Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Excretion is a function of the body. Which would be considered excretion? 1) _____
A) Movement of salt from sweat glands to the surface of the skin.
B) Movement of glucose from the kidney to the bloodstream.
C) Movement of sodium from the intestines to the bloodstream.
D) Movement of potassium from kidney cells into one's urine
E) Movement of oxygen from the lungs to the blood stream.

Answer: A
Diff: 1 Type: MC

2) Which system(s) does NOT exchange material with the internal and external environments? 2) _____
A) respiratory system
B) digestive system
C) urinary system
D) circulatory system
E) All of the above.

Answer: D
Diff: 1 Type: MC

3) You conduct an experiment on twenty 18-year-old male subjects to see how various intensities of exercise affect heart rate. Which is/are an independent variable? 3) _____
A) sex of subjects
B) age of subjects
C) intensity of exercise
D) heart rate
E) More than one answer is correct.

Answer: C
Diff: 1 Type: MC

4) Mass balance involves determining the total amount of a substance in the body. We can determine mass flow of this substance by which formula? 4) _____
A) volume of flow / (amount of substance / min)
B) intake + production - excretion - metabolism.
C) (amount of substance / min) × (concentration of the substance)
D) (concentration of a substance) × (volume/min)
E) (concentration of a substance) / volume flow

Answer: D
Diff: 1 Type: MC

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

5) Why do we need to label the axes of a graph? 5) _____

Answer: A graph with no axis labels is meaningless–without knowing what trend is being illustrated, there is no communication of scientific information.
Diff: 1 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

6) The human environment is terrestrial, dry, and highly variable. However, our bodies expend enormous amounts of energy maintaining a constant internal environment. Studying why our bodies do this is what kind of approach? 6) _____

A) teleological
B) meterological
C) mechanistic
D) anatomical
E) translational

Answer: A
Diff: 2 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

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

Heart rates (bpm) of *Sprague-Dawley* rats after administration of various concentrations of epinephrine.

	Heart Rates		
Epinephrine (mg)	**Animal 1**	**Animal 2**	**Animal 3**
50	48	62	55
100	58	67	63
150	67	70	79
200	80	85	93
150	67	70	79

Table 1.1

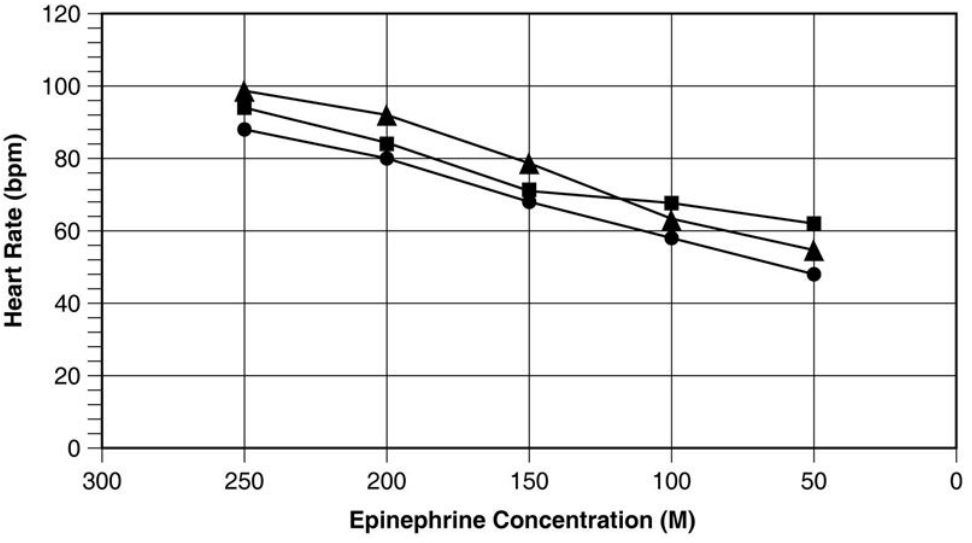

Figure 1.1

7) Why is a line graph to used to show the results of this study?

Answer: Line graphs are commonly used when the independent variable (*x*-axis) is a continuous phenomenon. In this study the concentration of epinephrine is a continuous function. The line allows for interpolation (i.e., estimating values between the measured values).

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

8) A placebo is 8) _____

A) a hole in a cavity wall through which an organ protrudes.
B) a drug or treatment that is expected to have no pharmacological effect.
C) a nutritive and respiratory organ in fetal development.
D) any drug being tested in a clinical trial.
E) any drug in a class of drugs commonly used as pain relievers.

Answer: B

Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

9) What is an example of the deconstructionist view of biology?

Answer: 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.

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

10) You are interested in learning more about Parkinson's disease, a neurological disorder that mainly affects motor function. Which is the best source to begin your investigation? 10) _____

A) Ask.com
B) a physician
C) public library
D) physiology textbook
E) MedlinePlus

Answer: E

Diff: 1 Type: MC

11) The literal meaning of the term *physiology* is knowledge of 11) _____

A) organs. B) math. C) chemistry. D) nature. E) science.

Answer: D

Diff: 1 Type: MC

12) Adaptive significance is an important concept in physiology because it describes the 12) _____

A) parameters necessary to maintain a constant internal environment.
B) ability of an organism to monitor and restore its internal state to normal conditions when necessary.
C) physiological functions that promote an organism's survival.
D) similarities between ancient and modern marine organisms.
E) importance of a highly variable external environment.

Answer: C

Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

13) There are 10 cloned horses, born on the same day, with identical chromosomes. They each follow the same physical training regimen, but are given daily injections of different concentrations of a particular vitamin. They all run the same race. What are the labels for the graph axes?

Answer: The x-axis is vitamin dose; the y-axis is finish time in minutes.

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

14) You conduct an experiment on twenty 18-year-old male subjects to see how various intensities of exercise influence heart rate. Which is/are a dependent variable? 14) _____

A) heart rate
B) age of subjects
C) sex of subjects
D) intensity of exercise
E) More than one of the answers is correct.

Answer: A
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

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

Average systolic blood pressure at various ages for males (M) and females (F).

Age	Average Blood Pressure M	F
10	115	113
20	122	117
30	127	120
40	130	128
50	131	136
60	140	144
70	145	160
80	144	156
90	142	150

Table 1.2

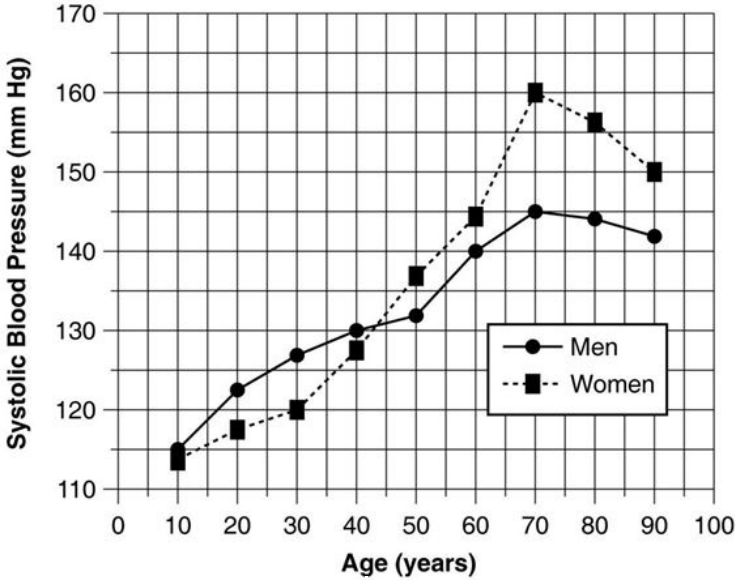

Figure 1.2

15) Summarize the data shown in Figure 1.2.

