MULTIPLE CHOICE.—For the following multiple choice questions circle the letter in front of the response that best answers the question or completes the sentence. (20 points, 2 points each)

1. Which of the following is (are) an assumption(s) of scientific philosophy?
   a. Someday all nature will be known with certainty.
   b. The natural world cannot be experienced through simple sense experience.
   c. There is order in the universe.
   d. Proof requires consistent and substantial evidence.
   e. All of the above.

2. The growing season would generally be shortest in which biome?
   a. Tropical rain forest
   b. Savanna
   c. Taiga
   d. Temperate deciduous forest
   e. Temperate grassland

3. Which of the following biomes is NOT subject to frequent fires?
   a. Desert
   b. Temperate grassland
   c. Savanna
   d. Chapparal
   e. None of the above (all are subject to frequent fires)

4. A species of fish that forms many separate tight schools exhibits a ________ pattern of dispersion.
   a. random
   b. clumped
   c. dispersed
   d. uniform
   e. demographic

5. The bottleneck effect causes __________.
   a. natural selection
   b. mutation
   c. gene flow
   d. genetic drift
   e. assortative mating

6. Which of the following is NOT a characteristic of an estuary?
   a. Nutrient rich
   b. Breeding grounds for many organisms
   c. Brackish
   d. Constant conditions
   e. Found along coastlines

7. Which of the following describes an organism that consumes another organism from the inside and kills it?
   a. Ectoparasite
   b. Endoparasite
   c. Parasitoid
   d. Predator
   e. Mutualist

8. Which of the following is a characteristic attributed to an R-selected (Opportunistic) species?
   a. Much parental care given
   b. Long life span
   c. Many young produced
   d. Large body size
   e. None of the above

9. Which of the following is a correct species name?
   a. Canis Familiaris
   b. familiaris
   c. Familiaris
   d. Canis familiaris
   e. Canidae

10. Which of the following is NOT an assumption of the Hardy-Weinberg theorem?
    a. No mutation
    b. No migration
    c. No random mating
    d. No natural selection
    e. None of the above (all are assumptions of the Hardy-Weinberg Theorem)
MATCHING.—For the following exercise the answers in the right column with the corresponding terrestrial biome in the left column. Each letter may be used more than once. (7 points, 1 pt. each)

1. Tundra _____ _____
2. Tropical Rain Forest _____
3. Temperate Deciduous Forest _____ _____
4. Temperate Grassland _____
5. Desert _____

A. Canopy
B. Permafrost
C. Many large animals
D. Dry (low precipitation)
E. Thick leaf litter

FILL-IN-THE-BLANK.—For the following exercises write the appropriate word or words in the available space. (23 points)

1. Fill in the missing ranks in the Linnean Classification. (4 points)

   Kingdom
   _________________________________
   _________________________________
   _________________________________

   Family
   _________________________________

   Species
   _________________________________

2. Fill in the four Geologic Eras in the boxes below. (8 points)

<table>
<thead>
<tr>
<th>“Age of Mammals”</th>
<th>“Age of Reptiles”</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Age of Fishes”</td>
<td></td>
</tr>
</tbody>
</table>

3. Geologic Eras are subdivided into
   ________________ (1 pt.) which themselves contain ________________, (1 pt.)

4. Label the three survivorship curves below with the appropriate type. (3 points)

   log % survivors

   Relative Age

5. Label the trophic levels in the boxes below. (6 points)

   SUN
   ↓
   ↓
   ↓

Points on Exam 1 Part 1 (50 possible)
DEFINITIONS.—For the following words or phrases define them as accurately and concisely as possible. (20 points, 4 points each)

1. Science:

2. Empirical:

3. Scala Naturae:

4. Evolutionary Species Concept:

5. Monophyletic Group:

POPULATION PROBLEMS.—Complete the following problems using the appropriate equations. (10 points, 5 points each)

1. A population of 20000 individuals is growing exponentially and has a yearly intrinsic rate of increase of 0.20. What is the size of this population after one year? After two years? After three years? (Be sure to write down any equations that you use.)

2. This problem refers to a population that IS at Hardy-Weinberg equilibrium. The gene being studied has two alleles represented by “N” and “n.” If the frequency of individuals with the genotype “nn” is 0.09, then what is the frequency of individuals with the heterozygote genotype (“Nn”)? (Be sure to write down any equations that you use.)
SHORT ESSAYS.—For the following essays, address each question in as concise and lucid a manner as possible. Do NOT exceed the space provided. (20 points)

1. Why is it wet near the equator and dry near $30^\circ$ N&S latitude? (Feel free to include drawings to SUPPLEMENT your answer.) (6 points)

2. How does natural selection occur? Explain how natural selection works and what it results in. (7 points)

3. How does genetic drift occur? Explain how genetic drift works and what it results in. (7 points)