood pressure?
- Coronary vein
  - Renal (kidney) artery
  - Hepatic portal (liver) vein
  - Any capillary
  - Pulmonary vein
28. The blood vessel or heart chamber with the **highest** oxygen concentration in an adult human is the:
- Jugular (neck) vein
  - Pulmonary artery
  - Pulmonary vein
  - Right ventricle
  - Right atrium
29. Fluid flow in the body is aided and directed by valves located in:
- Veins
  - Arteries
  - Lymph vessels
  - Arterioles
  - More than one of the above
30. Which is **not** true about the lymphatic system?
- The vessels are thin walled like veins.
  - There is no pump.
  - The flow of lymph is about as fast as in the veins.
  - Lymph originates by fluid leaking out of the capillaries.
  - Lymph empties into the large veins near the heart.
31. **Elephantiasis** is a condition directly affecting the:
- Lymph nodes
  - Lymph valves
  - Lymph veins
  - Lymph capillaries
  - More than one of the above
32. Heart murmurs are caused by:
- Incomplete closure of heart valves
  - Poor pulmonary circulation
  - Atherosclerosis
  - Faulty coronary artery circulation
  - Pacemaker malfunction

33. Swelling of the body tissues due to a low concentration of blood protein is:
- A. Anemia
  - B. Hemophilia
  - C. Leukemia
  - D. Edema
  - E. Lymphocytis
34. Where does the heartbeat **originate**?
- A. Medulla oblongata
  - B. The heart muscle itself
  - C. The hypothalamus of the brain
  - D. Cardiovascular control center
  - E. More than one of the above is correct.
35. Which of the following represents an **incorrect** association?
- A. Blue baby—incomplete heart valve (window) closure
  - B. Fibrillation—pacemaker stops sending impulses
  - C. Angina—coronary artery constriction
  - D. Myocardial infarction—a type of heart attack
  - E. Atherosclerosis—a major contributor to death in the U.S.
36. A “lub-dub-swish” heart sound indicates a problem with the:
- A. Pacemaker
  - B. Coronary arteries
  - C. Valves between the atria and ventricles
  - D. Valves as the blood leaves the ventricles
  - E. Pulmonary aorta
37. Which of the following is a **FALSE** pairing?
- A. Edema: loss of blood fluid to tissues
  - B. Coronary artery constriction: angina
  - C. Leukemia: high white blood cell count
  - D. Cerebral thrombosis: heart attack
  - E. Anemia: low red blood cell count
38. Which of the following does **not** lead to atherosclerosis?
- A. High blood cholesterol levels
  - B. Diabetes
  - C. High estrogen levels
  - D. Smoking
  - E. Stress
39. Which of the following would **not** be a stroke symptom?
- A. Difficulty in saying some word combinations.
  - B. Difficulty with balance in climbing stairs.
  - C. Difficulty in stopping the bleeding in a scalp wound.
  - D. Loss of feeling in the right hand.
  - E. Loss of ability to move two fingers.
40. Hypertension/high blood pressure (BP) is associated with all of the following **EXCEPT**:
- A. Decreased risk of edema.
  - B. Increased risk of blood clotting.
  - C. Increased risk of atherosclerosis.
  - D. Increased risk of aneurisms.
  - E. 20% of 60 yr. olds in US w/hi BP