**Evolution**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_ 1. (eoc) Under which condition might the theory of evolution be modified?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Additional empirical data shows natural selection occurring today. | c. | Peer review of Darwin’s earliest studies is published in a new journal. |
| b. | Scientists find data collected by a  scientist who lived before Darwin. | d. | Other studies on natural selection show new evidence about how it works. |

\_\_\_\_ 2. (eoc) Which describes the difference between pure science and applied science?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Pure science attempts to solve practical problems. | c. | Engineering would be an example of  pure science. |
| b. | Applied science attempts to solve  practical problems. | d. | Basic cell research would be an example of applied science. |

\_\_\_\_ 3. (eoc) Which describes a change of alleles in a population over time?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | relative frequency | c. | incomplete dominance |
| b. | biological evolution | d. | independent assortment |

\_\_\_\_ 4. (eoc) Which **best** illustrates the relationship between variations within a population and

natural selection?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Natural selection acts upon a population since all members of the population are identical. | c. | Giraffes have long necks and legs from stretching to reach food in trees. This trait was then passed to their offspring. |
| b. | Organisms are able to change their  genetic makeup to best adapt to a  changing external environment. | d. | Antelopes with muscular legs are able to outrun their predators better than antelopes with poor muscle tone. Thus they lived to reproduce. |

\_\_\_\_ 5. (eoc) Which taxonomic category is **most** appropriately described as a group of

individuals that can successfully interbreed?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | class | c. | family |
| b. | order | d. | species |

\_\_\_\_ 6. (eoc) A strain of bacteria has been effectively treated by penicillin for many years. Lately,

the drug has not been completely able to destroy it. What has been the result of

evolution that has taken place with the bacteria?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | DNA analysis | c. | pesticide resistance |
| b. | viral evolution | d. | antibiotic resistance |

\_\_\_\_ 7. (eoc) Which statement **best** describes what happened after Darwin developed his theory

of evolution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | It was made into a law. | c. | It was reviewed by peers for verification. |
| b. | It was automatically approved as fact. | d. | It was voted on by scientists to be accepted or rejected. |

\_\_\_\_ 8. (eoc) A species of flower lives in an environment that has always had an abundance of rain but is now experiencing less rainfall each year. Which variation within the flower population

would be beneficial in terms of natural selection?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | a difference in pollen production | c. | a difference in the length of the roots |
| b. | a difference in the color of petals | d. | a difference in the length of the stems |

\_\_\_\_ 9. (eoc) The Chinquapin, a tree native to northwest Arkansas, was plentiful until it was devastated by a fungal disease carried by the Asian chestnut tree. To restore the Chinquapin to its former numbers and maintain biodiversity, scientists should try to

|  |  |  |  |
| --- | --- | --- | --- |
| a. | remove all Asian chestnut trees from  Arkansas. | c. | develop a vaccine for the fungal disease which harms the Chinquapin. |
| b. | plant many Chinquapin trees near Asian chestnut trees. | d. | breed the surviving Chinquapin trees  that demonstrated resistance to the  disease. |

\_\_\_\_ 10. (eoc) Which is part of the process of radioactive dating for determining the age of fossils?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | using the carbon 14 isotope | c. | observing the biozones of different  species |
| b. | studying stratified bands of rocks | d. | studying the different types of inclusions found in rock formations |

\_\_\_\_ 11. (eoc) Biological evolution can be summarized as the change in

|  |  |  |  |
| --- | --- | --- | --- |
| a. | allele frequency of a population over  time. | c. | allele frequency of a population in one  generation. |
| b. | chromosome frequency of a population over time. | d. | chromosome frequency of a population in one generation. |

\_\_\_\_ 12. (eoc) Which illustrates Lamarck’s explanation of evolution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | A female peacock has brightly colored feathers, therefore attracting a mate more easily. | c. | A species of fish develops fins that  allow it to swim faster after a bigger,  predatory fish is introduced into its  environment. |
| b. | A population of humans develops a  darker skin tone after moving to a  sunnier and warmer environment. | d. | A blacksmith, through his work,  strengthens the muscles in his arms, and therefore, his sons will have similar muscular development when they mature. |

\_\_\_\_ 13. (eoc) Relative dating of fossils is **different** from radioactive dating of fossils because relative

dating

|  |  |  |  |
| --- | --- | --- | --- |
| a. | requires the use of modern technology. | c. | measures changes in fossils according to decaying isotopes. |
| b. | can provide a rough estimation of the  age of a fossil. | d. | requires observing the location in which the fossil was found. |

