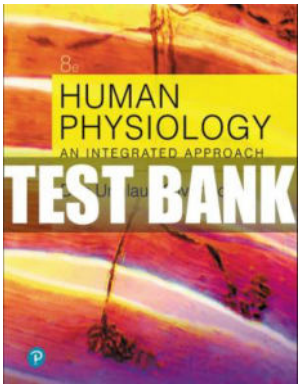

Human Physiology: An Integrated Approach, 8e (Silverthorn)Chapter 1 Introduction to Physiology

1) Physiology is the study of
A) the structure of the body.
B) the tissues and organs of the body at the microscopic level.
C) growth and reproduction.
D) the normal functions of the organ systems.
E) the facial features as an indication of personality.
: D
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

2) The literal meaning of the term physiology is knowledge of
A) organs.
B) nature.
C) science.
D) chemistry.
E) math.
: B
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

3) Because anatomy and physiology have different definitions, they are usually considered separately in studies of the body.
A) True
B) False
: B
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

4) The following is a list of several levels of organization that make up the human body.

1. tissue
2. cell
3. organ
4. molecule

5. organism
6. organ system
The correct order from the smallest to the largest is
A) 2, 4, 1, 3, 6, 5.
B) 4, 2, 1, 6, 3, 5.
C) 4, 2, 1, 3, 6, 5.
D) 4, 2, 3, 1, 6, 5.
E) 6, 4, 5, 2, 3, 1.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.1
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

5) "Glucose is transported from blood into cells because cells require glucose to meet their energy needs." This type of explanation is
A) mechanistic.
B) theological.
C) teleological.
D) metalogical.
E) scatological.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.4
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

6) "Glucose is transported from blood into cells by transporters in response to insulin." This type of explanation is
A) mechanistic.
B) theological.
C) teleological.
D) metalogical.
E) scatological.
: A
Section Title: The Science of Physiology
Learning Outcome: 1.4
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

7) Which of the following is a buffer zone between the outside world and most of the cells of the body?
A) blood

B) lumen
C) lymph
D) extracellular fluid
E) All of the answers are correct.
: D
Section Title: Homeostasis
Learning Outcome: 1.6
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Comprehension)

8) Which of the following is one of Cannon's "internal secretions"?
A) hormones
B) nutrients
C) water
D) inorganic ions
E) None of the answers are correct.
: A
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

9) The study of body function in a disease state is
A) necrology.
B) physiology.
C) microbiology.
D) pathophysiology.
E) histology.
: D
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

10) Homeostasis is the ability of the body to
A) prevent the external environment from changing.
B) prevent the internal environment from changing.
C) quickly restore changed conditions to normal.
D) ignore external stimuli to remain in a state of rest.
E) prevent excessive blood loss.

: C
Section Title: The Science of Physiology
Learning Outcome: 1.6
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

11) Oxytocin is a hormone that is released in response to cervical dilation. It in turn causes more uterine contractions that will further dilate the cervix. What type of feedback loop does oxytocin trigger?
A) negative feedback
B) positive feedback
C) local control
D) nociceptive feedback
: B
Section Title: Homeostasis
Learning Outcome: 1.6
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Comprehension)

12) How genetics influences the body's response to drugs is called
A) pharmacokinetics.
B) pharmacogenetics.
C) pharmacogenomics.
D) pharmacodynamics.
E) pharmageddon.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

13) A physician basing clinical decisions on primary research published in biomedical literature is doing_____medicine.
A) evidence-based
B) traditional
C) alternative
D) whimsical
E) holistic
: A
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <

: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Comprehension)

14) A study in which a participant acts as an experimental subject in part of the experiment and a control in another part of the experiment is called what?
A) double-blind study
B) crossover study
C) meta-analysis study
D) retrospective study
: B
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

15) The Internet database for molecular, cellular, and physiological information is called the_____Project.
A) Human Genome
B) Physiognomy
C) Physiosome
D) Physiome
E) Manhattan
: D
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

16) A placebo is
A) any drug being tested in a clinical trial.
B) any drug in a class of drugs commonly used as pain relievers.
C) a drug or treatment that is expected to have no pharmacological effect.
D) a nutritive and respiratory organ in fetal development.
E) a hole in a cavity wall through which an organ protrudes.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

17) A technique used to resolve contradictory results in scientific studies

is
A) meta-analysis.
B) retrospective analysis.
C) prospective analysis.
D) cross-sectional analysis.
E) longitudinal analysis.
: A
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