Answer: The systolic pressure of both genders increases with age. Under age 40, the systolic pressure of males is higher than that of females. After age 40, the systolic pressure of females is higher than that of males. The greatest rate of increase is from ages 50 to 70 in both genders. Blood pressure declines after age 70.

Diff: 2 Type: ES

Following is a table of data collected from one section of an 8 A.M. physiology lab. There were 20 students present, 10 males and 10 females. Information collected included students' height, weight, age, sex, and resting pulse rate. In addition, the students were surveyed to see if they smoked cigarettes, considered themselves "regular exercisers," and if they had consumed caffeine or eaten the morning of the lab. A "y" or "n" (yes or no) was recorded to indicate their answers. Each student did "jumping jacks" for 5 minutes and recorded the time required to return to their resting heart rate, which is listed on the table as "recovery time." Finally, each student's reaction time (in milliseconds) was measured by catching an object dropped by a lab partner according to specified criteria.

Use this table to answer the following questions. Ignore statistical problems caused by small sample size, and so on.

DATA COLLECTED DURING HUMAN PHYSIOLOGY LAB

ID	Ht cm	Wt kgs	AGE YRS	GENDER	SMOKE?	REG EXERCISE?	CAFFEINE?	RESTING PR (BPM)	RECOVERY TIME (Mins)	break fast?	REACTION TIME (MS)
MH	168	75	24	F	N	N	Y	72	5	N	180
JH	175	68	20	F	N	Y	N	108	4	N	201
Su	157	57	27	F	N	Y	N	44	3	N	137
Sa	178	67	22	F	N	N	N	48	7	Y	156
SH	178	61	32	F	N	N	Y	72	4	Y	206
D	170	55	36	F	Y	Y	Y	72	3	Y	232
A	168	57	19	F	Y	Y	N	72	1	Y	146
AN	162	54	20	F	Y	Y	Y	65	2	Y	166
CA	165	57	33	F	Y	N	Y	68	2	N	228
MS	155	55	28	F	Y	N	N	77	4	N	202
AVG	167.5	60.6	26.1					69.8	3.5		185.4
AVG	Values	With	Brkfast	Females				65.8	3.4		181.2
AVG	Values	Without	Brkfast	Females				73.8	3.6		189.6
M	178	92	38	M	N	N	Y	62	4	N	158
P	170	82	33	M	Y	Y	Y	61	4	N	158
G	175	80	23	M	N	Y	N	75	4	N	193
S	175	69	21	M	N	N	N	90	3	N	174
CH	179	82	19	M	N	N	Y	64	1	N	174
GM	184	75	22	M	Y	Y	N	80	2	Y	150
MP	178	70	27	M	N	Y	Y	69	1	Y	145
DM	190	102	23	M	Y	Y	Y	72	1	Y	170
RB	193	95	21	M	Y	N	N	68	4	Y	153
BF	185	97	20	M	Y	N	N	68	3	Y	163
AV-M	181	84	25					71	2.7	MEN	164
AV-F	168	61	26					70	3.5	WOMEN	185
AVG	174	72	25					70	3	ALL	175
AVG	Values	With	Brkfast	Males				71.4	2.2		156.2
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Table 1.3

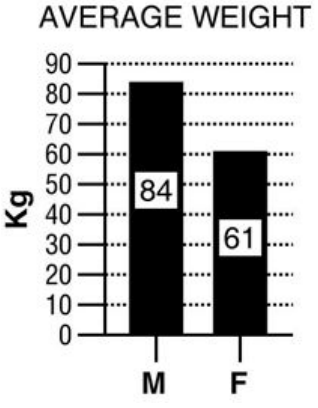


Figure 1.3

For these questions, the data were separated and analyzed by gender.

16) Refer to Table 1.3.

A. Ignoring the sex of the subjects, write a hypothesis that expresses the relationship between weight and height.

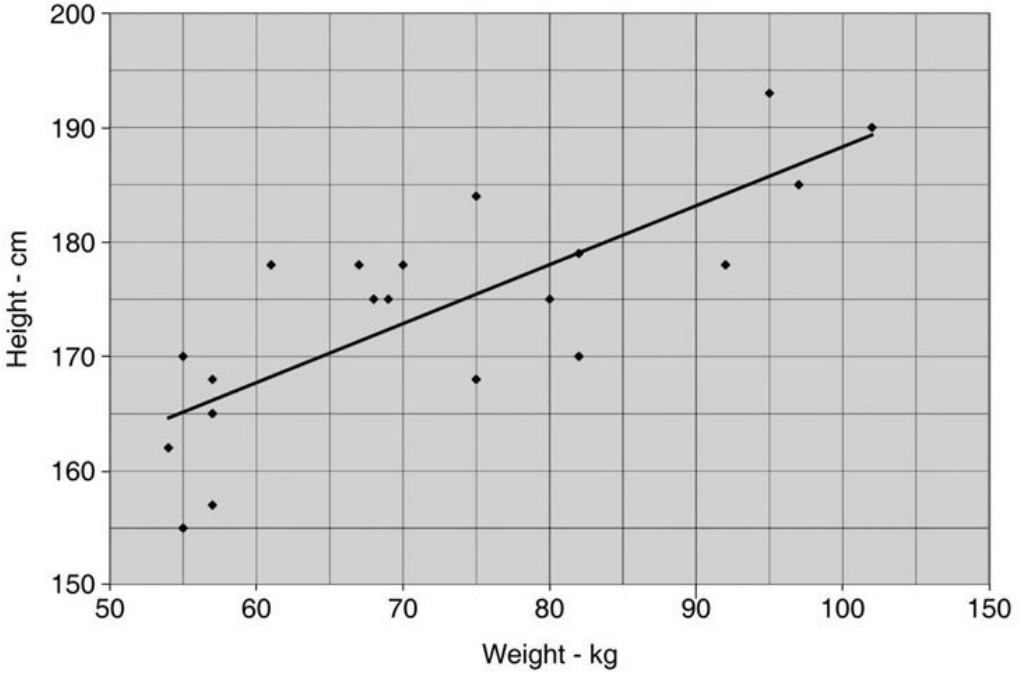
B. What is the dependent variable? What is the independent variable?

