Introduction to Biology
Cell Biology and Genetics Quiz

Instructions:

- Answer all questions.
- For Questions 1–5, choose the best option.
- For Questions 6–8, mark True or False.
- For Questions 9–10, write detailed answers with biological explanations.

1. Which organelle is responsible for ATP production in eukaryotic cells?

(A) Ribosome

(B) Golgi apparatus

(C) Mitochondrion

(D) Endoplasmic reticulum

2. The process by which mRNA is synthesized from a DNA template is called:

(A) Translation

(B) Replication

(C) Transcription

(D) Transduction

3. In Mendelian genetics, if a heterozygous tall plant (Tt) is crossed with a homozygous short plant (tt), what percentage of offspring will be tall?

(A) 25%

(B) 50%

(C) 75%

(D) 100%

4. Which of the following is NOT a function of the cell membrane?

(A) Selective permeability

(B) Cell signaling

(C) Protein synthesis

(D) Cell adhesion

5. Sister chromatids separate during which phase of cell division?

(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

6. All cells contain membrane-bound organelles such as mitochondria and nuclei. (True/False)

7. DNA replication is described as "semi-conservative" because each new double helix contains one original and one newly synthesized strand. (True/False)

8. Mutations are always harmful to an organism. (True/False)

9. Describe the structure of DNA and explain how its structure enables its function as the molecule of heredity. Include the concepts of complementary base pairing and the double helix.

10. Compare and contrast mitosis and meiosis. Discuss the purposes of each process and explain why meiosis produces genetic variation while mitosis does not.