Chapter 01: Functional Organization of the Human Body and Control of the "Internal Environment"

Hall: Guyton and Hall Textbook of Medical Physiology, 15th Edition

Test Bank

MULTIPLE CHOICE

1. Which of the following statements is incorrect?

a. Positive feedback usually promotes a change and may be associated with vicious cycles and progressive disease.
b. Some positive feedback systems may be useful and part of an overall negative feedback process.
c. Some physiological variables such as blood pressure, cardiac output, blood cortisol concentration, and metabolic rate change significantly throughout the day in healthy persons.
d. In most diseases, homeostatic mechanisms are completely inoperative.
e. In many diseases, the body's compensatory mechanisms may lead to deviations from the normal range in some body functions.

ANS: D

2. If the feedback gain of a control system is -3.0, this means that the system is
a. A negative feedback system capable of correcting 1/3 of the initial disturbance to the system
b. A negative feedback system capable of correcting 2/3 of the initial disturbance to the system
c. A negative feedback system capable of correcting 3/4 of the initial disturbance to the system
d. A positive feedback system that exacerbates the initial disturbance to the system by 33%
e. A positive feedback system that exacerbates the initial disturbance to the system by 75%
f. A positive feedback system that exacerbates the initial disturbance to the system by 3-fold

ANS: C

3. Which of the following statements about homeostasis is incorrect?

a. It refers to the maintenance of a stable internal environment for the body.
b. Homeostatic mechanisms do not operate in diseases.
c. Homeostasis requires integrated actions of the cells, tissues, organs, and multiple nervous, hormonal, and local control systems.
d. Homeostatic compensations that begin after a major environmental challenge may contribute to abnormalities of body function.

ANS: B

4. What is the most abundant type of cell in the human body?

a. Neuron
b. Epithelial cell
c. Red blood cell
d. White blood cell
e. Vascular smooth muscle cell
f. Skeletal muscle cell

ANS: C

5. The most abundant substance in the human body and the approximate percentage of that substance in the body is which of the following?

a. Protein, 30%
b. Protein, 60%
c. Water, 30%
d. Water, 60%
e. Carbohydrate, 30%
f. Carbohydrate, 60%

ANS: D

6. Which of the following substances has the highest extracellular fluid to intracellular fluid concentration ratio for most mammalian cells?

a. Sodium ions
b. Potassium ions
c. Carbon dioxide
d. Glucose
e. Protein

ANS: A

7. Exchange of substances between the cardiovascular system and the interstitial fluid occurs mainly in which of the following?

a. Arteries
b. Arterioles
c. Capillaries
d. Venules
e. Veins

ANS: C

8. When a person is at rest, how much time is required for the blood in the circulation to traverse the entire circulatory circuit?

a. 1 second
b. 1 minute
c. 3 minutes
d. 4 minutes
e. 5 minutes

ANS: B

9. A 60-year old man is admitted to the intensive care unit, in shock and unconscious with a mean arterial pressure is 35 mmHg, following a farming accident in which his femoral artery was severed. His estimated blood loss was over 2.5 liters. Despite rapid infusion of 2.5 liters of blood, his blood pressure, after an initial increase to 60 mmHg, continued to decline. Which of the following statements is most likely to be true regarding his continued decline in blood pressure?

a. The severe hemorrhage led to impaired cardiac function that, in turn, created a *negative feedback* that caused further reduction of blood pressure.
b. The severe hemorrhage led to impaired cardiac function that, in turn, created a *positive feedback* that caused further reduction of blood pressure.
c. The continued decline of blood pressure is an example of feed-forward control by the cardiopulmonary reflexes
d. Transfusion of additional blood (more than 2.5 liters) would likely return his blood pressure to normal and lead to full recovery

ANS: B

10. Which of the following is an example of positive feedback in the body?

a. Return of blood pressure toward normal after a hemorrhage
b. Generation of action potentials in nerves
c. Increased respiration rate caused by accumulation of carbon dioxide in the blood
d. Decreased sympathetic nervous system activity that occurs in response to increased blood pressure

ANS: B

11. Which of the following statements is incorrect?

a. Trillions of microorganisms normally inhabit the body.
b. Microorganisms of the body normally live in harmony with their human hosts.

c. Homeostasis is a static process.
d. Sexual dimorphism is a term that describes two distinct and non-overlapping traits of males and females from the same species.
e. Some physiological variables show wide variation among different individuals who are healthy.

ANS: C

12. Which of the following is an example of a “feed-forward” control system?

a. The arterial baroreceptor system
b. The progressive nature of uterine contractions during childbirth
c. Control of skeletal muscle movements by the brain
d. Generation of an action potential

ANS: C

13. Which of the following is an example of negative feedback?

Example 1: Arterial baroreceptor control of blood pressure
Example 2: Excitation of the respiratory center by increased blood carbon dioxide concentration
Example 3: Hemorrhagic shock caused by severe blood loss

a. Example 1 only
b. Example 2 only
c. Example 3 only
d. Examples 1 and 2, but not 3
e. Examples 1, 2, and 3

ANS: D