

### D3 Life Science Written Questions:

- Which of the following is not suggested in Charles Darwin's theory of evolution?
  - All species share a common ancestor that evolved over time
  - Favorable traits that are heritable are passed down
  - Specific organisms will adapt to their environment over time
  - Random mutations cannot create new heritable traits
- Which of the following is NOT a requirement for Hardy-Weinberg Equilibrium?
  - A very large population
  - No immigration or emigration from the population
  - Sexual selection
  - No natural selection
- Which of the following plant cells is commonly associated with lignified cell walls and can form fibers?
  - Parenchyma cells
  - Collenchyma cells
  - Sclerenchyma cells
  - Sclereid cells
- You stumble into a secret garden, which has a population of jewel-tailed mice in Hardy-Weinberg equilibrium. They either are ruby-tailed or sapphire-tailed. Based on a journal you found hidden beneath a stone bench, you discover that the population obeys Mendelian genetics with ruby tail being dominant, and there are 84 ruby-tailed and 16 sapphire-tailed mice. What percentage of the population is heterozygous for ruby tails?
  - 40%
  - 48%
  - 60%
  - 84%
- In your adventures with your ecology professor Dr. K, you have found a pond of 100 frogs with gold and silver skin. The frogs' skin obey Mendelian genetics, and previous notes indicate that a true-breeding gold frog and true-breeding silver frog have all golden offspring. In an effort to save the fast-dwindling and highly endangered silver frogs, you scoop up all the silver-skinned frogs in the population. There are 96 golden-skinned frogs left. Which of the following is closest to the frequency of the silver skin allele in the remaining pond population?
  - 0.17
  - 0.20
  - 0.80
  - 0.83
- Which of the following organelles is present in mature red blood cells?
  - Nucleus
  - Mitochondria
  - Ribosomes
  - Endoplasmic reticulum
- Which of the following is not a step of aerobic cellular respiration?
  - Krebs cycle

- b. Calvin cycle
  - c. Oxidative phosphorylation
  - d. Glycolysis
8. Where is the oxygen from photosynthesis derived?
- a. Carbon dioxide
  - b. Water
  - c. Both A and B
  - d. Neither A nor B
9. How many polypeptide chains make up a singular human hemoglobin?
- a. 1
  - b. 2
  - c. 3
  - d. 4
10. Which of the following eye structures is responsible for color vision?
- a. Cornea
  - b. Rods
  - c. Cones
  - d. Sclera
11. The wing of a bat and a whale flipper are an example of:
- a. Homologous structures
  - b. Automorphic structures
  - c. Analogous structures
  - d. Facsimile structures
12. The soil horizon that usually the least disturbed is:
- a. A horizon
  - b. B horizon
  - c. C horizon
  - d. O horizon
13. Which of the following characteristics would likely be present in grass?
- a. Two cotyledons
  - b. Branched venation
  - c. Tap root system
  - d. Scattered vascular bundles
14. In Mendelsohn and Stahl's experiment, which element was used to determine that DNA replication is semi-conservative?
- a. Nitrogen
  - b. Oxygen
  - c. Phosphorus
  - d. Sulfur
15. Which of the following does blood travel through as it exits the heart into the lung capillaries?
- a. Aorta
  - b. Vena cavae
  - c. Pulmonary artery
  - d. Pulmonary vein

16. Which of the following characterizes earlywood in a tree trunk?
  - a. Closely packed cells
  - b. The delineation of a “tree ring”
  - c. Large vessels
  - d. Unusually high amounts of collenchyma cells
17. In a population of Ostriches, a particular gene is responsible for leg length. The gene has two alleles: A and B. If the frequency of A is 0.6, what is the frequency of B?
  - a. 0.6
  - b. 0.16
  - c. 0.36
  - d. 0.4
18. Which of the following is not a muscle tissue type?
  - a. Smooth muscle
  - b. Cardiac muscle
  - c. Nervous muscle
  - d. Skeletal muscle
19. Which of the following is not directly involved in transmitting electrical signals throughout the nervous system?
  - a. Synapses
  - b. Axons
  - c. Dendrites
  - d. Bones
20. In an ecosystem, which of the following would be an abiotic factor?
  - a. Water
  - b. Bacteria
  - c. Animals
  - d. Plants
21. What does amylase do in the digestive system?
  - a. Breaks down proteins
  - b. Breaks down carbohydrates
  - c. Breaks down lipids
  - d. Breaks down nucleic acids
22. What is the role of nephrons?
  - a. The production of urine
  - b. The filtration of blood
  - c. The creation of water
  - d. The production of digestive enzymes
23. A karyotype of a person shows that the person has an extra chromosome 21. What condition does this person have?
  - a. Turner Syndrome
  - b. Cleft Palate
  - c. Down Syndrome
  - d. Cystic Fibrosis
24. What model of replication does DNA follow?

- a. Conservative Model
  - b. Semiconservative Model
  - c. Dispersive Model
  - d. Semi-Dispersive Model
25. Which of the following is an example of allopatric speciation?
- a. Convergent Evolution
  - b. Divergent Evolution
  - c. Cloning
  - d. Geographic Isolation
26. Which of these is a vestigial organ in humans?
- a. Liver
  - b. Stomach
  - c. Appendix
  - d. Loop of Henle
27. What is the role of catalase?
- a. DNA replication
  - b. Breaking down H<sub>2</sub>O<sub>2</sub>
  - c. Synthesis of insulin
  - d. Production of bile
28. Which of these body systems is responsible for the coordination and the control of the human body?
- a. Motor System
  - b. Digestive System
  - c. Circulatory System
  - d. Endocrine System
29. Which of the following is not a characteristic of Chordata?
- a. Dorsal Nerve Cord
  - b. Segmental tissue
  - c. Pharyngeal Slits or Clefts
  - d. Post-anal Tail
30. Which of the following animals has the fastest metabolism?
- a. Elephant
  - b. Lion
  - c. Human
  - d. Rat