**Chapter 1**

**Multiple Choice (Correct answers delineated with \*)**

1. The decade of the 1990s was designated as the decade of:
   1. The brain (\*)
   2. Behavior
   3. Mind
   4. Cognition
2. If someone is interested in the relationships between behavior and the body, what area of science do they work in?
   1. Psychobiology
   2. Biopsychology
   3. Physiological psychology
   4. All of these areas are correct. (\*)
3. Neuroscience is the multidisciplinary study of the \_\_\_\_ and its role in behavior:
   1. Brain
   2. Nervous system (\*)
   3. Mind
   4. Human psyche
4. The annual costs of brain disorders and addictions in the United States is an estimated:
   1. 100 trillion dollars
   2. 500 billion dollars
   3. 1 trillion dollars (\*)
   4. 5 trillion dollars
5. Psychologists use the term *behavior* to refer to:
   1. Overt acts
   2. Learning
   3. Emotions
   4. All of the above (\*)
6. Which of the following questions would a biopsychologist be *least* likely to study?
   1. How does the brain’s activity result in consciousness? (\*)
   2. What changes occur in the nervous system when a person learns?
   3. How do people in different cultures view mental illness?
   4. What is the physiological explanation for depression?
7. If you were able to build a time machine, and wanted to travel back to observe the first psychology laboratory, where would you go?
   1. To Charles Darwin’s office in Germany
   2. To Charles Darwin’s boat in England
   3. To Wilhelm Wundt’s lab in Germany (\*)
   4. to Rene Descartes’ apothecary in France
8. The mind-brain question:
   1. Is concerned with the nature of the mind and its relation to the brain (\*)
   2. Was originally posed by early neuroscientists and remains unsolved today
   3. Usually involves a choice between the positions of psychology and philosophy
   4. All of the other alternatives are correct.
9. The textbook author views the mind as a:
   1. Spirit
   2. Soul
   3. Collection of things the brain does, such as planning and feeling
   4. Concept (\*)
10. Which of the following statements is *most* consistent with the materialistic monist view of the mind-brain problem?
    1. Both hemispheres of the brain work together.
    2. The brain and the mind are both physical. (\*)
    3. Everything is made of matter and energy.
    4. The body is made of matter, whereas the mind is not.
11. Which of the following statements is *most* consistent with the dualism view of the mind-brain problem?
    1. Both hemispheres of the brain work together.
    2. The brain and the mind are both physical.
    3. Everything is made of matter and energy.
    4. The body is made of matter, whereas the mind is not. (\*)
12. Which mind-brain view is *most* likely to be held by a neuroscientist?
    1. Idealistic monism
    2. Dualism
    3. Interactionism
    4. Monism (\*)
13. If you say you are a dualist, you are saying you believe in:
    1. The mind and the spirit
    2. Only the nonmaterial
    3. A mind that is separate from the brain (\*)
    4. The body and the brain
14. If you say you are a monist, you are saying you believe in:
    1. Just the mind
    2. Both the material and the nonmaterial
    3. The brain and mind are composed of the same substance (\*)
    4. Just the spiritual
15. Some neuroscientists:
    1. Believe that evolution can’t explain all biological processes, such as brain development
    2. Believe that nonmaterial neuroscience has a better chance of explaining consciousness than material neuroscience (\*)
    3. Believe that the mind changes the brain, based on the study of psychotherapy altering the brain in patients with OCD
    4. View the mind as being material
16. Which of the following philosophers debated the mind-brain question?
    1. Aristotle
    2. Democritus
    3. Plato
    4. All of the above (\*)
17. A \_\_\_\_\_\_\_\_\_ is a proposed mechanism to explain how something, usually more complex than the proposed mechanism, works.
    1. assumption
    2. model (\*)
    3. construct
    4. hypothesis
18. According to Descartes, the brain controlled behavior by:
    1. Directing spirit fluid through nerves, thereby inflating the muscles (\*)
    2. Tilting the spinal cord like a joystick
    3. Bending energy from an outside light source
    4. Actively directing the pineal gland to inflate and deflate
19. According to Descartes, \_\_\_ was where the mind interacted with the body.
    1. the ventricles of the brain
    2. the pineal gland (\*)
    3. fluid filled nerves and muscles
    4. the pituitary gland
20. Why did Descartes choose the pineal gland as the “seat of the soul”?
