1. Which statement is consistent with scientific terminology?

    a.) Researchers proved the hypothesis is false…
    b.) Researchers provided evidence that refutes a hypothesis…
    c.) Researchers provided facts that refutes a hypothesis…
    d.) Researchers found proof that refutes a hypothesis…

2. Which is the correctly formatted binomial scientific name?

    a.) DROSOPHILA MELANOGASTER
    b.) *Drosophila melanogaster*
    c.) "Drosophila melanogaster"
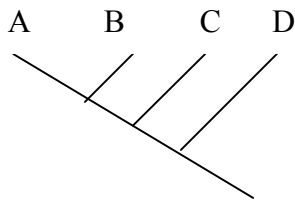   d.) Drosophila Melanogaster
    e.) *DROSOPHILA melanogaster*

3. "Reptiles" are an example of a _____ group.

    a.) Monophyletic
    b.) Polyphyletic
    c.) Paraphyletic

4. "Vultures" are an example of a _____ group.

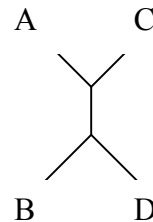   a.) Monophyletic
    b.) Polyphyletic
    c.) Paraphyletic
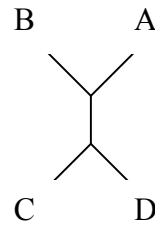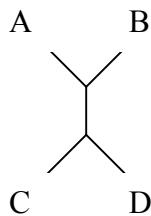
5. Which unrooted tree(s) below matches this rooted tree.

    a.) A only
    b.) B only
    c.) C only
    d.) A and B
    e.) A, B, and C

6. Which of the following is not a mode of natural selection on quantitative traits?

    a.) disruptive
    b.) stabilizing
    c.) strengthening
    d.) directional

7. Which word is defined by the following, "considering human beings as the most significant entity of the universe"?

    a.) misanthropy
    b.) philanthropy
    c.) anthropocentric
    d.) anthropomorphism
    e.) anthropology

(8-10) Identify the following statements as being either proximate or ultimate explanations of behaviors or physiology.

8. Some birds migrate to lower latitudes during winter because individuals that have migrated in the past have sired more offspring

    a.) proximate
    b.) ultimate

9. A rattlesnake shakes its rattle as a consequence of fast twitching muscle activity in the tail.

    a.) proximate
    b.) ultimate

10. A tactile response causes a carnivorous venus fly trap plant to close in on prey

    a.) proximate
    b.) ultimate

11. Eukaryotes are defined by having…

    a.) a cell wall
    b.) chromosomes enclosed in nucleus
    c.) chloroplasts
    d.) shelled eggs
    e.) an amniotic membrane

12. Which one of the following can be considered a synapomorphy?

    a.) hair in humans
    b.) hair in mammals
    c.) teeth in mammals
    d.) bones in animals
    e.) exoskeleton in insects

 (13-17) True or false

13. Humans use spoken language and are therefore more highly evolved than their primitive ape relatives.

    a.) True
    b.) False

14. Scientists interpret reality using models that are based on evidence from repeated observations and experimentation.

    a.) True
    b.) False

15. Scientists use genetic sequences to prove relationships among organisms.

    a.) True
    b.) False

16. Natural selection acts to ensure that species persist and do not go extinct

    a.) True
    b.) False

17. Natural selection operates by differential reproductive success.

    a.) True
    b.) False

18. Migration of individuals between populations may result in changes in frequency of some genes by way of _____.

    a.) genetic drift
    b.) ecological interactions
    c.) predation
    d.) gene flow
    e.) competition

19. Which of the following are greenhouse gases?

        a.) Carbon dioxide
        b.) Methane
        c.) Trifluoromethyl Sulfur Pentafluoride
        d.) ozone
        e.) all of these

20. The theory of _____ reduces the unit of selection down to individual genes and asserts that organisms are only vehicles for promoting successful replication of independent genes.

        a.) meiotic drive
        b.) group selection
        c.) selfish genes
        d.) coevolution
        e.) endosymbiosis

21. Chloroplasts and mitochondria are examples of _____.

        a.) endosymbionts
        b.) eukaryotes
        c.) cells
        d.) Protista
        e.) parasites

22. Fungi are most closely related to which of the following?

        a.) plants
        b.) green algae
        c.) animals
        d.) red algae
        e.) bacteria

23. The earliest fossils of bacteria are dated at ____ years old.

        a.) 3.6 billion
        b.) 1 billion
        c.) 36 billion
        d.) 3.6 million
        e.) 36 billion

24. Birds, mammals, lizards, and turtles are _____.

    a.) vertebrates
    b.) chordates
    c.) amniotes
    d.) A, B, and C

25. Individuals organisms _____ and populations _____.

    a.) evolve; are selected
    b.) are selected; are selected
    c.) evolve; evolve
    d.) are selected; evolve

26. The best evidence for an asteroid impact on Earth 65 million years ago is _____.

    a.) extinction of most dinosaurs
    b.) global deposit of iridium dated at 65 million years ago
    c.) reversal in Earth's magnetic poles
    d.) increased diversity of large mammals
    e.) increased diversity of flowering plants through the Cenozoic