C. Construct a graph that examines relationship between weight and height.

Answer: A. A prediction such as "As height increases, weight increases" would be appropriate.

B. The dependent variable would be weight; the independent variable is height.

C.



Diff: 2 Type: ES

17) You want to display data on the finish times of the 10 fastest race horses in a single race at the Kentucky Derby. What would the labels be for the graph axes?

Answer: The *x*-axis is horse name or number; the *y*-axis is finish time in minutes.

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

18) Because anatomy and physiology have different definitions, they are usually considered separately in studies of the body. 18) _____

A) True B) False

Answer: B

Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

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

Average systolic blood pressure at various ages for males (M) and females (F).

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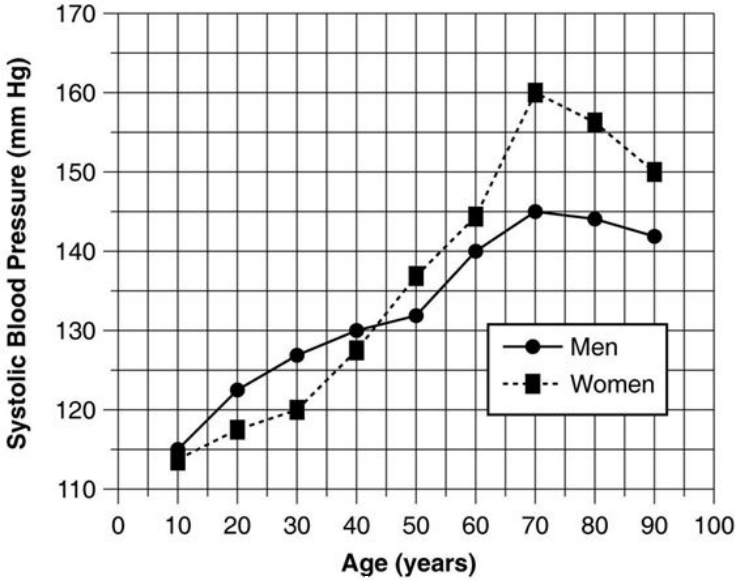

Figure 1.2

19) Referring to Figure 1.2, at approximately what ages do males have higher systolic blood pressures than females? At what age does this trend reverse?

Answer: From age 10 to 40, male pressures are higher; after age 40, female pressures are higher.
Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

20) The Internet database for molecular, cellular, and physiological information is called the _____ Project. 20) _____

A) Physiosome
B) Physiome
C) Manhattan
D) Human Genome
E) Physiognomy

Answer: B
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

21) Provide an example of a control system. Be sure to include the three main parts: an input signal, an integrating center, and an output signal.

Answer: 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.
Diff: 1 Type: ES

22) What is a nocebo effect?

Answer: It is the phenomenon whereby a patient who has been informed of the side effects of a drug he or she 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.
Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

23) There are 10 cloned horses, born on the same day, with identical chromosomes. They each follow the same physical training regimen, but are given daily injections of different concentrations of a particular vitamin. They all run the same race. Which type of graph would be best to explore a relationship between race finish time and vitamin dose? 23) _____

A) line graph B) bar graph C) scatter plot

Answer: C
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

24) Sahra has just flown around the world in the last 48 hours. She is having trouble sleeping, a condition known as insomnia. How do you think Sahra's long flights and her insomnia are related to biological rhythms?

Answer: Our sleep-wake cycle is a biological rhythm that lets our body know when it is time to rest. Most likely Sahra has ignored the signals like sleepiness, changes in body temperature, and mood that her body is sending. By ignoring these rhythms, she has disrupted the cycle and the body is struggling to maintain homeostasis.
Diff: 1 Type: ES

Following is a table of data collected from one section of an 8 A.M. physiology lab. There were 20 students present, 10 males and 10 females. Information collected included students' height, weight, age, sex, and resting pulse rate. In addition, the students were surveyed to see if they smoked cigarettes, considered themselves "regular exercisers," and if they had consumed caffeine or eaten the morning of the lab. A "y" or "n" (yes or no) was recorded to indicate their answers. Each student did "jumping jacks" for 5 minutes and recorded the time required to return to their resting heart rate, which is listed on the table as "recovery time." Finally, each student's reaction time (in milliseconds) was measured by catching an

object dropped by a lab partner according to specified criteria.
Use this table to answer the following questions. Ignore statistical problems caused by small sample size, and so on.

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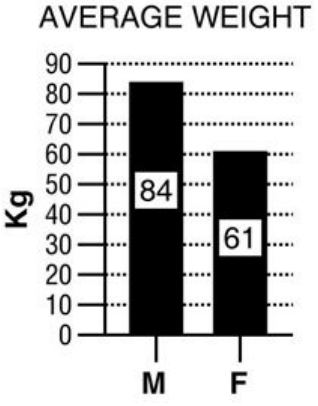


Figure 1.3

For these questions, the data were separated and analyzed by gender.

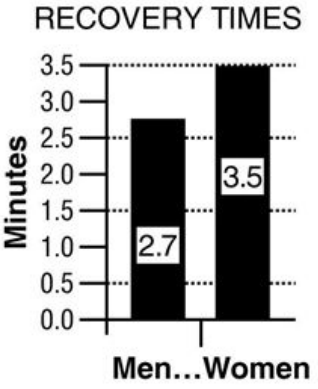
25) Refer to Table 1.3.

A. Write a hypothesis regarding sex and recovery time.

B. What is the dependent variable? What is the independent variable?

C. Create a graph using the averages from the data table. Based on these data, what do you conclude?

Answer: A. A prediction such as "Males recover from exercise more quickly than females" would be appropriate.
B. The independent variable is sex; the dependent variable is recovery time.
C. A bar graph such as the one below is appropriate. In this study, males recovered from exercise more quickly than females.



Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

26) "Glucose is transported from blood into cells by transporters in response to insulin." This type of explanation is 26) _____

A) mechanistic.
B) theological.
C) scatological.
D) teleological.
E) metalogical.

Answer: A
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

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

Heart rates (bpm) of *Sprague-Dawley* rats after administration of various concentrations of epinephrine.

