



AP Biology Practice Exam (Set 1)

Free Response Questions (FRQs)

1.

- (a) Draw a labeled diagram of a eukaryotic cell and identify two organelles involved in protein secretion.
- (b) Describe how the structure of the rough ER facilitates its function.
- (c) Predict the effect of a nonfunctional Golgi apparatus on protein transport.

2

- (a) Write the complementary DNA sequence to 5'–ATGCCGTA–3'.
- (b) Identify the process in which DNA is used to produce RNA.
- (c) Explain how mutations in DNA can alter protein function.

3.

- (a) Define active transport.
- (b) Explain why active transport requires ATP.
- (c) Provide one example of active transport in animal cells.

4.

- (a) Write the balanced chemical equation for cellular respiration.
- (b) Identify the organelle where it occurs.
- (c) Explain the role of oxygen in the process.

5.

- (a) Describe how surface area to volume ratio affects cell size.
- (b) Explain how microvilli in the intestine relate to this principle.
- (c) Predict the effect of decreased surface area on nutrient uptake.

6.

- (a) Describe one structural difference between DNA and RNA.
- (b) Explain how this difference affects stability.
- (c) Identify one function unique to RNA.

7.

- (a) Define allopatric speciation.

- (b) Provide one example in nature.
- (c) Explain how geographic isolation contributes to divergence.

8.

- (a) Identify the phase of mitosis in which chromosomes line up at the equator.
- (b) Explain the role of spindle fibers.
- (c) Predict what happens if spindle fibers fail.

9.

- (a) Describe the role of enzymes in biochemical reactions.
- (b) Explain how temperature affects enzyme activity.
- (c) Predict the effect of denaturation on an enzyme.

10.

- (a) Identify the trophic level of herbivores.
- (b) Explain why energy transfer between trophic levels is inefficient.
- (c) Predict the effect of removing primary producers from an ecosystem.

11.

- (a) Define homeostasis.
- (b) Explain how negative feedback regulates blood glucose.
- (c) Predict the effect of a nonfunctional insulin receptor.

12.

- (a) Write the Hardy-Weinberg equation.
- (b) Explain the meaning of q^2 in the equation.
- (c) Predict the effect of genetic drift on allele frequencies.

13.

- (a) Describe the role of ribosomes in protein synthesis.
- (b) Identify where in the cell ribosomes are located.
- (c) Explain the difference between free and bound ribosomes.

14.

- (a) Define ecological succession.
- (b) Distinguish between primary and secondary succession.
- (c) Provide one example of secondary succession.

15.

- (a) Identify one function of guard cells.

- (b) Explain how stomatal opening is regulated.
- (c) Predict the effect of drought on stomatal function.

Multiple Choice Questions (MCQs)

1. Which organelle contains digestive enzymes?
 - (A) Lysosome
 - (B) Mitochondrion
 - (C) Ribosome
 - (D) Nucleus

2. The primary energy molecule of cells is:
 - (A) DNA
 - (B) ATP
 - (C) NADH
 - (D) Glucose

3. Which statement about diffusion is correct?
 - (A) Requires ATP
 - (B) Moves substances against gradient
 - (C) Moves substances down gradient
 - (D) Only occurs in prokaryotes

4. Which stage of cellular respiration produces the most ATP?
 - (A) Glycolysis
 - (B) Krebs cycle
 - (C) Electron transport chain
 - (D) Fermentation

5. Which base is found only in RNA?
 - (A) Adenine
 - (B) Cytosine
 - (C) Thymine
 - (D) Uracil

6. The process by which mRNA is decoded into protein is:
 - (A) Transcription

- (B) Translation
- (C) Replication
- (D) Transduction

7. Natural selection acts on:

- (A) Populations
- (B) Genes
- (C) Individuals
- (D) Communities

8. Which hormone regulates blood glucose?

- (A) Insulin
- (B) Estrogen
- (C) Testosterone
- (D) Thyroxine

9. Which best describes the cell cycle checkpoint?

- (A) Prevents apoptosis
- (B) Ensures DNA replication is complete
- (C) Inhibits enzyme function
- (D) Produces ribosomes

10. Which trophic level receives the most energy?

- (A) Primary producers
- (B) Primary consumers
- (C) Secondary consumers
- (D) Tertiary consumers

11. The Hardy–Weinberg principle assumes:

- (A) Mutation
- (B) Migration
- (C) Large population size
- (D) Natural selection

12. Which molecule carries genetic information?

- (A) DNA
- (B) RNA
- (C) Protein
- (D) Lipid

- 13.** Which process increases genetic variation in meiosis?
- (A) Crossing over
 - (B) Cytokinesis
 - (C) Mitosis
 - (D) Binary fission
- 14.** Which organelle is the site of photosynthesis?
- (A) Chloroplast
 - (B) Ribosome
 - (C) Mitochondrion
 - (D) Nucleus
- 15.** The primary function of guard cells is to:
- (A) Store starch
 - (B) Transport oxygen
 - (C) Regulate stomatal opening
 - (D) Absorb water
- 16.** Which type of succession occurs after volcanic eruption?
- (A) Primary
 - (B) Secondary
 - (C) Tertiary
 - (D) Climax
- 17.** Which structure regulates what enters and exits a cell?
- (A) Ribosome
 - (B) Plasma membrane
 - (C) Nucleus
 - (D) Chloroplast
- 18.** In an experiment, the control group is used to:
- (A) Prove the hypothesis
 - (B) Eliminate variables
 - (C) Provide a basis for comparison
 - (D) Increase accuracy of measurement
- 19.** Which biomolecule is the major component of cell membranes?
- (A) Protein
 - (B) Phospholipid

- (C) Carbohydrate
- (D) Nucleic acid

20. The process that converts sunlight into chemical energy is:

- (A) Respiration
- (B) Fermentation
- (C) Photosynthesis
- (D) Chemosynthesis