

Practice questions for midterm 1

1. The physiochemical theory of life implies that ...

- A. The behavior of living organisms can be predicted based on physiochemical laws.
- B. Living organisms must be made of carbon.
- C. Living organisms do not violate physical or chemical laws.

_____ is wrong because ...

2. Charles Darwin wrote "Ignorance more frequently begets confidence than does knowledge: it is those who know little, and not those who know much, who so positively assert that this or that problem will never be solved by science." What gives us confidence that problems, like the origin of life, will eventually be solved scientifically?

- A. A. simple human arrogance
- B. a belief that the world was created in such a way so that we would be able to understand it
- C. previous experience with difficult problems

_____ is wrong because ...

3. In a particular population the average male and female each produce

- A. the same number of offspring
- B. males produce more
- C. females produce more

_____ is wrong because ...

4. You find a completely new form of life, one that does not use DNA to store genetic material or proteins to get things done. Where would you put such an organism on the circular tree of life?

- A. I would put it on a new circle
- B. I would put it near the center of the circle
- C. I would put it on the periphery, but unconnected to other organisms

_____ is wrong because ...

5. Which do you think is beyond the ability of science to achieve

- A. the creation of a living organism
- B. the construction of a thinking (self-conscious) machine
- C. the construction of machine that generates more energy than it uses

_____ is wrong because ...

6. You go to Whole Foods and you see a new holistic "supplement" that suggests it can help

people with "social awkwardness disorder" (SAD). When you read the instructions, you discover that you are supposed to take a shower and brush your teeth after you take the supplement. What kind of study might you want to perform in order to convince yourself that the supplement actually works as advertised.

- A. take a shower and brush your teeth without taking the medicine
- B. take the medicine, but don't take a shower or brush your teeth
- C. take the medicine, brush your teeth and take a shower

_____ is wrong because ...

7. There is a human gene which, when mutated, leads to significant increase in intelligence, and this increase occurs in young children. There is evidence that the "smart version" of the gene is always rapidly eliminated from populations of humans. Which is a plausible reason?

- A. genetic drift leads to its elimination
- B. higher intelligence makes it harder to find a mate
- C. the early increase in intelligence drives parents crazy, and they abandon their "smart ass" children

_____ is wrong because ...

8. Some lost and befuddled aliens visit the earth about 120 million years ago, they are most likely to find

- A. humans
- B. apes
- C. the ancestors of humans

_____ is wrong because ...

9. Consider humans, how would you describe the effects of sexual selection; it

- A. exclusively effected males
- B. exclusively effected females
- C. produced different effects on males and females

_____ is wrong because ...

10. Consider the following distribution of a trait (within a population); over time the number of organisms at the position of the down arrow decreases, while those at the up arrow increases; what type of selection is occurring?

- A. Disruptive
- B. Conservative
- C. Directed

_____ is wrong because ...

11. Under what conditions would disruptive selection be most likely to occur?

- A. a uniform environment, with a small population
- B. rapidly changing environment with a large population
- C. a very diverse environment, independent of population size

_____ is wrong because ...

12. How does population size influence genetic drift?

- A. no effect, drift is independent of population size
- B. the smaller the population, the more rapid is the effect of genetic drift
- C. the larger the population, the more rapid is the effect of genetic drift

_____ is wrong because ...

13. When fossils were first understood to represent organisms that lived long ago, it was hard to understand why any type of organism would become extinct. Now we understand that extinct organisms ...

- A. were unable to adapt to a changing environment
- B. were unable to survive due to genetic drift and high levels of mutation
- C. were badly designed from the onset

_____ is wrong because ...

14. Most adult mammals are intolerant of milk sugar (lactose). However, there are populations of humans in which lactose tolerance is high. We can assume that ...

- A. lactose tolerance is a homologous trait
- B. lactose tolerance is harmful
- C. lactose tolerance is an analogous trait

_____ is wrong because ...

15. Even among species that form stable mating pairs, and in which the males aggressively "protect their females", it is not uncommon to find evidence of sexual "cheating." This is because....

- A. such a strategy can enhance the reproductive success of females
- B. such a strategy permits all males a chance to breed
- C. animals are unaware of their own behavior, that is, they do not think they are cheating

_____ is wrong because ...

16. The most extreme forms of sexual selection generally affect males because ...

- A. males differ more than females in terms of reproductive success
- B. females lack the genetic variation to produce such traits
- C. females are less interested in sex than males

_____ is wrong because ...

17. Genetic drift can be beneficial in terms of subsequent evolution because ...

- A. it decreases the size of the population on which selection acts
- B. an originally harmful trait can be changed by mutation and subsequent selection
- C. it preferentially removes harmful traits, leaving beneficial ones

_____ is wrong because ...

18. Predict the appearance of the most recent common ancestor of humans and cows...

- A. large and scaly
- B. small and furry
- C. furry and egg laying

_____ is wrong because ...

19. A number of different organisms have eyes, these are...

- A. homologous
- B. analogous
- C. depends on the organisms

_____ is wrong because ...

20. Domesticated dogs range from the smallest Chihuahua (~2 lbs) to the largest English Mastiff (~280 lbs), a range of over two orders of magnitude (10^2). Why isn't there a similar range in the sizes of domestic cats?

