Multiple Choice – Please select the most appropriate answer for each.

1. *Pheromones* are used by many creatures for many purposes. Which of the following best describes the status of our current scientific understanding of human chemical communication?

    (a) human behavior is not under the influence of olfactory signals
    (b) human (e.g., reproductive) behavior is influenced by chemicals (e.g., secreted by armpits, etc.)
    (c) several specific human pheromones have been isolated and identified
    (d) human pheromones can be purchased online and are reliably used to attract mates

2. If you encounter a mountain lion (puma / cougar) at close range, you are advised to…

    (a) run away as fast as you can, preferably downhill
    (b) cover your head, lay still and play dead; let it maul you until it gets bored
    (c) climb the nearest tree to a height of at least ten meters
    (d) back away slowly, make yourself large and loud, and (if necessary) fight back

3. Sterile worker bees tend to the reproductive output of their queen. Young Scrub Jays help raise their younger siblings. Female ground squirrels give alarm calls to warn other members of the colony when predators are near. These are all examples of:

    (a) agonistic behavior   (b) habituation   (c) taxis   (d) inclusive fitness   (e) spatial learning

4. Which of the following is an appropriate example of **operant conditioning**?

    (a) using a reward system, a dolphin is trained to jump on command
    (b) Pavlov's dogs salivate when they hear a dinner bell
    (c) Clark's nutcracker (birds) memorize a complex map to retrieve their food caches
    (d) prairie voles are monogamous; males have more vasopressin and sons learn by example
    (e) a semi-wild population of snow monkeys has demonstrated the ability to pass on certain innovations
       (like separating rice from sand) from one generation to the next

5. Which of the following fulfills the basic requirements that define **culture**?

    (a) using a reward system, a dolphin is trained to jump on command
    (b) Pavlov's dogs salivate when they hear a dinner bell
    (c) Clark's nutcracker (birds) memorize a complex map to retrieve their food caches
    (d) prairie voles are monogamous; males have more vasopressin and sons learn by example
    (e) a semi-wild population of snow monkeys has demonstrated the ability to pass on certain innovations
       (like separating rice from sand) from one generation to the next

6. A baby herring gull begs for food in response to a red spot on its parent's beak. This is called:

    (a) sign stimulus (b) taxis (c) spatial learning (d) associative learning (e) optimal foraging theory

7. Which of the following descriptions fits the *tundra* biome?

    (a) trees are killed off regularly by drought or natural fires
    (b) permafrost prevents tree roots from penetrating the soil
    (c) snow buffers coniferous tree roots from below-freezing temperatures
    (d) broadleaf trees deposit leaf litter which decays slowly on the forest floor
    (e) spiny shrubs dominate in a climate of warm dry summers and mild wet winters

8. Which of the following descriptions fits the *chaparral* biome?

   (a) trees are killed off regularly by drought or natural fires
   (b) permafrost prevents tree roots from penetrating the soil
   (c) snow buffers coniferous tree roots from below-freezing temperatures
   (d) broadleaf trees deposit leaf litter which decays slowly on the forest floor
   (e) spiny shrubs dominate in a climate of warm dry summers and mild wet winters

9. Which of the following factors are incorporated into the *exponential growth model*? **You may choose more than one answer.**

   (a) birth rate   (b) death rate   (c) immigration   (d) emigration   (e) carrying capacity

10. Movement corridors should allow dispersal among source and sink populations. This applied conservation practice best relates to which of the following ecological concepts?