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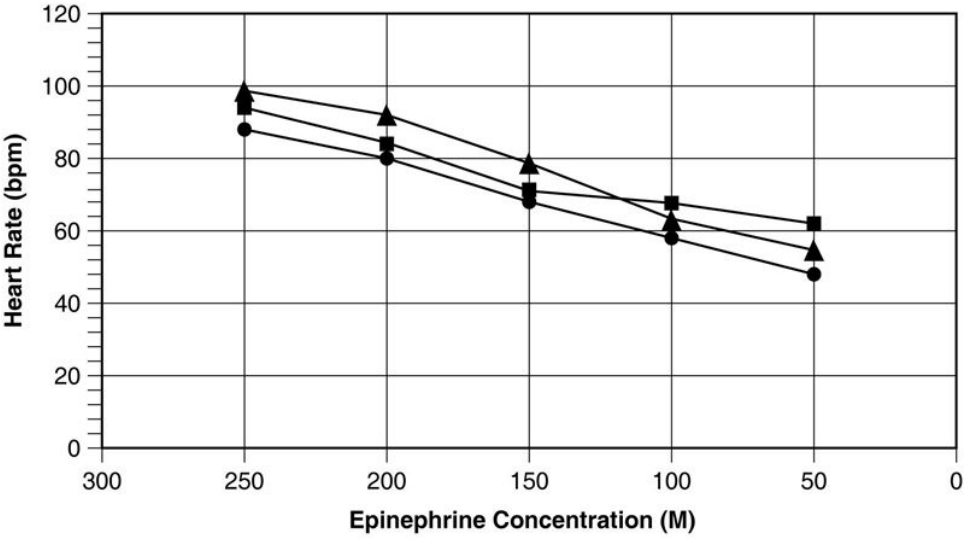

Figure 1.1

27) Use Table 1.1 to graph the data appropriately. What can you CONCLUDE based on the new figure?

Answer: Graphs should address the errors in Figure 1.1.
This small sample suggests that an increase in epinephrine concentration increases the average heart rate of *Sprague-Dawley* rats.

Diff: 3 Type: ES

28) 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?

Answer: 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.

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

29) A technique used to resolve contradictory results in scientific studies is 29) _____
A) cross-sectional analysis.
B) prospective analysis.
C) longitudinal analysis.
D) retrospective analysis.
E) meta-analysis.

Answer: E
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

Following is a table of data collected from one section of an 8 A.M. physiology lab. There were 20 students present, 10 males and 10 females. Information collected included students' height, weight, age, sex, and resting pulse rate. In addition, the students were surveyed to see if they smoked cigarettes, considered themselves "regular exercisers," and if they had consumed caffeine or eaten the morning of the lab. A "y" or "n" (yes or no) was recorded to indicate their answers. Each student did "jumping jacks" for 5 minutes and recorded the time required to return to their resting heart rate, which is listed on the table as "recovery time." Finally, each student's reaction time (in milliseconds) was measured by catching an object dropped by a lab partner according to specified criteria.
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MP	178	70	27	M	N	Y	Y	69	1	Y	145
DM	190	102	23	M	Y	Y	Y	72	1	Y	170
RB	193	95	21	M	Y	N	N	68	4	Y	153
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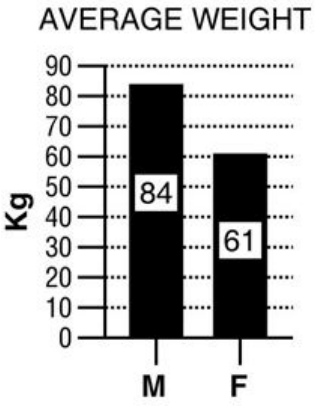

Figure 1.3

For these questions, the data were separated and analyzed by gender.

30) Refer to Table 1.3 and Figure 1.3
A. Write a hypothesis regarding gender and weight.
B. What is the dependent variable? What is the independent variable?
C. Based on the data in the graph above, what is your conclusion?
D. Why is a bar graph a good choice for presentation of these data? Would another type of chart be as effective?

Answer: A. Males weigh more than females.
B. Weight depends on gender; thus weight is dependent, gender is independent.
C. Males weigh more than females.
D. Bar graph allows comparison of the average of two groups. No.

Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

31) The following is a list of several levels of organization that make up the human body. 31) _____
1. tissue
2. cell
3. organ
4. molecule
5. organism
6. organ system

The correct order from the smallest to the largest is
A) 6, 4, 5, 2, 3, 1.
B) 4, 2, 1, 3, 6, 5.
C) 2, 4, 1, 3, 6, 5.
D) 4, 2, 1, 6, 3, 5.
E) 4, 2, 3, 1, 6, 5.

Answer: B
Diff: 1 Type: MC

32) Oxytocin is a hormone released in response to cervical dilation. This causes more uterine contractions that will further dilate the cervix. Which type of feedback does oxytocin trigger? 32) _____

A) nociceptive feedback
B) negative feedback
C) local control
D) positive feedback

Answer: D
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

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

Average systolic blood pressure at various ages for males (M) and females (F).

Age	Average Blood Pressure M	F
10	115	113
20	122	117
30	127	120
40	130	128
50	131	136
60	140	144
70	145	160
80	144	156
90	142	150

Table 1.2

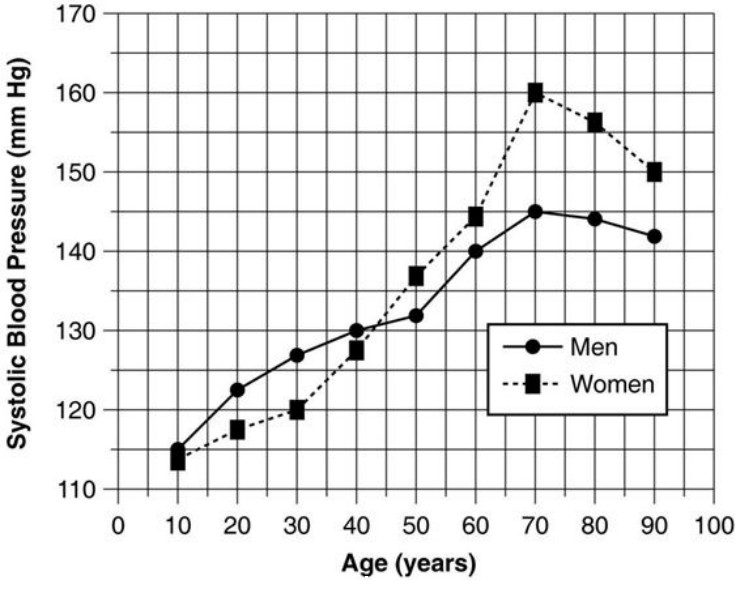

Figure 1.2

33) Referring to Table 1.2, what general trend in systolic blood pressures is seen as both males and females increase in age?

Answer: The systolic pressure of both genders increases until age 70 but declines after age 70.
Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

34) If a scientific model is supported or verified repeatedly by multiple investigators, it may become a 34) _____
A) law.
B) theory.
C) variable.
D) hypothesis.
E) model.

Answer: B
Diff: 1 Type: MC

35) Which are used to keep our systems at or near their setpoints? 35) _____
A) response loops
B) feedforward control loop
C) negative feedback loops
D) open control loops
E) positive feedback loops

Answer: C
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

Following is a table of data collected from one section of an 8 A.M. physiology lab. There were 20 students present, 10 males and 10 females. Information collected included students' height, weight, age, sex, and resting pulse rate. In addition, the students were surveyed to see if they smoked cigarettes, considered themselves "regular exercisers," and if they had consumed caffeine or eaten the morning of the lab. A "y" or "n" (yes or no) was recorded to indicate their answers. Each student did "jumping jacks" for 5 minutes and recorded the time required to return to their resting heart rate, which is listed on the table as "recovery time." Finally, each student's reaction time (in milliseconds) was measured by catching an object dropped by a lab partner according to specified criteria.
Use this table to answer the following questions. Ignore statistical problems caused by small sample size, and so on.

