BIO 170 General Biology I
Spring 2013
Freeman
Lecture Exam 1
Part B

1) This is part B of the lecture exam. Please choose the answer b below:
   a. Do not choose this answer
   b. Choose this answer

2) Which of the following lends evidence for evolution
   a. Fossils
   b. Homology
   c. Biogeography
   d. Artificial selection
   e. All of the above

3) There is a population of beetles that typically have black wings. A scientist studying these beetles knows that their eggs hatch in early spring, the baby insects grow through the late spring and summer, they lay eggs in the early fall, and die in the early winter. Recently some beetles have been born with white wings. Early in life the black and white winged beetles seem to be very similar in number of mating events, eggs laid, and survival rates, but shortly after laying their eggs the white beetles die and there are only black winged beetles during the late fall. Which of the following is a true statement about the beetles?
   a. White and black winged beetles have equal fitness
   b. Black winged beetles have a higher fitness than white winged beetles
   c. The number of baby white winged beetles will decrease in frequency over time.
   d. White wings are an adaptation.

4) Which of the following is the best modern definition of evolution
   a. Survival of the fittest
   b. Change in allele frequencies in a population over time
   c. Descent without modification
   d. Inheritance of acquired characteristics

5) Do individuals change when natural selection occurs? Why or why not?
   a. No. Individuals do not change because the population does not.
   b. Yes. Individuals change because the population does.
   c. Yes. Acquired characteristics produce adaptations.
   d. No. Individuals do not change but the population does.

6) Evolution is occurring today
   a. True
   b. False
7) Darwin developed his theory of natural selection based on all the following observations EXCEPT
a. Individuals vary in the traits they possess
b. Traits are heritable
\textcolor{red}{c. Individuals produce enough offspring to replace themselves}
d. Resources are limited

8) Fitness refers to
a. The number of offspring an individual leaves to the next generation
b. The strength on an individual
c. The health on an individual
d. All of the above

9) The similarity of the bone structure in a horse's forelimb and a bat's wing is an example of
a. Structural homology
b. Structural homoplasy
c. Developmental homology
d. Developmental homoplasy

10) Long necks make it easier for giraffes to reach leaves high on trees, while also making them better fighters in “neck wrestling” contests. In both cases, which kind of selection appears to have made giraffes the long-necked creatures they are today?
\textcolor{red}{a. Directional selection}
b. Disruptive selection
c. Stabilizing selection

11) Genetic drift \textcolor{red}{__________}.
\textcolor{red}{a. Produces changes in allele frequencies that are not adaptive}
b. Is most pronounced in large populations
c. Cannot occur if mating is random
d. Can lead to fixation of alleles only.

12) How do stabilizing and disruptive selection differ?
\textcolor{red}{a. With stabilizing selection, the average phenotype for a trait does not change. With disruptive selection, the average phenotype for a trait changes.}
b. Stabilizing selection produces adaptation. Disruptive selection is non-adaptive.
c. Stabilizing selection reduces the amount of variation in a trait. Disruptive selection increases the amount of variation in a trait.
d. With stabilizing selection, extreme individuals have high biological fitness. With disruptive selection, extreme individuals have low biological fitness.
13) Knowing that there are 30% blue eyed individuals in the population and 70% brown eyed individuals tells you the
   a. Genotype ratio
   b. Phenotype ratio
   c. Allele ratio
   d. Gene pool

14) Gene flow between populations ______.
   a. Increases the differences between the populations.
   b. Causes the populations to become more similar.
   c. Either a or b could occur.

15) Mutation is the only creative force in evolution.
   a. True
   b. False

16) Refer to the picture to the right. Which of the following forms a monophyletic group?
   a. A, B, C, D
   b. C and D
   c. D, E, and F
   d. E, F, and G
   e. All of the above

17) There is an island in the middle of a large river that houses a large population of ants. Damming of the river causes the island to flood and only the highest points of the island are now above water. The ants cannot swim, so are now in multiple isolated populations. Which of the following best describes this event?
   a. Isolation by dispersal
   b. Isolation by vicariance
   c. A form of sympatric speciation
   d. Speciation will not occur in this case because of gene flow

18) Natural selection for traits that keep distinct populations from reproducing with each other is called reinforcement. When is reinforcement beneficial?
   a. When prezygotic isolating mechanisms are in place
   b. When the environment is changing
   c. When gene flow is low
   d. When hybrids have lower fitness than either parent population
   e. Reinforcement is beneficial under all the above conditions
19) All of the following are prezygotic reproductive isolation mechanisms EXCEPT
   a. Behavioral isolation
   b. Temporal isolation
   c. Mechanical isolation
   d. Hybrid sterility

20) A gametic barrier refers to
   a. Vicariance
   b. Incompatibility between egg and sperm
   c. Incompatibility between male and female reproductive morphology
   d. Gametes maturing a different times

21) The morphospecies concept _________.
   a. Can be applied to fossil species
   b. Is used when the criterion of reproductive isolation cannot be applied
   c. Relies on morphological similarity to determine evolutionary lineages
   d. All of the above.

22) Which of the following statements about adaptive radiation is correct?
   a. Adaptive radiation occurs within a single lineage.
   b. Adaptive radiation occurs very slowly over time.
   c. Adaptive radiation occurs in species that live in one habitat.
   d. Adaptive radiation occurs in the presence of competitors.

23) Which statement is correct?
   a. A synapomorphy is an ancestral trait.
   b. Synapomorphies identify monophyletic groups.
   c. Synapomorphies are examples of homoplasy.
   d. All of the above.

24) In the diagram to the right, the arrow points to
   a. A node
   b. A tip
   c. A branch
   d. A lineage

25) Populations must be physically separated in order to evolve into separate species.
   a. True
   b. False
26) The phenetic approach to constructing phylogenies is based on
   a. Identifying Synapomorphies between lineages
   b. Overall similarity of lineages
   c. Phenotypic ratios
   d. All of the above

27) A modified ancestral trait is referred to as
   a. A homology
   b. A homoplasy
   c. A derived trait
   d. A synapomorphy