\_\_\_\_ 14.  **Event Estimated Time of Occurrence**

earliest evidence of life ..............3.5 billion years ago

Paleozoic era begins................. 545.0 million years ago

first land plants......................... 400.0 million years ago

Triassic period begins............... 248.0 million years ago

Mesozoic era begins................. 245.0 million years ago

first mammals and dinosaurs...... 225.0 million years ago

Jurassic period begins............... 208.0 million years ago

first birds.................................. 150.0 million years ago

Cretaceous period begins.......... 144.0 million years ago

dinosaurs become extinct........... 65.0 million years ago

Cenozoic era begins................... 65.0 million years ago

primates appear......................... 60.0 million years ago

humans appear 200.0 thousand years ago

(eoc) At what point did a catastrophic environmental change **most** likely take place across the planet?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 65 million years ago | c. | 225 million years ago |
| b. | 144 million years ago | d. | 400 million years ago |

\_\_\_\_ 15. (eoc) What question did both Lamarck and Darwin try to answer with their theories of evolution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | What is the role of DNA in the  inheritance of traits? | c. | What are the patterns of heredity in  sexually reproducing organisms? |
| b. | What causes populations of organisms to change over time? | d. | What happens to beneficial traits when populations undergo natural selection? |

\_\_\_\_ 16. (eoc) Geneticists have learned that segment’s of a cell’s DNA can be removed and replaced with different segments of DNA. What development can arise as a result of this knowledge?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | animals that can inherit acquired traits | c. | crops that can avoid passing genetic traits to their offspring |
| b. | crops that have more desirable genetic traits | d. | animals that can convert acquired traits into genetic ones |

\_\_\_\_ 17. (eoc) Biologists have the technology to convert a tiny amount of DNA, such as that found in

ancient fossils, into a large amount of DNA, which is more easily studied. What scientific

discovery has resulted from this technology?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the social interactions between many  ancient species | c. | the evolutionary relationships between many ancient species |
| b. | the traits that many ancient species  learned and acquired | d. | the environmental factors that caused  many ancient species to evolve |

\_\_\_\_ 18. (eoc) Which bond must be broken for DNA replication to occur?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Hydrogen bond | c. | Ionic Bond |
| b. | Peptide bond | d. | None of the Above |

\_\_\_\_ 19. (eoc) Which statement best describes the mapping of the human genome?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | It has rejected the basic premises of the cell theory | c. | It has rejected the basic premise of the chromosome theory of heredity. |
| b. | It is built on the foundation reaching back to the germ theory disease. | d. | It is built on a foundation reaching back to the chromosome theory of heredity. |

\_\_\_\_ 20. (eoc) When viewing a karyotype, which evidence provides the strongest support that an

individual body cell has the condition of trisomy?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The cell has an odd number of chromosomes. | c. | One chromosome appears shorter than its match. |
| b. | The cell has an even number of chromosomes. | d. | One chromosome appears to be inverted in comparison to its match. |

\_\_\_\_ 21. (eoc) Which nitrogen base is found only in an RNA nucleotide

|  |  |  |  |
| --- | --- | --- | --- |
| a. | uracil | c. | cytosine |
| b. | thymine | d. | guanine |

\_\_\_\_ 22. (eoc) A cell nucleus sends out molecules that carry instructions for protein synthesis. What is the destination of these molecules?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell membrane | c. | enzymes |
| b. | cytoskeleton | d. | ribosomes |

\_\_\_\_ 23. (eoc) Which structural component do DNA and RNA have in common?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | uracil | c. | phosphate group |
| b. | double-stranded backbone | d. | deoxyribose sugar |

\_\_\_\_ 24. (eoc) One way in which a point mutation and a deletion mutation are **different** is that

|  |  |  |  |
| --- | --- | --- | --- |
| a. | a point mutation is always harmful, and a deletion mutation is never harmful. | c. | a point mutation always results in a  frameshift mutation, while a deletion  mutation never results in a frameshift  mutation. |
| b. | a point mutation is a physical change,  and a deletion mutation is a chemical  change. | d. | a point mutation only results in a change in a single nucleotide base, while a deletion mutation can result in a change in multiple nucleotide bases. |

\_\_\_\_ 25. (eoc) Which organic molecule is part of an enzyme?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fatty acid | c. | amino acid |
| b. | nucleotide | d. | glycerol |

\_\_\_\_ 26. (eoc) Which is a **correct** example of the base-pairing rule within the Watson-Crick

double-helix model of DNA?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | guanine-adenine | c. | thymine-guanine |
| b. | adenine-thymine | d. | cytosine-thymine |

\_\_\_\_ 27. A normal strand of DNA is shown below, followed by the same strand of DNA after

mutations have occurred.