DATA COLLECTED DURING HUMAN PHYSIOLOGY LAB

ID	Ht cm	Wt kgs	AGE YRS	GENDER	SMOKE?	REG EXERCISE?	CAFFEINE?	RESTING PR (BPM)	RECOVERY TIME (Mins)	break fast?	REACTION TIME (MS)
MH	168	75	24	F	N	N	Y	72	5	N	180
JH	175	68	20	F	N	Y	N	108	4	N	201
Su	157	57	27	F	N	Y	N	44	3	N	137
Sa	178	67	22	F	N	N	N	48	7	Y	156
SH	178	61	32	F	N	N	Y	72	4	Y	206
D	170	55	36	F	Y	Y	Y	72	3	Y	232
A	168	57	19	F	Y	Y	N	72	1	Y	146
AN	162	54	20	F	Y	Y	Y	65	2	Y	166
CA	165	57	33	F	Y	N	Y	68	2	N	228
MS	155	55	28	F	Y	N	N	77	4	N	202
AVG	167.5	60.6	26.1					69.8	3.5		185.4
AVG	Values	With	Brkfast	Females				65.8	3.4		181.2
AVG	Values	Without	Brkfast	Females				73.8	3.6		189.6
M	178	92	38	M	N	N	Y	62	4	N	158
P	170	82	33	M	Y	Y	Y	61	4	N	158
G	175	80	23	M	N	Y	N	75	4	N	193
S	175	69	21	M	N	N	N	90	3	N	174
CH	179	82	19	M	N	N	Y	64	1	N	174
GM	184	75	22	M	Y	Y	N	80	2	Y	150
MP	178	70	27	M	N	Y	Y	69	1	Y	145
DM	190	102	23	M	Y	Y	Y	72	1	Y	170
RB	193	95	21	M	Y	N	N	68	4	Y	153
BF	185	97	20	M	Y	N	N	68	3	Y	163
AV-M	181	84	25					71	2.7	MEN	164
AV-F	168	61	26					70	3.5	WOMEN	185
AVG	174	72	25					70	3	ALL	175
AVG	Values	With	Brkfast	Males				71.4	2.2		156.2
AVG	Values	Without	Brkfast	Males				70.4	3.2		171.4

Table 1.3

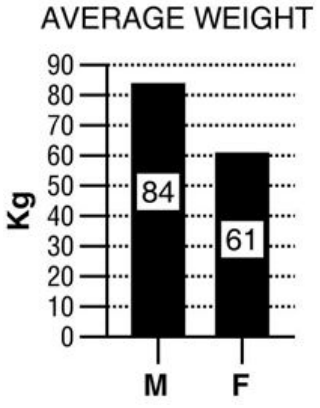

Figure 1.3

For these questions, the data were separated and analyzed by gender.

36) Table 1.3 shows data on various factors that may or may not be related to resting pulse rate, time to recovery to resting pulse rate after a few minutes of exercise, and reaction time measured by how quickly a student could press a keyboard key after seeing a computer-generated prompt. For each question below, write a testable hypothesis, identify the dependent and independent variables, sketch an appropriate graph of the results, and draw a conclusion from the data presented in the table. Discuss your results.

A. Does caffeine consumption have an effect on resting pulse rate?

B. Does age play a role in resting pulse rate? Does weight?

C. Is there a relationship between eating breakfast and recovery time?

D. Is there a relationship between reaction time and height?

E. Do females who smoke show differences in their resting pulse rates compared to female nonsmokers or to male smokers and male nonsmokers?

F. Does regular exercise have an effect on resting pulse rate?

Answer: Answers will vary, but examples follow (conclusions written here are based on cursory examination of graphed data–no statistical tests of significance were performed).
A. Hypothesis: Caffeine consumption increases heart rate.
Independent variable: caffeine consumption.
Dependent variable: resting pulse rate.
Conclusion: Mean pulse rates between caffeine-drinking (68 bpm) and control subjects (73 bpm) are similar (large variation between individuals); hypothesis not supported.
B. Hypothesis: Pulse rate is lower in older subjects and is higher in heavier subjects.
Independent variables: age and weight.
Dependent variables: resting pulse rate.
Conclusion: Pulse rate was similar in all groups; hypothesis not supported.
C. Hypothesis: Subjects who ate breakfast have a faster reaction time.
Independent variable: breakfast consumption.
Dependent variable: pulse rate.
Conclusion: Subjects who ate breakfast had a faster reaction time (168.7 msec vs. 180.5 msec); hypothesis supported.
D. Hypothesis: There is no relationship between height and reaction time.
Independent variable: height.
Dependent variable: reaction time.
Conclusion: Reaction time did not vary with height; hypothesis supported.
E. Hypothesis: Smokers of both sexes have a higher resting pulse rate than nonsmokers of either sex, and males and females are affected equally.
Independent variables: smoking and sex.
Dependent variable: pulse rate.
Conclusion: There was no difference in pulse rate in any of the groups (70.4 bpm in nonsmokers vs. 70.3 bpm in smokers); hypothesis not supported.
F. Hypothesis: Subjects who exercise regularly have a lower resting pulse rate.
Independent variable: exercise.
Dependent variable: pulse rate.
Conclusion: Regular exercise had no effect on resting pulse rate (68.9 bpm in nonexercisers vs. 71.8 bpm in exercisers); hypothesis not supported.

Discussion may cover issues such as the effect of small sample size, use of adults of limited age range, lack of control over treatments (Were the subjects honest about age, eating breakfast, consuming caffeine, smoking, and exercising? Were the quantitative data of height and weight determined in the lab using the same equipment and same data collector?), the value of statistical analysis, and so on. It is likely that students will be surprised by some of the results and could make erroneous conclusions. For example, pulse rate may vary with age, but without including children and senior citizens in the sample population, this trend would be missed.

Diff: 2 Type: ES

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

Heart rates (bpm) of *Sprague-Dawley* rats after administration of various concentrations of epinephrine.