18) A scientifically logical guess is a
A) model.
B) theory.
C) hypothesis.
D) law.
E) variable.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

19) If a scientific opinion has been verified repeatedly, it becomes a
A) model.
B) theory.
C) hypothesis.
D) law.
E) variable.
: D
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪<
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

20) Place these terms in the typical sequence in which they appear in the scientific process: experimental data, theory, model, observation, hypothesis, replication.
A) experimental data, theory, model, observation, hypothesis, replication
B) replication, hypothesis, experimental data, theory, model, observation
C) theory, observation, experimental data, hypothesis, replication, model

D) observation, replication, model, experimental data, hypothesis, theory
E) observation, hypothesis, experimental data, replication, model, theory
: E
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Comprehension)

21) You are interested in learning more about Parkinson's disease, a neurological disorder that primarily affects motor function. What is the best source to begin your investigation?
A) Google
B) PubMed
C) public library
D) physiology textbook
E) a physician
: B
Section Title: The Science of Physiology
Learning Outcome: 1.11
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

Match the level of organization with its definition below.

A. a collection of similar cells that carry out similar functions
B. the smallest living unit
C. a collection of different tissues that carry out related functions
D. groups of organs functioning in a coordinated manner

22) cell
: B
Section Title: The Science of Physiology
Learning Outcome: 1.1
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

23) tissue
: A
Section Title: The Science of Physiology
Learning Outcome: 1.1
▪ <

: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

24) organs
: C
Section Title: The Science of Physiology
Learning Outcome: 1.1
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

25) organ systems
: D
Section Title: The Science of Physiology
Learning Outcome: 1.1
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

26) What is a nocebo effect?
: It is the phenomenon whereby a patient who has been informed of the side effects of a drug he is taking is more likely to experience some of the side effects than an otherwise similar patient receiving the same drug who has not been so informed.
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

27) List the key concepts or themes in physiology.
: See Table 1.2 in the chapter.
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level I: Reviewing Facts and Terms (Bloom's Taxonomy: Knowledge)

28) Adaptive significance is an important concept in physiology because it describes
A) the importance of a highly variable external environment.
B) the physiological functions that promote an organism's survival.
C) the ability of an organism to monitor and restore its internal state to normal conditions when necessary.
D) the similarities between ancient and modern marine organisms.
E) the parameters necessary to maintain a constant internal environment.

: B
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Comprehension)

29) You conduct an experiment on twenty 18-year-old male subjects to see how various intensities of exercise influence heart rate. Which of the following is/are considered an independent variable?
A) age of subjects
B) sex of subjects
C) intensity of exercise
D) heart rate
E) More than one of the answers is correct.
: C
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Comprehension)

30) You conduct an experiment on twenty 18-year-old male subjects to see how various intensities of exercise influence heart rate. Which of the following is/are considered a dependent variable?
A) age of subjects
B) sex of subjects
C) intensity of exercise
D) heart rate
E) More than one of the answers is correct.
: D
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Comprehension)

31) Why are physiology and anatomy frequently studied together?
: This is discussed in the "Physiology Is an Integrative Science" section of the chapter.
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

32) You want to display data on the finish times of the 10 fastest race

horses in a single race at the Kentucky Derby.

What type of graph would be best to display this information?
A) bar graph
B) line graph
C) scatter plot
: A
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

33) What would the labels be for the graph axes?
: The x-axis is horse name or number; the y-axis is finish time in minutes.
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

34) A horse runs 10 races, each a mile long, during a 6-month period, and you are interested in determining if the horse's race time changes with experience. You set up a graph to display the race finish times of this horse.

What type of graph would be best to display the race finish times of this horse?
A) bar graph
B) line graph
C) scatter plot
: B
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Evaluation)

35) What would the labels be for the graph axes?
: The x-axis is race number or date; the y-axis is finish time in minutes.
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

36) There are 10 cloned horses, born on the same day, with identical chromosomes. They are each subjected to the same physical training regimen, but given daily injections of different concentrations of a particular vitamin. They all run the same race. You set up a graph to explore a relationship between race finish time and vitamin dose.