- A. Dogs have more genetic variation than cats
- B. Large cats are more dangerous than large dogs
- C. The social nature of dogs makes it easier to breed for "controllability"

_____ is wrong because ...

Exam 2-1 A scientific theory is characterized by the fact that

- A. it is the most widely accepted explanation of a particular observation
- B. it is based on the fewest possible assumptions
- C. it makes testable predictions that have been confirmed
- D. it upsets the fewest number of people

_____ is wrong because ...

2. Physical laws, chemical principles, and evolutionary mechanisms

- A. accurately predict which organisms exist today
- B. are sufficient to explain how the universe works
- C. are insufficient to explain how the human brain works
- D. are sufficient to explain the meaning of life

_____ is wrong because ...

3. If spontaneous generation had occurred during the last 10 million years or so, how would that change the circular map of life?

- A. no change, same as before
- B. dramatically, and would indicate that the theory of evolution is incorrect.
- C. some organisms would be "unconnected" to others
- D. all organisms would be "unconnected" to each other

_____ is wrong because ...

4. According to the naturalistic hypothesis upon which science is based, the soul

- A. could not, if it exists, be studied scientifically
- B. is the product of a living human brain
- C. is the factor that makes scientific experiments on human beings difficult
- D. has been proven not to exist

_____ is wrong because ...

5. At the end of Pasteur's famous experiment on spontaneous generation, he broke open the sterile flasks and found that growth began. This proved that

- A. the broth was originally sterile
- B. the broth could support growth
- C. the broth required a component of air to support growth
- D. it was a negative control experiment

_____ is wrong because ...

6. Wohler's synthesis of urea and the Miller/Urey experiment proved ...

- A. the origin of life occurred soon after the formation of the earth
- B. organic molecules can be synthesized outside of cells
- C. the mechanism of spontaneous generation is simple
- D. the origin of life involved electricity

_____ is wrong because ...

7. You are trying to determine whether two populations of similar looking birds, living in different geographical areas, are members of the same or different species, you would

- A. Closely compared their anatomies
- B. Carefully study their behavior
- C. Determine whether they produce fertile offspring
- D. Determine whether they produce any offspring

_____ is wrong because ...

8. A population of an organism reaches steady state; which would most likely have the biggest impact on population density?

- A. sexual dimorphism
- B. the residual effects of genetic drift
- C. the indirect effects of disruptive selection on mate choice
- D. the need to establish territories in order to breed successfully

_____ is wrong because ...

9. According to modern biological theory

- A. all cells are analogous
- B. all cells are homologous
- C. different types of cells are the result of distinct spontaneous generation events
- D. depends upon which group of organisms we are considering

_____ is wrong because ...

10. What is one of the key biological facts that leads to "naturalselection"?

- A. The importance of choosing the "right" mate.
- B. The heritable nature of variation
- C. The ability of organisms to produce many offspring
- D. The ability to anticipate future needs

_____ is wrong because ...

11. For sexual selection to occur, which must be true?

- A. mate choice must lead to increased reproductive success
- B. the features chosen must not negatively impact the individual's survival
- C. the number of males and females in the population must be similar
- D. depends upon which group of organisms we are considering

_____ is wrong because ...

12. A population of sexually reproducing organisms undergoes a major bottleneck; after the bottleneck, the effects of genetic drift

- A. remains unchanged
- B. increases
- C. decreases
- D. is determined by the mutation rate

_____ is wrong because ...

13. Under which conditions is disruptive selection likely to occur?

- A. An environment in which the mutation rate is low stable

- B. A uniform environment
- C. A rapidly changing environment
- D. A spatially heterogeneous environment

_____ is wrong because ...

14. What limits the extent to which directed selection can act on a particular trait

- A. the number of genes involved in producing the trait.
- B. the costs and benefits associated with a trait
- C. the genetic variation present in the population at the start of the process
- D. sexual selection and genetic drift

_____ is wrong because ...

15. Vertebrate eyes, but not molluscan eyes, have a blind spot - a hole in the retina. This is an example of

- A. differences in the environment in which eyes evolved.
- B. differences in constraints posed by the laws of optics
- C. early, independent events in the evolution of the eye
- D. the homologous nature of eyes

_____ is wrong because ...

16. Unlike other mammals, some (but not all) adult humans can tolerate (and even enjoy) drinking milk. This is evidence for

- A. genetic drift or a population bottleneck
- B. the effects of selection on certain populations
- C. the fact that milk drinking can lead to resistance to disease
- D. humans do not share a common ancestor with other mammals

_____ is wrong because ...

17. The extinction of a species is evidence for

- A. Bad initial design
- B. Excessive specialization and environmental change environment
- C. lack of variation within the population
- D. bad luck, pure and simple

_____ is wrong because ...

18. Imagine a population of organisms in which all mutation stopped. What would be most likely to happen?

- A. Conservative selection who produce a perfectly uniform population of organisms
- B. Disruptive selection would produce distinct types of organisms
- C. Evolutionary change would continue for awhile and then stop

D. The population would become extinct

_____ is wrong because ...

19. One reason that sexual selection often effects male rather than female traits is that

- A. Typically a population contains more males than females
- B. Typically females go out of their way to hide themselves from predators
- C. Typically there is a larger difference between the reproductive success of males than of females
- D. The effects of testosterone makes males unable to think of alternative ways to attract females

_____ is wrong because ...