	Heart Rates		
Epinephrine (mg)	**Animal 1**	**Animal 2**	**Animal 3**
50	48	62	55
100	58	67	63
150	67	70	79
200	80	85	93
150	67	70	79

Table 1.1

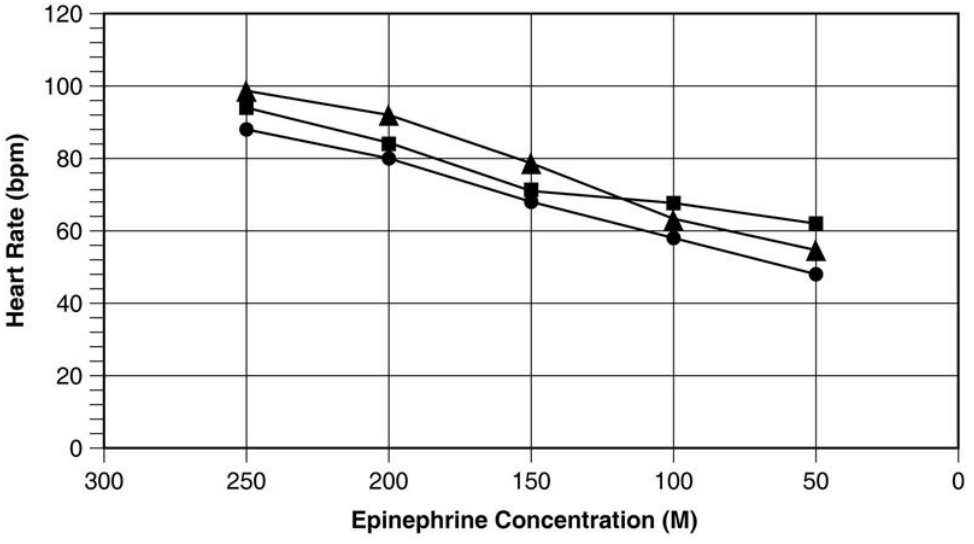

Figure 1.1

37) List all of the errors in Figure 1.1.

Answer: 1. The units of concentration are labeled as M when they should be mg.
2. The *x*-axis is in decreasing order of concentration.
3. The graph needs a legend.

Diff: 3 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

38) The law of mass balance states 38) _____

A) that all substances in the body have equal mass.
B) if a substance is to remain constant any gain must be offset by an equal loss.
C) if one is to survive they must have a certain amount of mass.
D) that all matter is neither created or destroyed.
E) that homeostasis can be maintained when the load of a substance is continuously lost.

Answer: B

Diff: 1 Type: MC

39) Homeostasis is the ability of the body to 39) _____
A) ignore external stimuli to remain in a state of rest.
B) prevent excessive blood loss.
C) prevent the internal environment from changing.
D) prevent the external environment from changing.
E) quickly restore changed conditions to normal.

Answer: E
Diff: 1 Type: MC

40) Place these terms in the typical sequence in the process of scientific inquiry: experimental data, theory, model, observation, hypothesis, replication. 40) _____
A) observation, replication, model, experimental data, hypothesis, theory
B) theory, observation, experimental data, hypothesis, replication, model
C) experimental data, theory, model, observation, hypothesis, replication
D) replication, hypothesis, experimental data, theory, model, observation
E) observation, hypothesis, experimental data, replication, model, theory

Answer: E
Diff: 2 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

41) You are designing a study to assess the effects of a new drug treatment for hypertension. Your subjects are white males, ages 40 to 60 years. Can your study results be applied to all people? Explain.

Answer: 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.
Diff: 3 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

42) The human body is best described as always being in a state of equilibrium such that all body compartments are identical. 42) _____
A) True B) False

Answer: B
Diff: 1 Type: MC

43) A physician basing clinical decisions on primary research published in biomedical literature is doing _____ medicine. 43) _____
A) whimsical
B) evidence-based
C) traditional
D) holistic
E) alternative

Answer: B
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

Following is a table of data collected from one section of an 8 A.M. physiology lab. There were 20 students present, 10 males and 10 females. Information collected included students' height, weight, age, sex, and resting pulse rate. In addition, the students were surveyed to see if they smoked cigarettes, considered themselves "regular exercisers," and if they had consumed caffeine or eaten the morning of the lab. A "y" or "n" (yes or no) was recorded to indicate their answers.
Each student did "jumping jacks" for 5 minutes and recorded the time required to return to their resting heart rate, which is listed on the table as "recovery time." Finally, each student's reaction time (in milliseconds) was measured by catching an object dropped by a lab partner according to specified criteria.
Use this table to answer the following questions. Ignore statistical problems caused by small sample size, and so on.

DATA COLLECTED DURING HUMAN PHYSIOLOGY LAB

ID	Ht cm	Wt kgs	AGE YRS	GENDER	SMOKE?	REG EXERCISE?	CAFFEINE?	RESTING PR (BPM)	RECOVERY TIME (Mins)	break fast?	REACTION TIME (MS)
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G	175	80	23	M	N	Y	N	75	4	N	193
S	175	69	21	M	N	N	N	90	3	N	174
CH	179	82	19	M	N	N	Y	64	1	N	174
GM	184	75	22	M	Y	Y	N	80	2	Y	150
MP	178	70	27	M	N	Y	Y	69	1	Y	145
DM	190	102	23	M	Y	Y	Y	72	1	Y	170
RB	193	95	21	M	Y	N	N	68	4	Y	153
BF	185	97	20	M	Y	N	N	68	3	Y	163
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Table 1.3

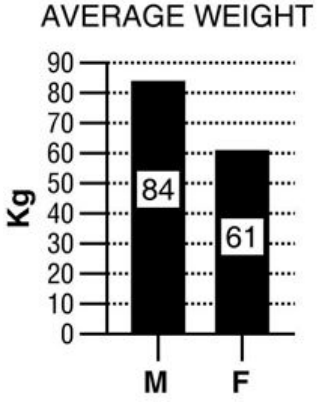

Figure 1.3

For these questions, the data were separated and analyzed by gender.

44) Refer to Table 1.3.
A. Write a hypothesis regarding the effects of breakfast consumption on reaction time.
B. What is the dependent variable? What is the independent variable?

Answer: A. A prediction such as "Eating breakfast prior to testing improves reaction time of subjects (compared to subjects who did not eat breakfast)" is appropriate.
B. The independent variable is breakfast consumption; the dependent variable is reaction time.
Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

45) You go outside on a very cold day and you start to shiver because you do not have on the proper clothing. The act of shivering would represent what step in a response loop? 45) _____
A) response
B) setpoint
C) integrating center
D) variable
E) sensor

Answer: A
Diff: 1 Type: MC

46) How genetics influences the body's response to drugs is called 46) _____
A) pharmacogenomics.
B) paleopharmacology.
C) pharmageddon.
D) pharmacodynamics.
E) pharmacokinetics.

Answer: A
Diff: 1 Type: MC

47) 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 finish time changes with experience. Which type of graph would be best to display this information? 47) _____
A) scatter plot B) bar graph C) line graph

Answer: C
Diff: 1 Type: MC

48) Physiology is the study of 48) _____
A) the facial features as an indication of personality.
B) the tissues and organs of the body at the microscopic level.
C) growth and reproduction.
D) the structure of the body.
E) the normal function of living organisms.

Answer: E
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

49) 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 finish time changes with experience. What would the labels be for the graph axes?

