

BIO100 Spring 2011

Practice Final Exam

True or False:

1. Continuous characteristics exhibit average values.

a. True

b. False

2. Different populations of the same species can exhibit different average values for the same trait.

a. True

b. False

3. In evolutionary terms, individuals can adapt to their environment.

a. True

b. False

4. Variation for a trait within a population is required if evolution is to occur.

a. True

b. False

5. In evolutionary terms, populations can adapt to their environments.

a. True

b. False

6. According to Hardy-Weinberg, if a population meets “ideal conditions” it will never evolve.

a. True

b. False

7. Members of two populations are considered members of two different species once they no longer

- a. can interbreed to produce viable and fertile offspring
- b. can subsist on the same prey species
- c. interact in nature
- d. be shot to yield valuable pelts

8. At the turn of the last century, the catastrophist (or Saltationist) school of thought believed that new species were usually formed due to

- a. hybridization between preexisting species
- b. slow, constant change over long periods of time
- c. rapid, or sudden, change punctuating long periods of little or no change
- d. intelligent design of a divine creator

9. Hardy and Weinberg demonstrated that, under ideal conditions,

- a. allele frequencies in a population will not change over time
- b. the frequency of genotypes in the population will not change over time
- c. populations will not evolve
- d. all of the above

10. Hardy-Weinberg equilibrium in a population with two possible alleles at one gene locus is given by the equation $p^2 + 2pq + q^2 = 1$, where p = the frequency of the first possible allele in the population and q = the frequency of the alternative allele in the population. Brown eyes is determined by a recessive allele in fruit flies. If I sample 10,000 fruit flies from a wild population and find one (1) to have brown eyes, what is the estimated frequency of the brown-eyed **allele** in this population?

- a. 0.1
- b. 0.01
- c. 0.001
- d. 0.0001

11. R. A. Fisher, a brilliant mathematician in evolutionary theory, focused on the ability of selection to effect evolution. He believed that large populations would be able to harbor much genetic diversity in the form of rare alleles. Because it would be difficult to 'lose' rare alleles in large populations, Fisher believed that large populations would be most likely to

- a. respond to changes in the environment
- b. recover from inbreeding problems
- c. marry first cousins
- d. remain unchanged as earth climates fluctuated

12. R. A. Fisher's view of evolution within large populations could be readily aligned with a _____ view of natural history.

- a. catastrophist
- b. uniformitarian

13. Because all inbred lines tended to diverge in phenotype, and because a few inbred lines appeared to remain unharmed by inbreeding, Wright theorized that small population sizes could cause infrequent, but rapid, evolution leading to sudden speciation events. Wright might best be characterized as a(n) _____.

- a. catastrophist
- b. uniformitarian

14. Sexual selection causes males and females to exhibit gender-specific behaviors due, presumably, to

- a. the inferiority of one gender, generally
- b. differences in body temperature between species
- c. the need for females to compete for mates
- d. differences in the cost of reproduction between genders

15. By far, the most common mating system exhibited in the Animal Kingdom is

- a. polygyny
- b. monogamy
- c. polyandry
- d. polygamy

16. Two major factors that influence the evolution of mating systems are:

- a. tail length and feather density
- b. feather pigment and hair density
- c. resource distribution and egg-size
- d. male-male competition and female choice

17. In some mating systems, males defend resources that all members of the species require. Males permit only females to obtain these resources in (hopeful) exchange for copulation. Thus, successful males sequester multiple matings and subdominant males obtain none. This type of mating system may be characterized as _____.

- a. resource defense polygyny
- b. resource defense polyandry
- c. discrete monogamy
- d. chaos

18. When females visit resources defended by different males and permit each male to copulate in exchange for resources, the mating system may be characterized as _____.

- a. resource defense polygyny
- b. prostitution polyandry
- c. discrete monogamy
- d. female defense polygyny

19. Songbirds may tend to exhibit monogamous mating systems in large part because

- a. they have big brains and have evolved morals
- b. the males are hypnotized into marital relationships
- c. all females tend to breed synchronously
- d. they undergo annual migratory behaviors

20. Human children may tend to resemble their fathers at birth more than their mothers because

- a. male genes are dominant to female genes
- b. sperm contain all of the genetic material for each offspring
- c. males that recognized themselves in a child tended to contribute parental care
- d. all males look alike

21. The spotted sandpiper exhibits a mating system where females compete for territories and attempt to coax multiple males into their territories throughout the mating season. This polyandrous system can be characterized as:

- a. female lek polyandry
- b. sex role reversal polyandry
- c. scramble competition polyandry
- d. prostitution polyandry

Questions 22 through 26: Hardy and Weinberg gave five conditions under which a populations would remain in equilibrium, i.e. unchanged from generation to generation. List them below.

22.

23.

24.

25.

26.