    1. It was in a perfect position to serve this function.
    2. It was capable of bending at different angles to direct the flow of animal spirits.
    3. It was attached just below the two cerebral hemispheres.
    4. All of the above (\*)
21. What was the major drawback of Descartes’ view of the mind-brain problem?
    1. It was a theory.
    2. It was not tested by empirical methods. (\*)
    3. It was a hydraulic model.
    4. He knew how the brain worked, but not the body.
22. Which individual was a seventeenth-century French philosopher and physiologist?
    1. Rene Descartes (\*)
    2. Paul Broca
    3. Eduard Hitzig
    4. Gustav Fritsch
23. Who first observed that muscles would respond to electrical stimulation?
    1. Gustav Fritsch
    2. Paul Broca
    3. Eduard Hitzig
    4. Luigi Galvani (\*)
24. Who first showed that movement would result from electrical stimulation of the brain?
    1. Fritsch and Galvani
    2. Broca and Helmholtz
    3. Hitzig and Helmholtz
    4. Fritsch and Hitzig (\*)
25. Who first measured the speed of conduction in the nervous system?
    1. Rene Descartes
    2. Paul Broca
    3. Eduard Hitzig
    4. Hermann von Helmholtz (\*)
26. \_\_\_ calculated the velocity of the electrical nerve impulse to be about \_\_\_.
    1. Helmholtz, 90 meters/second
    2. Hitzig, 90 feet/second
    3. Helmholtz, 90 feet/second (\*)
    4. Broca, 900 feet/second
27. Which of the following statements is *true* about the case of Phineas Gage?
    1. He did not survive the railroad accident.
    2. His case supported the equipotentiality view.
    3. The major damage he experienced was in the frontal lobes. (\*)
    4. Paul Broca was the scientist that first described Gage’s disorder.
28. Which of the following conclusions was reached from observations at autopsy on the brain of a man who had an inability to speak?
    1. Speech is not localized in a particular brain region.
    2. Speech is inherited.
    3. Auditory reflexes are found in the dominant hemisphere.
    4. Speech is localized in the left side of the brain. (\*)
29. Who first localized the speech control center in the human brain?
    1. Broca (\*)
    2. Gage
    3. Helmholtz
    4. Galvani
30. The proposition that specific brain areas control specific functions refers to:
    1. Functionalism
    2. Specific nerve control
    3. Localization (\*)
    4. Neuroscience
31. Whereas phrenology claimed to precisely localize \_\_\_ in the brain, \_\_\_ argued that virtually no functions were precisely localized.
    1. equipotentialities, Gall
    2. faculties, Lashley (\*)
    3. faculties, Spurzheim
    4. motor functions, Lashley
32. Today’s research tells us that functions or characteristics are:
    1. Mostly localized
    2. Mostly distributed
    3. Both localized and distributed (\*)
    4. None of the above
33. Which of the following statements is *true*?
    1. Some genes are found in the mitochondria. (\*)
    2. Every body cell has 23 chromosomes.
    3. Ova and sperm have paired chromosomes, XX for eggs and XY for sperm.
    4. The sequences of nucleotides that make up our DNA differ among individuals by about 10%.
34. A direct function of genes is:
    1. Influencing behavior
    2. Building the brain and nervous system
    3. Directing the building of proteins (\*)
    4. Replication
35. About what percentage of the genes in any two people are identical?
    1. Approximately 75%
    2. 25% or less
    3. Over 99% (\*)
    4. Approximately 50%, depending on race
36. A \_\_\_ gene will produce its effect regardless of which gene it is paired with.
    1. homozygous
    2. heterozygous
    3. dominant (\*)
    4. recessive
37. A \_\_\_ gene will have its effects *only* when it is paired with a similar gene on the other chromosome.
    1. recessive (\*)
    2. dominant
    3. polygenic
    4. heterozygous
38. An example of an X-linked trait is:
    1. Hand clasping
    2. Blood type
    3. Red-green color-blindness (\*)
    4. Huntington’s disease
39. Different versions of a gene are called:
    1. Nucleotides
    2. Alleles (\*)
    3. Polygenic
    4. Chromosomes
40. If a person has different genes for hand clasping preference, they are \_\_\_ for that trait.
    1. homozygous
    2. phenotypic
    3. heterozygous (\*)
    4. polygenic
41. The specific pattern of genes inherited at conception defines an individual's:
    1. Phenotype
    2. Genotype (\*)
    3. Genomic imprint
    4. Somatotype
42. The observable characteristics of an individual are referred to as one's:
    1. Genotype
    2. Phenotype (\*)