Which type of graph is best to explore a relationship between race finish time and vitamin dose?
A) bar graph
B) line graph
C) scatter plot
: C
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Evaluation)

37) What are the labels for the graph axes?
: The x-axis is vitamin dose; the y-axis is finish time in minutes.
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

38) What is the difference between a peer-reviewed article and a review article?
: A peer-reviewed article describes original research by one author (or group of authors working together) that has gone through a screening process in which a panel of qualified scientists evaluate the work. A review article is a summary (usually a collection of published research that was previously peer-reviewed, usually from more than one independent lab) that discusses a particular topic in the field.
Section Title: The Science of Physiology
Learning Outcome: 1.11
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Comprehension)

39) What is the major problem with the deconstructionist view of biology?
: Return to the topic of function and process. The deconstructionist view of biology predicted that once we uncovered the sequence of the human genome, the inner workings of the human body would be revealed. In reality, it is possible to know how a gene codes for a particular protein

without knowing why that protein exists. Our knowledge of the human genome is only a piece of the puzzle.
Section Title: The Science of Physiology
Learning Outcome: 1.4
▪<
: Level II: Reviewing Concepts (Bloom's Taxonomy: Synthesis)

40) Seasonal Affective Depressive Disorder or SADD is a condition commonly seen in Northern climates of the United States and Canada and it may be due to a decrease in the amount of sunlight they receive during winter months. How is this condition related to biological rhythms and what process is not being compensated for well enough?
: The change in exposure to sunlight may affect the release of a hormone from the pineal gland known as melatonin. Also, it can drastically lower the amount of vitamin D the skin is making from exposure to ultraviolet light. The body of some individuals does not change its patterns during the winter months, so they do not acclimatize as well as they should and develop signs and symptoms of SADD.
Section Title: Control Systems and Homeostasis
Learning Outcome: 1.6
▪<
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

41) Why is it necessary to label the axes of a graph?
: A graph with no axis labels is meaningless-without knowing what trend is being illustrated, there is no communication of scientific information.
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪<
: Level II: Reviewing Concepts (Bloom's Taxonomy: Comprehension)

42) Why is it necessary to space grid marks on a graph proportionally to the quantity measured (example: each square represents one centimeter)?
: If this is not done, a trend would be obscured or even misrepresented.
Section Title: The Science of Physiology
Learning Outcome: 1.12
▪<
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

43) Explain why the prefix homeo- is used in the term homeostasis. Why do some physiologists prefer the term homeodynamics over homeostasis?

: The prefix homeo-, meaning like or similar, is used to indicate that the body's internal environment is maintained within a range of acceptable values rather than a fixed state. Some physiologists argue that the term homeodynamics better reflects the small but constant changes that continuously take place in the internal environment, as opposed to homeostasis, which erroneously implies lack of change.
Section Title: The Science of Physiology
Learning Outcome: 1.6

: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

44) Explain why animals are used in research. Are there any limitations to the application of animal data to human physiology? Could these limitations be addressed using cell or tissue culture, or computer simulations?
: (Note to instructor: This may be a good question to ask early in the semester, then again toward the end, after the organ systems have been covered.) There is a brief discussion of using humans or animals in research in the chapter. This question is intended to stimulate students to think about how science is done, how data are generated, and how the process is challenged by social issues. Generally, there are limitations to the usefulness of computer simulations and cell/tissue culture systems for the same reason that nonhuman animal data are not 100% applicable to human physiology. How human organ systems perform may be different in very subtle ways from corresponding systems in other species. Cells in culture are in an artificial environment, and while much has been learned from such systems, it has also been noted that the behavior of cells in culture is not identical to cells in a living body. Furthermore, cells cultured from established lines can change over time, becoming less like the original cells from which they were derived, and presumably less like normal cells. Computer simulations are valuable, but are only as good as the data entered, and given that we don't know everything there is to know about physiology, we can't write a perfect computer program. All three approaches are useful, but for different reasons, and therefore one research system does not completely substitute for another, nor is it appropriate to abandon one entirely.
Section Title: The Science of Physiology
Learning Outcome: 1.10

: Level II: Reviewing Concepts (Bloom's Taxonomy: Analysis)

45) You conduct an experiment on twenty 18-year-old male subjects to

see how various levels of exercise influence heart rate. Explain why only 18-year-old males were used as subjects.
: An important part of scientific inquiry is to remove sources of variation from among subjects. By choosing subjects of one gender in a particular age group, it is easier to determine that the dependent variable (heart rate, in this case) depends only on the independent variable, level of exercise. This also allows a study to have fewer participants, assuming that subjects were randomly assigned to a level of exercise. If subjects were of random ages and genders, data would have to be collected from many more individuals.
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level II: Reviewing Concepts (Bloom's Taxonomy: Application)

