AP Biology Practice

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

1. A cell model follows a protein from the rough endoplasmic reticulum toward the outside of the cell. Which organelle usually sorts the protein on this route?
   A. Golgi apparatus
   B. Nucleolus
   C. Mitochondrion
   D. Central vacuole

2. A membrane diagram shows water on both faces of a phospholipid bilayer. Where do the phospholipids’ water-attracting heads face?
   A. Toward the water on the outer face only
   B. Toward the middle of the bilayer on both faces
   C. Toward the water on both faces
   D. Toward the water on the inner face only

3. A mitosis model shows sister chromatids separating and moving toward opposite poles. Which stage does it show?
   A. Prophase
   B. Anaphase
   C. Metaphase
   D. Telophase

4. In a fictional shrub, BB flowers show blue pigment and GG flowers show gold pigment. BG flowers display both pigments in separate bands. Which inheritance pattern fits both pigments appearing?
   A. Polygenic inheritance
   B. Incomplete dominance
   C. Complete dominance
   D. Codominance

5. A windstorm knocks down most trees in a fictional woodland and leaves the soil in place. Grasses and shrubs spread, and young trees appear over time. What process does this describe?
   A. Primary succession
   B. Secondary succession
   C. Seasonal migration
   D. Resource partitioning

6. Model cells A and B are rectangular boxes. A measures 2 × 2 × 4 µm and B measures 4 × 4 × 1 µm. Count all six faces. Which comparison of membrane area per unit volume is correct?

A. B has the higher ratio because it has more surface area at the same volume.
B. A has the higher ratio because it has more surface area at the same volume.
C. The ratios match because the volumes match.
D. The ratios match because both boxes have six faces.

7. A model shows small dissolved molecules moving directly between the cytoplasm of two neighboring plant cells through their cell walls. Which structure provides that route?

A. Stomata
B. Tight junctions
C. Desmosomes
D. Plasmodesmata

8. A fictional diploid cell starts meiosis with eight chromosomes. How many chromosomes and chromatids does each daughter cell have immediately after a typical meiosis I?

A. 8 chromosomes and 8 chromatids
B. 4 chromosomes and 4 chromatids
C. 4 chromosomes and 8 chromatids
D. 8 chromosomes and 16 chromatids

9. A fictional plant has genotype RrTt. The two genes assort independently, and each allele in a pair is equally likely to pass on. What fraction of its gametes should carry exactly one uppercase allele?

A. 1/2
B. 1/4
C. 3/4
D. 0

10. In a fictional model, a few seeds start an island population. An allele is rare on the mainland and common among those seeds. The model gives it no survival or reproductive advantage. Which mechanism explains the initial difference?

A. New mutations that arose on the island
B. Ongoing gene flow between established populations
C. Natural selection favoring the allele
D. Founder effect

11. At four equally spaced ages, a fictional graph records 125, 100, 80, and 64 survivors from one cohort. Which survivorship pattern best describes the intervals shown?

A. A Type III pattern because the first interval loses the largest fraction.
B. A Type I pattern because the fraction lost increases with age.
C. A Type II pattern because each interval loses 20% of those alive at its start.
D. A Type II pattern because each interval loses the same number.

12. Two fictional plots of equal area start with 20 and 40 plants of the same species. All survive. They produce 50 and 60 flowers, respectively. What do these observations support?

A. The denser plot produced more flowers per plant. This pattern favors competition.
B. The denser plot produced fewer flowers per plant. This pattern is consistent with competition.
C. The two plots produced the same number of flowers per plant.
D. The flower counts show that density is the only cause of the difference.

13. In a fictional population at Hardy–Weinberg equilibrium, one gene has two alleles, A and a. The frequency of genotype aa is 0.16. What frequency is expected for genotype Aa?

A. 0.64
B. 0.24
C. 0.36
D. 0.48

14. In a fictional plant cell model, solute potential is −0.75 MPa and pressure potential is +0.45 MPa. Add these to get the cell’s water potential. If each surrounding solution is considered separately, where does net water movement initially go for X at −0.10 MPa and Y at −0.50 MPa?

A. Into the cell with X and out of the cell with Y.
B. Out of the cell with X and into the cell with Y.
C. Into the cell with both X and Y.
D. Out of the cell with both X and Y.

15. A fictional data set has 84 red and 36 cream flowers. A model predicts a 3 red to 1 cream ratio. Calculate chi-square as the sum of (observed − expected)² / expected. Using the critical value 3.84, which conclusion follows?

A. 3.84 with insufficient evidence to reject the 3 to 1 model.
B. 1.60 with sufficient evidence to reject the 3 to 1 model.
C. 1.60 with insufficient evidence to reject the 3 to 1 model.
D. 6.00 with sufficient evidence to reject the 3 to 1 model.