1. ‘Evolution’ is essentially just another word for:
*a. change.
b. progression.
c. adaptation.
d. survival.
e. genetics.

2. ‘Gene pool’ refers to:
a. the total pool of genes that an offspring receives from its parents.
b. the total possible set of genes an offspring COULD receive from its parents.
*c. the entire set of genes that exist within one population.
d. the distribution of dominant alleles in a population.
e. every gene known to science.

3. ‘Niche construction’ describes:
a. shelter building behavior engaged in by certain species (e.g., beavers, humans).
* b. when organisms, through biological and behavioral processes, act upon the environmental niches that they occupy just as those niches act upon them.
c. when individual members of a species adapt to the environment.
d. a change in frequency of genes in a population’s gene pool.
e. when a species shifts from reliance on one food source to another.

4. A structured package or bundle of DNA (one that can be passed along to an offspring) is called:
a. a cell.
b. a gene.
*c. a chromosome.
d. a polygene.
e. an allele.

5. The portion of DNA that codes for a functional protein is called:
a. a chromosome.
b. an allele.
c. a mutation.
d. an antigen.
*e. a gene.

6. An ‘allele’ is:
a. another word for gene.
b. the phenotypic expression of a gene.
*c. a specific version of a gene.
d. a dominant or recessive phenotype.
e. a mechanism of mutation.

7. A ‘polymorphic’ gene:
a. has numerous pairs.

*b. has numerous alleles.
c. has numerous chromosomes.
d. combines with many others to generate a trait.
e. is never certain.

8. Most human traits have a:
a. genetic basis in a dominant-recessive gene combination.
b. genetic basis in co-dominant genes.
c. genetic basis in a polymorphic gene.
*d. polygenic (complex, multi-gene) origin.
e. common ancestor.

9. Genetically speaking, the majority of traits:
*a. result from the expression of many genes working together.
b. result from the expression of two gene pairs.
c. are generated by the same gene.
d. depend upon a heterozygous pair of alleles.
e. depend upon a homozygous pair of alleles.

10. When speaking of dominant and recessive genes, which of the following is true?
a. Dominant alleles must co-occur in an individual in order to be expressed.
*b. Recessive alleles must co-occur in an individual in order to be expressed.
c. Recessive genes are never expressed.
d. Dominant genes are never expressed.
e. Monogenic traits are always co-dominant.

11. In talking about genetic adaptation, ‘dominance’ refers to:
a. species that are most fit in their environment.
b. the specific genes that are most fit for their environment.
c. genes that overpower the expression of other genes.
*d. alleles that overpower the expression of other related alleles.
e. powerful forces of natural selection.

12. We learned that one simple, graphical way of discovering all of the potential combinations of a particular gene that can occur in children, given the genotypes of their parents, is to:
*a. draw a Punnett Square.
b. develop a pie chart.
c. track cause and correlation.
d. draw a Mendelian Circle.
e. create a flow chart using Boasian reasoning.

13. A tree in the woods is randomly knocked over (say, by a lighting strike), and the falling tree kills a badger that had been sheltering below it. The evolutionary consequence of this badger’s death is:
a. gene flow.

*b. genetic drift.
c. mutation.
d. eugenics.
e. macroevolution.

14. Genetic mutations are best described as a form of:
*a. miscopying.
b. speciation.
c. survival.
d. fitness.
e. artificial selection.

15. What would a geneticist say happens when a group of people with blue eyes migrates to an area where people do not have blue eyes, and then both populations interbreed?
a. genetic drift
*b. gene flow
c. nothing on this list works as an answer
d. macroevolution
e. natural selection

16. Genetic drift, gene flow, and mutation are all:
a. inhibitors of or barriers to natural selection.
b. components of artificial selection.
c. non-existent in human populations.
*d. evolutionary processes.
e. classified instances of natural selection.