46) Design a concept map on scientific experimental design.
: Variable. It is recommended that the instructor create a map before evaluating the students' maps, and modify the instructor map as necessary.
Section Title: The Science of Physiology
Learning Outcome: 1.3
▪ <
: Level III: Problem Solving (Bloom's Taxonomy: Synthesis)
47) Provide an example of a control system. Be sure to include the three main components: an input signal, a controller, and an output signal.
: Variable. One example is blood glucose concentration. The input signal is a blood glucose concentration outside of the normal range, the controller is the pancreas, and the output signal is release of either insulin or glucagon.
Section Title: Control Systems and Homeostasis
Learning Outcome: 1.7
▪ <
: Level III: Problem Solving (Bloom's Taxonomy: Synthesis)

48) Write a teleological explanation for why heart rate increases during exercise. Now write a mechanistic explanation for the same phenomenon.
: Teleological: Heart rate increases because the increased activity of skeletal and cardiac muscles requires increased delivery of blood contents such as oxygen and glucose. Mechanistic: Heart rate increases in response to signals from the brain (pacemaker cells of the heart are stimulated by the nervous system).

Section Title: Control Systems and Homeostasis
Learning Outcome: 1.4
▪ <
: Level III: Problem Solving (Bloom's Taxonomy: Synthesis)

49) What is a hypothesis? What are the steps involved in following the scientific method? How does one distinguish the dependent variable from the independent variable in an experiment? How are each of these represented on a graph?
: This is discussed in "The Science of Physiology" section of the chapter and in Figure 1.7.
Section Title: The Science of Physiology
Learning Outcome: 1.5
▪ <
: Level III: Problem Solving (Bloom's Taxonomy: Analysis)

50) You are designing a study to assess the effects of a new treatment for hypertension. What ethical considerations would you employ when monitoring your progress?
: Major considerations should involve assessing the efficacy of the treatment such that the control group patients are not deprived as well as ensuring that the experimental treatment is not less effective than the standard treatments.
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <
: Level III: Problem Solving (Bloom's Taxonomy: Analysis)
51) In your study of a drug's efficacy in treating hypertension, your subjects are white males, ages 40 to 60 years. Is your study applicable to all people? Explain.
: Possibly, but not necessarily. There are gender differences in appropriate therapies because of physiological effects of higher testosterone in males compared to females, for example. Drugs are often not tested in children, and children also have a different hormonal environment than adults (again, sex hormones are a good example, because their levels are low until just before the onset of puberty). There are also racial differences in effectiveness of therapies, and while it is a contentious issue as to whether these represent genetic or socioeconomic influences, they should be considered.
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪ <

: Level III: Problem Solving (Bloom's Taxonomy: Analysis)

52) High cholesterol levels have been known to be a contributing factor to heart disease and death due to cardiovascular disease for many decades. In the 1970's, scientists used this information to develop a hypothesis that giving a medicine to reduce blood cholesterol levels could reduce the chances of developing cardiovascular disease or dying from cardiovascular disease. They tested a group of people living in a town called Framingham, Massachusetts. This study became known as the Framingham Study and it is very well known, because it did not support the hypothesis that giving cholesterol lowering medications would reduce the risk of developing or dying from cardiovascular disease. Does this mean that high cholesterol is not a risk factor for heart disease? What does this demonstrate about the scientific process, especially as it pertains to human studies? You can find a copy of the study online and read it, if necessary.
: This demonstrates the difficulty in doing human research because, even though elevated cholesterol levels are a risk factor for cardiovascular disease, reducing cholesterol levels without addressing the reason those levels were high in the first place may not have the expected effect on reducing heart disease. Human testing on hypotheses is important because humans don't always respond to treatments like other animals do, they may actually respond quite differently and each person may respond differently from the rest. It is why we need to test each hypothesis in circumstances as similar to the actual real group that would be treated.
Section Title: The Science of Physiology
Learning Outcome: 1.10
▪<
: Level III: Problem Solving (Bloom's Taxonomy: Analysis)

Use the table and graph below to answer the following questions.

Table 1.1

Figure 1.1

53) List all of the errors in Figure 1.1.
:
1. The units of concentration are labeled as M when they should be mg.