27. Wallace's line is a biogeographic boundary that separates which two land masses?

    a.) North America and South America
    b.) Continental Africa and Madagascar
    c.) Galapagos Islands and South America
    d.) Southeast Asia and Australia
    e.) Europe and Asia

28. Which is the most recent (the current) geological era?

    a.) Paleozoic
    b.) Cenozoic
    c.) Precambrian
    d.) Mesozoic

29. More large mammals and fewer small monitor lizards are found _____ of Wallace's Line.

    a.) North
    b.) South

30. Continuous oscillations in global climate are predicted by _____.

        a.) polarity reversals
        b.) radioisotopes
        c.) Milankovitch cycles
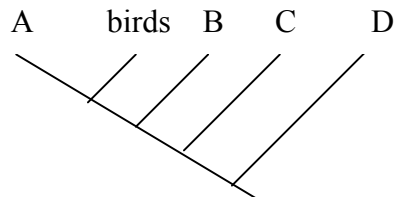   d.) the geological time scale

31. Which of the following is not a biogeographic realm?

        a.) Equatorial
        b.) Nearctic
        c.) Palearctic
        d.) Neotropical
        e.) Australian

32. Boundaries on the geological time scale are marked by _____.

        a.) carbon dating
        b.) magnetic reversals
        c.) sea level changes
        d.) extinctions
        e.) asteroid impacts

(33-36) Match the following groups to the position on the tree (each group is monophyletic so can only be used once)

A   birds B   C   D

33. Crocodilians
        a.) A
        b.) B
        c.) C
        d.) D

34. Lizards
        a.) A
        b.) B
        c.) C
        d.) D

35. Mammals
    a.) A
    b.) B
    c.) C
    d.) D

36. Turtles
    a.) A
    b.) B
    c.) C
    d.) D

37. Which city receives more hours of sunlight over the course of a year?

    a.) Austin
    b.) Chicago
    c.) Sydney
    d.) Mexico City
    e.) all the same

38. Retention of infrared radiation within the Earth's atmosphere is described by _____.

    a.) the coriolis force
    b.) precession
    c.) rainshadow effect
    d.) the hydrologic cycle
    e.) the greenhouse effect

39. Since 1960 the global human population has approximately _____.

    a.) remained the same
    b.) tripled
    c.) quadrupled
    d.) doubled
    e.) decreased

40. Fossils of related organisms found on different continents were the first evidence of _____.

    a.) evolution
    b.) continental drift
    c.) climate change
    d.) Milankovitch cycles
    e.) asteroid impacts

41. An insect's best option to live in a stable daily climate would be in which kind of habitat?

      a.) top of canopy
      b.) ground surface
      c.) underground
      d.) 3 meters above ground

42. The Haber-Bosch process _____.

      a.) genetically engineers crop plants for a higher yield
      b.) provides pest resistance for crop plants
      c.) produces clean electricity through nuclear fission
      d.) produces ammonia from atmospheric gases
      e.) produces energy through photosynthesis

43. Rate of evapotranspiration is controlled by _____.

      a.) size and condition of the stomata openings
      b.) amount of available water
      c.) temperature
      d.) all of these

44. Rapid decomposition, nutrient poor soils, and stable climate are characteristic of which biome?

      a.) Taiga
      b.) Tropical rainforest
      c.) Desert
      d.) Chaparral
      e.) Tundra

45. A lizard should face _____ to the sun on the _____ of a slope to maximize incident solar radiation.

      a.) sideways; equatorial side
      b.) sideways; polar side
      c.) head on; top
      d.) sideways; top
      e.) head on; polar side

46. _____ are transitional areas between adjacent ecosystems.

       a.) thermoclines
       b.) moisture gradients
       c.) subduction zones
       d.) tolerance curves
       e.) ecotones

47. Chose the answer that does NOT characterize primary succession.

       a.) lichen growing on bare rock
       b.) ferns spores fertilizing a lifeless volcanic island
       c.) vegetation recovery after a natural forest fire
       d.) initial plant growth on Antarctica once the polar ice caps melt
       e.) the origin of life on Earth

48. Which of the following is not an assumption in an "economics of consumer choice" model.

       a.) food items can be arranged along a continuum of most to least valuable
       b.) environment is random, with equal chance of finding resources everywhere
       c.) similar phenotypes are closely equivalent in harvesting abilities
       d.) no one phenotype can be maximally efficient on all prey types
       e.) individuals attempt to maximize total intake of food resources

49. In a eutrophic lake you would expect to see _____.

       a.) clear water to the bottom sediment
       b.) high algal and plant growth at the lake surface
       c.) more nutrients (like nitrogen and phosphorus) compared to oligotrophic lakes
       d.) A and C
       e.) B and C

50. Generation time of *Escherichia coli* under optimal conditions is _____.

       a.) 1 day
       b.) 2 days
       c.) 1 minute
       d.) 1 hour
       e.) 20 minutes