    3. Genome
    4. Meme
43. Most behavioral characteristics and psychological disorders are:
    1. Polygenic (\*)
    2. Recessive
    3. Dominant
    4. X-linked
44. Which of the following statements is *true* about the Human Genome Project and the subsequent ENCODE Project?
    1. The project revealed we have over 100,000 functioning genes.
    2. An international version of the project was able to identify what most of the genes actually do in the body.
    3. Only about 3% of our DNA sequence encodes for proteins. (\*)
    4. It was used to identify the gene for Huntington’s disease.
45. The human characteristic that has been most investigated for its genetic basis is:
    1. Criminality
    2. Personality
    3. Intelligence (\*)
    4. Creativity
    5. Anxiety
46. Which of the following is *not* true about heritability?
    1. It is the percentage of variation in a characteristic that can be attributed to genetic factors.
    2. It is not an absolute measure.
    3. It has been estimated at 60–90% for intelligence. (\*)
    4. The heritability for intelligence has been overestimated in adoption studies.
47. Adoption studies of intelligence suggest that:
    1. Genetics is the sole determinant of intelligence.
    2. Family environment more strongly determines intelligence than genetics.
    3. Both genetics and environment contribute to intelligence. (\*)
    4. Methods exist to assess the relative contributions of genetics and experience on intelligence.
48. Which of the following techniques is used by scientists to determine the relative influence of genetics and experience on behavioral traits?
    1. Gene mapping
    2. Adoption studies (\*)
    3. Chromosomal analysis
    4. All of the above
49. Twin studies have shown that:
    1. Concordance rates for medical disorders are higher than for psychological disorders.
    2. There is a strong case for a genetic basis if the identical twin concordance rate is higher than the rate for fraternal twins. (\*)
    3. There is only weak evidence that autism has a genetic basis.
    4. All of the above
50. As far as is known, the only humans who have the same genotype are:
    1. Two individuals who look exactly alike
    2. Identical twins (\*)
    3. Fraternal twins
    4. Cousins born on the same day
51. The degree of genetic similarity between identical twins is:
    1. Nearly 100%
    2. 50%
    3. 25%
    4. 100% (\*)
52. Which statement below is *true* of the vulnerability model?
    1. We inherit dispositions, not destinies.
    2. This model has been applied to disorders such as schizophrenia.
    3. The model shows how nature and nurture interact to produce a characteristic or disorder.
    4. All of the above (\*)
53. We inherit \_\_\_but not \_\_\_.
    1. chromosomes, genes
    2. phenotypes, genotypes
    3. vulnerabilities, predispositions
    4. dispositions, destinies (\*)
54. \_\_\_ means that genes contribute a predisposition for a disorder that may or may not exceed the threshold to produce the disorder.
    1. Heritability
    2. Heritability quotient
    3. Concordance rate
    4. Vulnerability (\*)
55. One parent can produce about \_\_\_ different combinations of chromosomes, and the two together can produce about \_\_\_.
    1. 8 million, 60 to 70 trillion (\*)
    2. 100 million, 250 trillion
    3. 2 billion, 750 trillion
    4. 1 million, 6 trillion
56. The Human Genome study indicates we have about \_\_\_ genes.
    1. about 100,000
    2. between 50,000 to 100,000
    3. between 20,000 to 25,000 (\*)
    4. between 26,000 to 40,000
57. One reason that humans have fewer genes than previously thought is because \_\_\_ of the genome does not encode proteins.
    1. 25%
    2. 50%
    3. 90%
    4. 97% (\*)
58. The next (or the first) time you stare eye to eye with a chimpanzee, remember to keep this humbling fact in mind: You and the chimpanzee have \_\_\_ identical DNA sequences.
    1. 90–95%
    2. 99%
    3. 95–98% (\*)
    4. 95%
59. While chimpanzees and humans resemble each other closely in terms of DNA sequences, we do differ dramatically in measures of genetic \_\_\_.
    1. genotype
    2. regulation
    3. expression (\*)
    4. makeup
60. Rob knew the creationist had his facts way, way wrong; human and chimpanzee DNA are divergent only in about \_\_\_ of the sequences.
    1. 1%
    2. 2–5% (\*)
    3. 10%
    4. 20%
61. The proposition that heritable characteristics that provide a survival or reproductive advantage are more likely to be passed on to subsequent generations is known as:
    1. Natural selection (\*)
    2. Genetic advantage
