

# 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.

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### 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 \_\_\_\_\_.

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## **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.

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*End of Practice Test 02*