17. 'Genetic adaptation' can be said to have occurred only when:
*a. the forces of natural selection lead to increases, in the next generation, of the frequency of genes supporting advantageous manifest traits that already existed within the population.
b. there are more individual members of a species than in the previous generation.
c. individuals within a population have each adapted to environmental pressures.
d. the environmental impact of one generation is greater than that of the previous generation.
e. organisms clone themselves to reproduce.

18. 'Genetic adaptation' involves changes in gene frequencies in a ____ from one ____ to the next.
a. person / habitat
*b. gene pool / generation
c. gene pool / habitat
d. person / generation
e. habitat / person

19. In regard to natural selection, 'fitness' is best characterized by:

a. higher fertility rates.
b. stronger individuals.
c. lower mortality rates.
d. the advantage provided by expressed traits given a new environmental pressure.
*e. having more babies that survive until at least after they have reproduced again.

20. 'Genetic fitness' is measured with reference to _____ and _____.
a. homeostasis and development
b. increased fertility and increased mortality
c. physiology and environment
*d. decreased mortality and increased fertility
e. increased strength and cunning (smartness)

21. The set of genes you carry is a:
a. phenotype.
b. gene pool.
*c. genotype.
d. polygenic.
e. monogene.

22. What kind of genetic evolution affects or works through altering the balance of 'phenotypic' or expressed traits?
*a. genetic adaptation
b. gene drift
c. gene flow
d. genetic mutation
e. fitness

23. 'Sexual selection' is one way to label what happens:
a. in the human creation of domestic animals.
b. wherever ecological selection cannot occur.
*c. in human populations where kinship rules dictate marriage/mating rules.
d. during artificial selection.
e. in certain fish species where cloning is common.

24. The concept of sexual selection can best explain the adaptive advantage of:
a. a high male-to-female ratio.
b. lactose tolerance.
c. industrial melanism.
d. genetic variation.
*e. male peacock tails.

25. When humans breed plants or animals on purpose to produce particular traits, this is called:
*a. artificial selection.
b. sexual selection.

c. natural selection.
d. environmental selection.
e. ecological selection.

26. 'Artificial selection' refers to or is:
a. any genetic change in a species brought on by human presence.
*b. the purposeful breeding of animals and plants by humans to achieve certain traits.
c. a process of cultural evolution that is analogous to natural selection.
d. how environmental pressures affect mechanical systems.
e. when a person chooses a mate based on traits that index his or her 'good' genes.

27. Sexual selection occurs when organisms respond directly to:
a. environmental pressures exerted from outside of the species.
b. the 'Red Queen Hypothesis.'
c. the time and effort saved by cloning.
d. the environment.
*e. index traits displayed by potential mates.

28. Why is 'genetic variation' in a population's gene pool helpful for species survival?
a. If only a small portion of a population varies genetically, then only a small portion dies.
b. It provides for broader variety during the process of mate selection.
c. It is not helpful; it makes extinction more likely.
*d. Genetic variation means that some members of a population faced with an environmental pressure will have a better chance of surviving it.
e. Where there is no variation, every organism can survive an environmental change.

29. The 'Red Queen Hypothesis' can best be applied to which of the following situations:
a. A lethal pathogen is introduced into and kills an entire population.
b. A pathogen develops a new lethal strain, and the host population puts up no resistance.
c. Sudden climate change kills a pathogen population.
*d. A population and its pathogen co-adapt.
e. Sexual reproduction leads to a lack of population-wide variation.

30. According to the 'Red Queen Hypothesis':
a. Over time, species will gradually progress and become more highly evolved.
*b. Variation in a species' gene pool allows that species to keep up with changes in another species, or to co-evolve.
c. Genetic variation is not as important as maintaining power.
d. A population that maintains its genetic variation cannot evolve quickly.
e. A species that starts out with a lot of variation in its gene pool can become less varied over time.

31. Sexual reproduction can be better for species survival than a-sexual reproduction because it:
*a. increases genetic variation in a population.

b. decreases the amount of time put into mate selection.
c. decreases the amount of energy the body puts into creating gametes (sperm, eggs).
d. increases the proportion of DNA that each mate provides.
e. decreases genetic variation in a population.