    3. Genetic cost
    4. Selective advantage
62. Genetic effects are:
    1. Constant over one's life
    2. Active at some times, inactive at other times (\*)
    3. A constant influence if the environment selects for this
    4. Active in a fixed sequence
63. \_\_\_ is the percentage of the variation in a given characteristic that can be attributed to genetics.
    1. Inheritance
    2. Genetic quotient
    3. Heritability (\*)
    4. Genetic weight
64. Heritability estimates range from about \_\_\_ for personality to about \_\_\_ for height.
    1. 0%, 100%
    2. 10%, 60–70%
    3. 40–50%, 90% (\*)
    4. 50%, 90%
65. An individual does not inherit schizophrenia but instead inherits a \_\_\_ for becoming schizophrenic.
    1. vulnerability (\*)
    2. heritability
    3. destiny
    4. genetic weight
66. The fertilized egg is called a:
    1. Embryo
    2. Zygote (\*)
    3. Fetus
    4. Cyst
67. Through their experiments, Fritsch and Hitzig showed that:
    1. The muscle in a frog's leg can be made to move by stimulating the nerve connected to it, even if the muscle had been removed from the body. (\*)
    2. The rate of nerve conduction is about 90 feet per second.
    3. The left hemisphere controls speech.
    4. Sensation is the result of electrical activity in the brain.
68. A woman is involved in a car crash, and as a result cannot speak at all for several days. Surprisingly, she can still hear and understand what her doctor is saying perfectly fine. If her doctor ordered a CAT scan of her brain (a form of x-ray), where might the doctor see damage/swelling?
    1. In her pineal gland
    2. In her right parietal lobe
    3. In her left frontal lobe (\*)
    4. In both sides of her motor cortex
69. Female humans have:
    1. Two X chromosomes (\*)
    2. Two Y chromosomes
    3. One X and one Y chromosome
    4. One X chromosome
70. A trait is polygenic if it is influenced:
    1. By a gene on the X chromosome
    2. By a gene on the Y chromosome
    3. By more than one gene (\*)
    4. Only by a single gene
71. Heritabilities are, on average, higher for \_\_\_ than for \_\_\_.
    1. behavioral disorders, medical disorders (\*)
    2. medical disorders, behavioral disorders
    3. psychological disorders, behavioral disorders
    4. mental characteristics, psychological disorders
72. Which of the following is *not* true of gene activity?
    1. Once a gene becomes inactive, it remains inactive. (\*)
    2. Genes may fluctuate in the amount of protein they code for at different times.
    3. A gene may become active at only a certain time of the life cycle.
    4. The activity of a gene may be influenced by environmental events.
73. Which of the following traits has the highest degree of heritability?
    1. Intelligence
    2. Schizophrenia
    3. Height (\*)
    4. Alzheimer's disease
74. According to the author of your textbook, the mind \_\_\_ and is now \_\_\_.
    1. ceased being a model, a label for complex mental actions
    2. ceased being an explanation, a phenomenon requiring an explanation itself (\*)
    3. is not an explanation, just a description
    4. is no longer a phenomenon requiring explanation, an explanation
75. About how many genes are different between any two unrelated individuals?
    1. One half percent (\*)
    2. 1%
    3. 10%
    4. 20%
76. About \_\_\_ of our DNA does not encode \_\_\_.
    1. 99%, RNA
    2. 97%, RNA
    3. 97%, proteins (\*)
    4. 90%, regulatory proteins
77. The number of genes an organism has \_\_\_ correlated with the organism's complexity; humans have just a few more than a \_\_\_.
    1. is, chimpanzee
    2. is not, mouse
    3. is not, roundworm (\*)
    4. is, Neanderthal
78. An organism’s complexity \_\_\_ with the number of its genes; it \_\_\_ with the amount of junk DNA.
    1. is correlated, is not correlated
    2. is not correlated, is correlated (\*)
    3. is correlated, has no relation
    4. None of the above
79. Some of our non-coding DNA controls \_\_\_.
    1. mutation rate
    2. gene expression (\*)
    3. our junk DNA
    4. RNA expression
80. The gene that causes Huntington’s disease:
    1. Is located on chromosome 4 (\*)
    2. Was identified in 1970
    3. Will most likely be identified when the Human Genome Project is complete
    4. None of the above
81. As of 2004, Human Genome Project researchers had mapped the genome to a point of being 99% completed, and the number of gaps in the human genome had decreased from \_\_\_ to \_\_\_.
    1. 25,000, 20,000
    2. 150,000, 25,000
    3. 25,000, 341
    4. 150,000, 341 (\*)