Normal strand: GTCCATCTGATTACGGCA

Mutated strand: GTCCATCGATTACGGCA

Which mutations have taken place?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | insertion and inversion mutations | c. | inversion and deltion mutations |
| b. | substitution and frameshift mutations | d. | deletion and frameshift mutations |

\_\_\_\_ 28. (eoc) When a chromosome appears by itself within a karyotype and not as part of a pair, it is known as

|  |  |  |  |
| --- | --- | --- | --- |
| a. | trisomy | c. | codominance |
| b. | monosomy | d. | incomplete dominance |

\_\_\_\_ 29. (eoc) What type of mutation occurs when a nucleotide base is replaced with a chemically

similar nucleotide base and, therefore, there are no recognizable effects upon the

organism?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | neutral mutation | c. | structural mutation |
| b. | harmful mutation | d. | beneficial mutation |

\_\_\_\_ 30. (eoc) How do the functions of DNA and RNA differ?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | DNA directs protein transport, while  RNA aids in energy production. | c. | DNA stores genetic information, while RNA relays genetic information for protein synthesis. |
| b. | DNA aids in energy production, while  RNA directs protein transport. | d. | DNA relays genetic information for  protein synthesis, while RNA stores  genetic information. |

\_\_\_\_ 31. (eoc) Which mode of inheritance explains why a mother with a particular recessive trait will

**always** pass it on to her son?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | sex-linkage | c. | multiple alleles |
| b. | codominance | d. | incomplete dominance |

\_\_\_\_ 32. (eoc) Which are components of DNA and RNA?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | sugar, sulfate, and amino acid | c. | sugar, phosphate, and amino acid |
| b. | sugar, sulfate, and nucleic acid | d. | sugar, phosphate, and nitrogenous base |

\_\_\_\_ 33. (eoc) What is the difference in structure between RNA and DNA?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | RNA is double stranded while DNA is single stranded. | c. | RNA has a 6-carbon sugar while DNA has a 5-carbon sugar. |
| b. | RNA is single stranded while DNA is  double stranded. | d. | RNA has a 5-carbon sugar while DNA has a 6-carbon sugar. |

\_\_\_\_ 34. (eoc) If one parent is homozygous recessive for attached earlobes and the other is

heterozygous, what is the probability that their children will have attached earlobes?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 25% | c. | 75% |
| b. | 50% | d. | 100% |

\_\_\_\_ 35. (eoc) What was one contribution Gregor Mendel made to science by performing his

experiments on plants?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | showing that traits are inherited | c. | showing that the structure of DNA is a double helix |
| b. | proving that traits can be acquired-not inherited | d. | proving that random mutations cause the creation of a new species |

\_\_\_\_ 36. (eoc) Why is it important that the number of chromosomes be reduced during meiosis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The cell can grow without the DNA content increasing. | c. | The chromosome number will stay constant from one generation to the next |
| b. | The amount of DNA in the cell can remain at its lowest number | d. | The nucleus of the cell will not be allowed to become larger due to cell growth. |

\_\_\_\_ 37. (eoc) Which theory was **most** influential in the completion of the Human Genome Project?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell theory | c. | germ theory of disease |
| b. | theory of evolution | d. | chromosome theory of heredity |

\_\_\_\_ 38. (eoc) According to the laws of genetics as determined by Gregor Mendel, the allele that

expresses itself in the phenotype of an organism is called the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | mutated allele. | c. | recessive allele. |
| b. | inherited allele. | d. | dominant allele. |

\_\_\_\_ 39. (eoc) Gregor Mendel’s experiments showed that an understanding of probabilty could be used to

|  |  |  |  |
| --- | --- | --- | --- |
| a. | find the molecular basis of genes. | c. | predict patterns of genetic inheritance. |
| b. | discover where genes exist in the cell. | d. | determine the structure of the DNA molecule. |

\_\_\_\_ 40. (eoc) When a cell with half the normal number of chromosomes is generated during meiosis,

how can it eventually produce cells with the normal number of chromosomes?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | by undergoing the 6 phases of mitosis. | c. | by releasing young normal cells through exocytosis. |
| b. | by forming 2 nuclei in cell division | d. | by combining with a gamete from another organism. |

\_\_\_\_ 41. (eoc) Gregor Mendel’s work with garden peas led him to a crucial understanding of inheritance. Before Mendel started his experiments, he had to ensure his plants were

|  |  |  |  |
| --- | --- | --- | --- |
| a. | hybrids. | c. | purebred. |
| b. | asexual. | d. | cross-pollinated. |

\_\_\_\_ 42. (eoc) Through his experiments with pea plants, Gregor Mendel concluded that inheritance of

traits is determined by

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the presence of bees in the environment. | c. | the environmental conditions on the day of mating. |
| b. | a factor that is just passed down from one parent. | d. | a pair of factors, one passed down from each parent. |