   (a) optimal foraging theory   (b) trophic pyramid   (c) trophic cascade
   (d) metapopulation dynamics   (e) resource partitioning

11. **Bivalve mollusks** like oysters and mussels experience very **high mortality** during their **juvenile** (larval) stage. However, those individuals who manage to find space on a hard surface where they can attach and grow their defensive calcium carbonate shell are likely to live a long time. This describes which of the following? (**choose the best two answers**)

   (a) Type I survivorship curve   (b) Type II survivorship curve   (c) Type III survivorship curve

   (d) K-selected species   (e) *r*-selected species

12. Which of the following fits the description of an **abiotic reservoir**? (**choose more than one**)

   (a) live phytoplankton   (b) Carbon in soil, dead leaves, coal   (c) Nitrogen in the atmosphere

   (d) Calcium or Phosphorus in un-weathered rock   (e) water in a lake or aquifer

13. A government study claims 51% of all greenhouse gases emitted by human practices are caused by:

   (a) driving personal automobiles   (b) manufacturing   (c) livestock production

   (d) all of the above, combined   (d) none of the above

True or False

14. Ground-laying birds inclined to *roll eggs back into the nest* are demonstrating an *innate* behavior.

15. Funnel web spiders in arid habitats exhibit *more risky foraging behavior* than members of the same species in populations adjacent to rivers; this is an example of *spatial learning*.

16. The study of the *evolutionary origins* of *cooperative behavior* is called *sociobiology*.

17. The potential for *marine biodiversity* is greatly *increased* where the water is clear enough for the *photic zone* to include the *benthic zone*.

18. A *riparian zone* is the narrow band of habitat *adjacent to a river*.

19. An *estuary* is an example of a *wetland*.

20. *Forests* counteract *global warming* by taking up Carbon Dioxide. They also *prevent soil erosion*.

21. Examples of *secondary succession* include reforestation of *beaver meadows* or *burned areas*.

22. According to the *laws of thermodynamics*, it takes many times *more resources* to feed a *secondary consumer* than a *primary consumer*.

23. The *sea otter* is an example of *keystone species*; though small in biomass and abundance its extinction would cause a dramatic loss in biodiversity of its community.

24. *Character displacement* over generations may lead to *resource partitioning* by competing species.

25. A relatively *dry climate* (rain shadow) is found on the *lee* side of a mountain range.

26. The plant called *mistletoe* is a *parasite*.

28. Evidence suggests the *ancient Mayan civilization crashed* in part due to human-caused *deforestation*.

Matching – Please select the most appropriate answer for each.

29. amount of land estimated for resource use	
30. preserving enough land to save the grizzly will protect many species that live below it in the food web	(a) range expansion
31. the Maya nut comes from a rainforest tree, so its use as a food source serves human needs and conservation at the same time	(b) biological invasion
32. allow dispersal among populations; within metapopulation	(c) clumped dispersion
33. high priority habitats contain extraordinary density of unique and/or endangered species	(d) uniform dispersion
34. popular animals serve as ambassadors to mobilize public support for conservation efforts; polar bear for global warming	(e) competitive exclusion principle
35. some organisms are concentrated in tight groups due to uneven distribution of resources or sometimes due to social behavior	(ab) βββββ ΩΩΩΩΩΩ
36. some organisms are evenly spaced due to intraspecific competition	(ac) £ β ΩΩΩΩΩΩΩΩΩΩ
37. feral goats have out-grazed Galapagos tortoises on their own islands; the cane toad poisons would-be predators in Australia	(ad) Type I survivorship
38. urban development has resulted in the northward spread of the Boat-tailed grackle in the southwestern US	(ae) Type II survivorship
39. this ecosystem is more diverse in terms of relative abundance (pretend the greek characters are different species in a community)	(bc) Type III survivorship
40. this ecosystem is more diverse in terms of species richness (pretend the greek characters are different species in a community)	(bd) biological magnification
41. two species cannot share an identical niche if they live in the same place at the same time	(be) umbrella species
42. mortality expected to be low for juveniles	(cd) movement corridors
43. mortality expected to be high for juveniles	(ce) restoration ecology
44. equal probability of mortality throughout life expectancy	(de) landscape ecology
45. sequestration of environmental contaminants in body tissues tends to be more severe at the top of a food chain	(abc) sustainable development
46. focus on exchange of materials, etc. *among* ecosystems	(abd) flagship species
47. apply ecological knowledge to alter damaged habitat with goal of repairing ecosystem function (e.g., remove Kissimmee canals)	(abe) biodiversity hot spot
	(acd) ecological footprint