32. Which of the following situations best exemplifies the type of scenario described in the 'Red Queen Hypothesis'?
*a. a situation in which sexual reproduction keeps a species from going extinct
b. a breakaway colony of bees stealing the queen bee from the main hive
c. a species in which few males live to reproduce, and therefore females are in charge
d. the tendency of fish to reproduce asexually when under threat from pathogens
e. the tendency of social insects (bees, termites, ants) to quarantine the queen when she is about to become fertile

33. In what way is malaria an 'anthropogenic' disease?
a. Malaria is connected to sickle cell anemia, a human disorder.
b. Malaria evolved to keep down the growing human population.
*c. The abundance of malaria-carrying mosquitoes is facilitated by human interaction with the environment.
d. Malaria is a disease that affects humans, as opposed to diseases that do not affect humans.
e. The disease is polymorphic.

34. Why did the moths of industrial England change colors?
a. The soot from the industrial revolution created a colder environment.
b. In the late 1800s, too many of the younger darker moths were 'harvested' by moth hunters who worked for the hat makers.
*c. Industrial soot covered the habitat of these moths, making light winged moths more easily visible to predators than darker ones.
d. Industrial soot entered the moths' food supply, and showed up in their wings.
e. The moths did not themselves change color; they only got covered in soot.

35. Lactose tolerance:
*a. evolved along with the ability to herd dairy animals.
b. was common in our earliest Homo sapiens sapiens ancestors.
c. offers no advantage to herders or pastoralists.
d. never offered any selective advantage to anyone.
e. is necessary for vegetarianism.

36. Lactose TOLERANCE is the exception, not the norm. This is because:
a. All adults have the enzyme lactase, which helps us to digest milk.
b. Fishing populations are more likely to be exposed to lactose bacterium and therefore to have evolved a tolerance for it.
c. Where milk is taboo infants never get exposed to it, causing an intolerance later in life.
*d. Lactose tolerance only holds a selective advantage for populations with dairy herds.

e. Lactose tolerance only holds a selective advantage for populations living near the equator.

37. The term for the relationship between an allele that itself is harmful but can be kept in a population's gene pool because the hazard it entails is offset by protection it provides an organism from another problem is:
a. the sickled-malarial link.
*b. balanced polymorphism.
c. hemoglobular polymorphism.
d. balanced polygenics.
e. balanced heterogenetics.

38. Which of the following situations provides the best example of 'balanced polymorphism'?
a. Dark and light colored moths were distributed equally in industrial England.
*b. The sickle cell trait is selected for at a rate high enough to confer protection from malaria but low enough to keep death rates from sickle cell anemia in check.
c. Lactose tolerance in some populations is balanced out by lactose intolerance in others.
d. The hemoglobin allele that offers protection from both malaria and sickle cell anemia exists in a balance with a hemoglobin allele that offers no protection.
e. Moth wing color alleles co-exist at rates that go up and down over time depending on which environmental pressures are more active.

39. Which of the following best describes the relation between sickle cell anemia and malaria?
a. An overabundance of hemoglobin caused by malaria counteracts sickle cell anemia.
*b. People who only have one allele for sickle cell anemia are poor hosts for malaria and therefore more likely to survive it.
c. The two diseases do not co-occur.
d. The two diseases can co-occur but not in the same geographic region.
e. The malaria parasite's primary niche is inside people with sickle cell anemia.

40. Hemoglobin is:
a. a type of adaptation.
*b. the part of red blood cells that transports oxygen throughout the body.
c. the part of white blood cells that transports oxygen throughout the body.
d. the part of red blood cells that makes them move or that propels them through the body.
e. an evolutionary byproduct or 'neutral adaptation.'

41. An individual who is heterozygous in regard to hemoglobin type 's' (which can lead to sickle shaped blood cells) and type 'a' (which supports a round shape) will probably:
a. have ancestors from Alaska or the northernmost part of the Americas.
b. have no children.
c. die of sickle cell anemia.
d. die of malaria.

*e. be somewhat protected against malaria and be healthy enough to reproduce.