\_\_\_\_ 43. (eoc) A couple has two children, one with brown hair and blue eyes and one with brown hair and brown eyes. The fact that the children can have the same hair color but **different** eye color is explained by the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | law of segregation. | c. | principle of dominance. |
| b. | principle of probabilty. | d. | law of independent assortment. |

\_\_\_\_ 44. (eoc) In pea plants, a smooth pea is dominant to a wrinkled pea. What is the genotypic ratio from a cross between a plant that has homozygous smooth-skin peas and a plant with wrinkled-skin peas?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 4 RR; 0 Rr; 0 rr | c. | 0 RR; 0 Rr; 4 rr |
| b. | 0 RR; 4 Rr; 0 rr | d. | 1 RR; 2 Rr; 1 rr |

\_\_\_\_ 45. (eoc) In tomato plants, the tall vine allele (T) is dominant to the short vine allele (t). Two tomato plants are crossed. Among the offspring plants grown from seed, 45% have tall vines and 55% have short vines.What are the most likely genotypes of the parent plants?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | TT and tt | c. | Tt and tt |
| b. | Tt and TT | d. | tt and tt |

\_\_\_\_ 46. (eoc) In fish of the species Perissodus microlepis, some individuals have mouths that open to the right and some individuals have mouths that open to the left. The direction of the mouth opening is a genetic trait controlled by a single gene. The allele for a right-opening mouth (R) is dominant to the allele for a left-opening mouth (r). If two fish heterozygous for the mouth trait are crossed, what is the expected ratio of phenotypes in the offspring?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 1 right-opening mouth : 3 left-opening mouth | c. | 3 right-opening mouth : 1 left-opening mouth |
| b. | 2 right-opening mouth : 2 left-opening mouth | d. | 4 right-opening mouth : 0 left-opening mouth |

\_\_\_\_ 47. (eoc) Which of the following crosses does **not** follow Mendel’s law of segregation?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Two tall pea plants (Tt x Tt) are expected to produce some tall offspring plants. | c. | A tall pea plant and a short pea plant (Tt x tt) are expected to produce all tall offspring plants. |
| b. | Two tall pea plants (Tt x Tt) are expected to produce some short offspring plants. | d. | A tall pea plant and a short pea plant (TT x tt) are expected to produce all tall offspring plants. |

\_\_\_\_ 48. (eoc) In rabbits, a single gene controlling coat color has four alleles. The inheritance pattern for coat color in rabbits is therefore best described as which of the following?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | multiple allele. | c. | recessive. |
| b. | polygenic. | d. | sex-linked. |

\_\_\_\_ 49. (eoc) According to Mendel’s law of segregation, which of the following describes what happens to the alleles of a gene pair?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The alleles are moved to different chromosomes. | c. | The alleles are separated during fertilization. |
| b. | The alleles are mutated in the process of mitosis. | d. | The alleles are separated during gamete formation. |

**Evolution**

**Answer Section**

**MULTIPLE CHOICE**

1. ANS: D PTS: 1

2. ANS: B PTS: 1

3. ANS: B PTS: 1

4. ANS: D PTS: 1

5. ANS: D PTS: 1

6. ANS: B PTS: 1

7. ANS: C PTS: 1

8. ANS: C PTS: 1

9. ANS: D PTS: 1

10. ANS: A PTS: 1

11. ANS: A PTS: 1

12. ANS: D PTS: 1

13. ANS: D PTS: 1

14. ANS: A PTS: 1

15. ANS: B PTS: 1

16. ANS: B PTS: 1

17. ANS: C PTS: 1

18. ANS: A PTS: 1

19. ANS: D PTS: 1

20. ANS: A PTS: 1

21. ANS: A PTS: 1

22. ANS: D PTS: 1

23. ANS: C PTS: 1

24. ANS: D PTS: 1

25. ANS: C PTS: 1

26. ANS: B PTS: 1

27. ANS: D PTS: 1

28. ANS: B PTS: 1

29. ANS: A PTS: 1

30. ANS: C PTS: 1

31. ANS: A PTS: 1

32. ANS: D PTS: 1

33. ANS: B PTS: 1

34. ANS: B PTS: 1

35. ANS: A PTS: 1

36. ANS: C PTS: 1

37. ANS: D PTS: 1

38. ANS: D PTS: 1

39. ANS: C PTS: 1

40. ANS: D PTS: 1

41. ANS: C PTS: 1

42. ANS: D PTS: 1

43. ANS: D PTS: 1

44. ANS: B PTS: 1

45. ANS: C PTS: 1

46. ANS: C PTS: 1

47. ANS: C PTS: 1

48. ANS: A PTS: 1

49. ANS: D PTS: 1