

BIOL-1 Practice Test 02

Modules 5-17: Membranes through Evolution

Instructions: This practice test covers material from Modules 5-17. Answer all questions to the best of your ability.

Part A: Multiple Choice (25 questions)

Choose the best answer for each question.

Modules 5-6: Membranes & Metabolism

1. The cell membrane is primarily composed of:

- A) Carbohydrates
- B) Proteins only
- C) Phospholipid bilayer
- D) Nucleic acids

2. Which transport process requires ATP?

- A) Diffusion
- B) Osmosis
- C) Facilitated diffusion
- D) Active transport

3. When a cell is placed in a hypotonic solution, water will:

- A) Move out of the cell
- B) Move into the cell
- C) Not move
- D) Move in both directions equally

4. Enzymes function by:

- A) Increasing activation energy
- B) Decreasing activation energy
- C) Providing energy for reactions
- D) Changing the equilibrium of reactions

5. The molecule that stores and transfers energy in all cells is:

- A) Glucose
 - B) ATP
 - C) DNA
 - D) NADH
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Modules 7-8: Photosynthesis & Cellular Respiration

6. Where do the light-dependent reactions of photosynthesis occur?

- A) Stroma
- B) Thylakoid membranes
- C) Cytoplasm
- D) Mitochondria

7. The Calvin cycle produces:

- A) Oxygen
- B) ATP
- C) Glucose
- D) Water

8. The net yield of ATP from glycolysis is:

- A) 0 ATP
- B) 2 ATP
- C) 4 ATP
- D) 36 ATP

9. Where does the Krebs cycle (citric acid cycle) occur?

- A) Cytoplasm
- B) Mitochondrial matrix
- C) Thylakoid
- D) Nucleus

10. The overall equation for cellular respiration shows that glucose and oxygen produce:

- A) Carbon dioxide and water
 - B) Oxygen and glucose
 - C) Light and ATP
 - D) Protein and lipids
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Modules 9-10: Cell Division & Meiosis

11. DNA replication occurs during which phase?

- A) G1 phase
- B) S phase
- C) G2 phase
- D) M phase

12. Sister chromatids separate during which phase of mitosis?

- A) Prophase
- B) Metaphase
- C) Anaphase
- D) Telophase

13. Meiosis produces:

- A) 2 diploid cells
- B) 4 diploid cells
- C) 2 haploid cells
- D) 4 haploid cells

14. Crossing over (exchange of genetic material) occurs during:

- A) Prophase I
- B) Metaphase I
- C) Anaphase II
- D) Telophase II

15. The purpose of mitosis is:

- A) Sexual reproduction
 - B) Growth and repair
 - C) Producing gametes
 - D) Genetic variation
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Modules 11-14: Genetics & Gene Expression

16. A cross between $Aa \times Aa$ gives a phenotypic ratio of:

- A) 1:1
- B) 3:1
- C) 1:2:1
- D) 9:3:3:1

17. DNA replication is described as:

- A) Conservative
- B) Semiconservative
- C) Dispersive
- D) Random

18. Which enzyme unwinds the DNA double helix?

- A) DNA polymerase
- B) Ligase
- C) Helicase
- D) Primase

19. The start codon (AUG) codes for:

- A) Leucine
- B) Methionine
- C) Stop signal
- D) Glycine

20. Translation occurs at the:

- A) Nucleus
 - B) Ribosome
 - C) Mitochondria only
 - D) Golgi apparatus
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Modules 15-17: Biotechnology & Evolution

21. PCR (polymerase chain reaction) is used to:

- A) Sequence DNA
- B) Amplify (copy) DNA
- C) Cut DNA
- D) Join DNA

22. Gel electrophoresis separates DNA fragments by:

- A) Color
- B) Size
- C) Charge only
- D) Origin

23. Homologous structures in different species suggest:

- A) Convergent evolution
- B) Common ancestry
- C) No relationship
- D) Parallel evolution

24. Natural selection requires:

- A) Artificial intervention
- B) Heritable variation
- C) Identical individuals
- D) No competition

25. Darwin's theory of evolution by natural selection includes all EXCEPT:

- A) Variation exists in populations
 - B) Organisms produce more offspring than survive
 - C) Favorable traits are inherited
 - D) Evolution happens in a single generation
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Part B: Fill in the Blank (10 questions)

Write the correct term in the blank.

26. The phospholipid bilayer is described as a _____ mosaic model.

27. The process by which water moves across a membrane is called _____.

28. Photosynthesis occurs in the _____ of plant cells.

29. The electron transport chain produces most of the _____ during cellular respiration.

30. The phase of the cell cycle when the cell grows and prepares to divide is called _____.

31. Gametes (sex cells) are produced by the process of _____.

32. A Punnett square is used to predict the _____ of offspring.

33. The process of copying DNA into mRNA is called _____.

34. The Central Dogma states that information flows from DNA to RNA to _____.

35. A change in the DNA sequence is called a _____.

Part C: Short Answer (5 questions)

Answer each question in 2-3 complete sentences.

36. Compare photosynthesis and cellular respiration in terms of their inputs and outputs.

37. Explain the difference between mitosis and meiosis in terms of purpose and outcomes.

38. Describe the Central Dogma of molecular biology.

39. Explain one piece of evidence that supports the theory of evolution.

40. Explain how natural selection leads to adaptation over time.

End of Practice Test 02