Cells, Inheritance and Ecology

Choose one answer per question. Circle A, B, C, or D.

1. In a typical plant root cell, where is most of the cell’s DNA located?
   A. Nucleus
   B. Cell wall
   C. Central vacuole
   D. Cell membrane

2. Which part of an animal cell forms the boundary that regulates what enters and leaves it?
   A. Ribosome
   B. Nucleolus
   C. Cell membrane
   D. Mitochondrion

3. Which structure on a cell diagram should be labeled as the place where proteins are assembled?
   A. Vacuole
   B. Ribosome
   C. Cell wall
   D. Centrosome

4. Which group represents one biological population at a pond?
   A. All the species that visit any pond in the county
   B. All the turtles, frogs and fish in that pond
   C. All the water and sediment in that pond
   D. All the painted turtles living in that pond

5. A student writes that a pea plant has purple flowers. What does that observation describe?
   A. Its exact genotype
   B. Its phenotype
   C. Its trophic level
   D. Its carrying capacity

6. A diagram compares a plant leaf cell and an animal cheek cell. Which feature normally surrounds the plant cell outside its membrane and is absent from the animal cell?

A. Cell wall
B. Cytoplasm
C. Nucleus
D. Ribosomes

7. Two equal-size spaces contain 12 and 3 particles of the same substance. A barrier lets those particles move freely either way. Which net movement is expected at first?

A. No movement because the two spaces are equal in size
B. From the 3-particle side to the 12-particle side
C. No net movement because both sides have some particles
D. From the 12-particle side to the 3-particle side

8. In a one-gene model, a plant’s genotype is written Bb. What does that tell you about its pair of alleles?

A. It has two copies of the lowercase allele.
B. It has two copies of the uppercase allele.
C. It has two different versions of the gene.
D. It has only one version of the gene and no second copy.

9. A survey already describes the plants and animals living in a marsh. Which addition would describe a nonliving part of the ecosystem?

A. How the water level changes with the seasons
B. How many frog species breed there
C. How many kinds of grass grow there
D. What the herons in the marsh eat

10. A food chain goes from algae to a snail, then to a fish, then to a heron. Which organism is the secondary consumer in this chain?

A. Algae
B. Snail
C. Heron
D. Fish

11. In a simple inheritance model, one parent is Aa and the other is aa. Each parent passes one of its two alleles at random. What percentage of offspring are expected to have genotype aa?

A. 75%
B. 25%
C. 50%
D. 100%

12. Two seedlings with the same genotype grow to different heights in different light conditions. Which explanation is consistent with that observation?

A. A height difference proves the seedlings began with different genes.
B. Growing conditions can affect an observable trait.
C. A shared genotype forces both plants to grow to the same height.
D. Plant height describes a genotype directly.

13. In a simplified food-chain model, producers store 1,200 units of energy. The primary consumers store 180 units derived from those producers. What percentage of the producers' stored energy ends up stored by those consumers?

A. 85%
B. 12%
C. 18%
D. 15%

14. Two kinds of shorebirds share a beach. One feeds on small crustaceans near the water. The other takes insects among the dunes. What best explains why their food use may overlap less than their shared location suggests?

A. They feed in different places and use different prey.
B. Both species must eat all food found anywhere on the beach.
C. Sharing a beach gives both species identical feeding niches.
D. The first species must provide all the food for the second.

15. In a population model, two habitats start with 10 animals each. Both initially gain 5 animals per year. Later Habitat A settles at 30 animals and Habitat B at 60. If those stable sizes reflect environmental limits, what differs between the habitats?

A. Habitat A had the faster initial growth.
B. Habitat B had the larger initial population.
C. The carrying capacity is higher in Habitat B.
D. Both habitats have the same carrying capacity.