Answer: The x-axis is race number or date; the y-axis is finish time in minutes.
Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

50) Individuals with Type I diabetes mellitus do not make enough insulin. Which would be a mechanistic explanation of how insulin is used by the body? 50) _____

A) Insulin binds to its receptor which stimulates the movement of glucose transporters to the cell membrane.
B) Without insulin most cells in the body would be unable to produce enough ATP.
C) Cells need insulin because glucose will not cross the cell membrane.
D) Insulin is a hormone involved in glucose transport.
E) Since all cells need glucose, insulin is required.

Answer: A
Diff: 1 Type: MC

51) You want to display data on the finish times of the 10 fastest race horses in a single race at the Kentucky Derby. Which type of graph would be best to display this information? 51) _____

A) bar graph B) scatter plot C) line graph

Answer: A
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

52) 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?

Answer: (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.
Diff: 2 Type: ES

53) High cholesterol levels have been shown to be a contribute to heart disease and death for many decades. In the 1970s, 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 Framingham, Massachusetts. This study became known as the Framingham Study, and it is very well known because it did not support the hypothesis. 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 relates to human studies? You can find a copy of the study online and read it, if necessary.

Answer: 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.

Diff: 3 Type: ES

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

Answer: 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.

Diff: 1 Type: ES

55) Use these terms to develop a reflex loop:
brain, sensory neuron, an eye, foot, soccer ball, motor neuron

Answer: Eye sees soccer ball.
Sensory neuron sends visual information.
Brain receives information and formulates a plan.
Motor neuron sends action information from the brain.
Foot and leg muscles contract, and the ball is kicked.

Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

56) The study of body function in a disease state is 56) _____

A) microbiology.
B) histology.
C) necrology.
D) pathophysiology.
E) physiology.

Answer: D

Diff: 1 Type: MC

57) Vasodilation of blood vessels supplying muscles in response to increased carbon dioxide during exercise is an example of 57) _____
A) long-distance control.
B) hormonal control.
C) neural control.
D) local control.
E) reflex control.

Answer: D
Diff: 1 Type: MC

58) "Glucose is transported from blood into cells because cells require glucose to meet their energy needs." This type of explanation is 58) _____
A) scatological.
B) teleological.
C) metalogical.
D) mechanistic.
E) theological.

Answer: B
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

59) Why are physiology and anatomy frequently studied together?

Answer: This is discussed in the "Physiology Is an Integrative Science" section of the chapter.
Diff: 1 Type: ES

60) What is the difference between a peer-reviewed article and a review article?

Answer: 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.
Diff: 1 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

61) A study in which a participant act as an experimental subject in part of the experiment and a control in another part of the experiment is called a _____ study. 61) _____
A) double-blind B) retrospective C) crossover D) meta-analysis

Answer: C
Diff: 1 Type: MC

62) Which is one of Cannon's "internal secretions"? 62) _____
A) inorganic ions
B) nutrients
C) water
D) hormones
E) None of the answers are correct.

Answer: D
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

63) List the key concepts or themes in physiology.

Answer: See Table 1.1 in the chapter.
Diff: 1 Type: ES

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

64) 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? 64) _____

Answer: This is discussed in "The Science of Physiology" section of the chapter and in Figure 1.15.
Diff: 1 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

65) _____ are kept within normal range by physiological control mechanisms which are used if the variable strays too far from its _____. 65) _____

A) Independent variables, steady state
B) Steady state values, integrating center
C) Dependent variables, lowest value
D) Setpoints, regulated variable
E) Regulated variables, setpoint

Answer: E
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

66) 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.

Answer: 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.
Diff: 2 Type: ES

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

67) A scientifically logical guess is a 67) _____

A) model.
B) variable.
C) theory.
D) law.
E) hypothesis.

Answer: E
Diff: 1 Type: MC

68) Which is a buffer zone between the outside world and most of the cells of the body? 68) _____

A) extracellular fluid
B) cell membrane
C) intracellular fluid
D) red blood cells
E) All of the answers are correct.

Answer: A
Diff: 1 Type: MC

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

69) Write a teleological explanation for why heart rate increases during exercise. Now write a mechanistic explanation for the same phenomenon.

Answer: 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).
Diff: 1 Type: ES

1) A
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

2) D
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

3) C
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

4) D
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

5) A graph with no axis labels is meaningless–without knowing what trend is being illustrated, there is no communication of scientific information.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

6) A
Diff: 2 Page Ref:
Section: 1.2 Function and Mechanism

7) Line graphs are commonly used when the independent variable (*x*-axis) is a continuous phenomenon. In this study the concentration of epinephrine is a continuous function. The line allows for interpolation (i.e., estimating values between the measured values).
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

8) B
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

9) 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.
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

10) E
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

11) D
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

12) C
Diff: 1 Page Ref:
Section: 1.2 Function and Mechanism

13) The *x*-axis is vitamin dose; the *y*-axis is finish time in minutes.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

14) A
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

15) The systolic pressure of both genders increases with age. Under age 40, the systolic pressure of males is higher than that of females. After age 40, the systolic pressure of females is higher than that of males. The greatest rate of increase is from ages 50 to 70 in both genders. Blood pressure declines after age 70.
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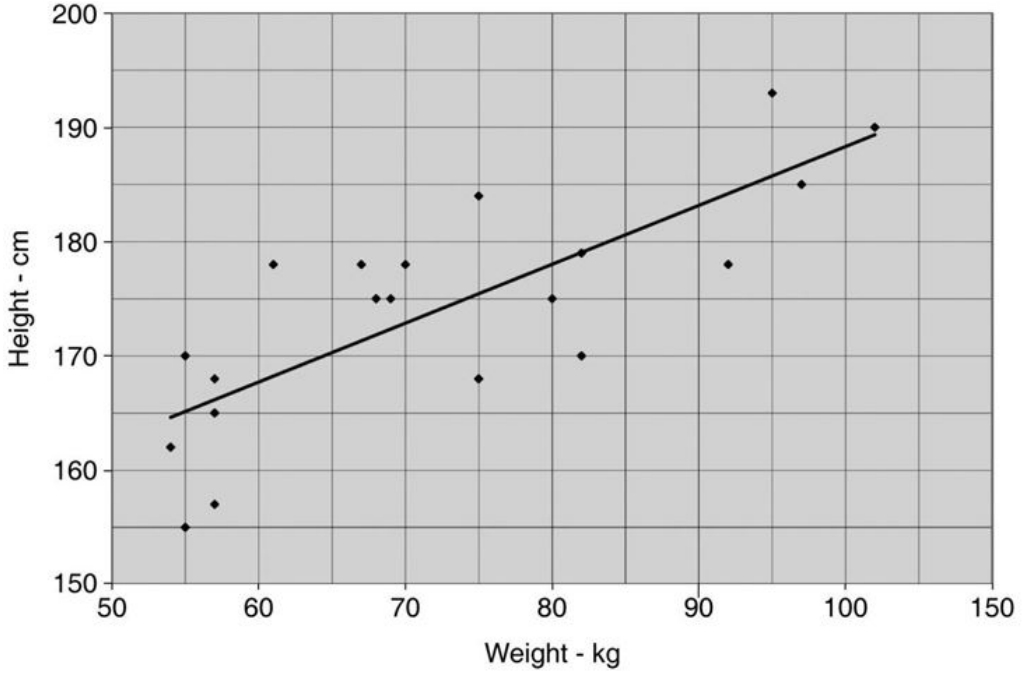
16) A. A prediction such as "As height increases, weight increases" would be appropriate.
B. The dependent variable would be weight; the independent variable is height.
C.