**Essay**

1. Describe the contributions of key players in neuroscience, such as Galvani, Fritch and Hitzig, and Helmholtz.
2. What is the mind-brain problem? Discuss it in terms of both materialistic monism and dualism.
3. Discuss the role of models in guiding research, with Descartes as an example.
4. What is localization? List and discuss discoveries that led to this line of thinking in prior centuries.
5. How can nature be sorted out from nurture?
6. Distinguish between the terms dominance and recessiveness and between heterozygous and homozygous, using the trait of hand clasping preference.
7. What is meant by the statement “heritability is not an absolute measure”?
8. What is meant by the term genetic predisposition?

**True/False**

1. Neuroscience belongs to the larger field of biopsychology.

Ans: False

1. The term behavior is reserved for overt actions.

Ans: False

1. Psychology came into existence as a distinct discipline in 1879, when Wundt established the first psychology laboratory.

Ans: True

1. Materialistic monism is the belief that the mind is a phenomenon produced by the workings of the nervous system.

Ans: True

1. Biological psychologists believe there is little hope that the mind-body question will ever be solved.

Ans: False

1. Descartes concluded the mind and body interacted in the pituitary gland.

Ans: False

1. Descartes argued that the inflation of a muscle by a fluid caused movement.

Ans: True

1. Gustav Fritsch and Eduard Hitzig used electrical stimulation of the brain to produce movement.

Ans: True

1. Paul Broca identified a region of the brain that he thought was necessary for vision.

Ans: False

1. Luigi Galvani identified a region of the brain that he thought was necessary for hearing.

Ans: False

1. Hermann Helmholtz was the first to accurately measure the speed of conduction in nerves.

Ans: True

1. According to the work done by Helmholtz, the speed of neural conduction is about the same as electricity.

Ans: False

1. Empiricism is the view that information can be obtained by reasoning alone.

Ans: False

1. Genes have been unequivocally shown to cause behavior.

Ans: False

1. The Y chromosome has fewer genes on it than the X chromosome.

Ans: True

1. Over 99% of the genes in any two individuals, related or unrelated, are identical.

Ans: True

1. Of the psychological characteristics examined for their genetic basis, probably the most studied has been personality.

Ans: False

1. Identical twins can be either monozygotic or dizygotic.

Ans: False

1. The gene for Huntington’s disease is located on chromosome 4.

Ans: True

1. Humans have far fewer genes than originally thought.

Ans: True

1. The fact that parent and offspring may differ is irrelevant for natural selection.

Ans: False

1. Heritability is the percentage of variation in a given characteristic that can be attributed to genetics.

Ans: True

1. Psychologists no longer find it useful to talk about nature versus nurture.

Ans: True

1. Heritability for schizophrenia ranges from 60–90%.

Ans: True

1. Concordance rates from twin studies are higher for medical disorders than psychological disorders.

Ans: False

1. Adoption studies have tended to overestimate the heritability of intelligence.

Ans: True