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17) The *x*-axis is horse name or number; the *y*-axis is finish time in minutes.
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Section: 1.6 The Science of Physiology

18) B
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Section: 1.1 Physiology Is an Integrative Science

19) From age 10 to 40, male pressures are higher; after age 40, female pressures are higher.
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20) B
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21) 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.
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

22) It is the phenomenon whereby a patient who has been informed of the side effects of a drug he or she 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.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

23) C
Diff: 1 Page Ref:
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24) Our sleep-wake cycle is a biological rhythm that lets our body know when it is time to rest. Most likely Sahra has ignored the signals like sleepiness, changes in body temperature, and mood that her body is sending. By ignoring these rhythms, she has disrupted the cycle and the body is struggling to maintain homeostasis.
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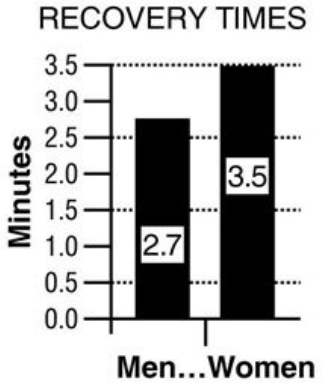
25) A. A prediction such as "Males recover from exercise more quickly than females" would be appropriate.
B. The independent variable is sex; the dependent variable is recovery time.
C. A bar graph such as the one below is appropriate. In this study, males recovered from exercise more quickly than females.



Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

26) A
Diff: 1 Page Ref:
Section: 1.2 Function and Mechanism

27) Graphs should address the errors in Figure 1.1.
This small sample suggests that an increase in epinephrine concentration increases the average heart rate of *Sprague-Dawley* rats.
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Section: 1.6 The Science of Physiology

28) 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.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

29) E
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

30) A. Males weigh more than females.
B. Weight depends on gender; thus weight is dependent, gender is independent.
C. Males weigh more than females.
D. Bar graph allows comparison of the average of two groups. No.
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

31) B
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

32) D
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

33) The systolic pressure of both genders increases until age 70 but declines after age 70.
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

34) B
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

35) C
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

36) Answers will vary, but examples follow (conclusions written here are based on cursory examination of graphed data –no statistical tests of significance were performed).
A. Hypothesis: Caffeine consumption increases heart rate.
Independent variable: caffeine consumption.
Dependent variable: resting pulse rate.
Conclusion: Mean pulse rates between caffeine-drinking (68 bpm) and control subjects (73 bpm) are similar (large variation between individuals); hypothesis not supported.
B. Hypothesis: Pulse rate is lower in older subjects and is higher in heavier subjects.
Independent variables: age and weight.
Dependent variables: resting pulse rate.
Conclusion: Pulse rate was similar in all groups; hypothesis not supported.
C. Hypothesis: Subjects who ate breakfast have a faster reaction time.
Independent variable: breakfast consumption.
Dependent variable: pulse rate.
Conclusion: Subjects who ate breakfast had a faster reaction time (168.7 msec vs. 180.5 msec); hypothesis supported.
D. Hypothesis: There is no relationship between height and reaction time.
Independent variable: height.
Dependent variable: reaction time.
Conclusion: Reaction time did not vary with height; hypothesis supported.
E. Hypothesis: Smokers of both sexes have a higher resting pulse rate than nonsmokers of either sex, and males and females are affected equally.
Independent variables: smoking and sex.
Dependent variable: pulse rate.
Conclusion: There was no difference in pulse rate in any of the groups (70.4 bpm in nonsmokers vs. 70.3 bpm in smokers); hypothesis not supported.
F. Hypothesis: Subjects who exercise regularly have a lower resting pulse rate.
Independent variable: exercise.
Dependent variable: pulse rate.
Conclusion: Regular exercise had no effect on resting pulse rate (68.9 bpm in nonexercisers vs. 71.8 bpm in exercisers); hypothesis not supported.

Discussion may cover issues such as the effect of small sample size, use of adults of limited age range, lack of control over treatments (Were the subjects honest about age, eating breakfast, consuming caffeine, smoking, and exercising? Were the quantitative data of height and weight determined in the lab using the same equipment and same data collector?), the value of statistical analysis, and so on. It is likely that students will be surprised by some of the results and could make erroneous conclusions. For example, pulse rate may vary with age, but without including children and senior citizens in the sample population, this trend would be missed.
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37) 1. The units of concentration are labeled as M when they should be mg.
2. The *x*-axis is in decreasing order of concentration.
3. The graph needs a legend.
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Section: 1.6 The Science of Physiology

38) B
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

39) E
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

40) E
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

41) 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.
Diff: 3 Page Ref:
Section: 1.6 The Science of Physiology

42) B
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

43) B
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

44) A. A prediction such as "Eating breakfast prior to testing improves reaction time of subjects (compared to subjects who did not eat breakfast)" is appropriate.
B. The independent variable is breakfast consumption; the dependent variable is reaction time.
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

45) A
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

46) A
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

47) C
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

48) E
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

49) The *x*-axis is race number or date; the *y*-axis is finish time in minutes.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

50) A
Diff: 1 Page Ref:
Section: 1.2 Function and Mechanism

51) A
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

52) (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.
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

53) 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.
Diff: 3 Page Ref:
Section: 1.6 The Science of Physiology

54) 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.
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

55) Eye sees soccer ball.
Sensory neuron sends visual information.
Brain receives information and formulates a plan.
Motor neuron sends action information from the brain.
Foot and leg muscles contract, and the ball is kicked.
Diff: 1 Page Ref:
Section: 1.3 Themes in Physiology

56) D
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

57) D
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

58) B
Diff: 1 Page Ref:
Section: 1.2 Function and Mechanism

59) This is discussed in the "Physiology Is an Integrative Science" section of the chapter.
Diff: 1 Page Ref:
Section: 1.1 Physiology Is an Integrative Science

60) 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.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

61) C
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

62) D
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

63) See Table 1.1 in the chapter.
Diff: 1 Page Ref:
Section: 1.3 Themes in Physiology

64) This is discussed in "The Science of Physiology" section of the chapter and in Figure 1.15.
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

65) E
Diff: 1 Page Ref:
Section: 1.5 Control Systems and Homeostasis

66) 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.
Diff: 2 Page Ref:
Section: 1.6 The Science of Physiology

67) E
Diff: 1 Page Ref:
Section: 1.6 The Science of Physiology

68) A
Diff: 1 Page Ref:
Section: 1.4 Homeostasis

69) 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).
Diff: 1 Page Ref:
Section: 1.2 Function and Mechanism