

# **Module 9: Cell Division and Mitosis**

## **Comprehension & Critical Thinking Questions**

### **Part 1: Core Concepts**

#### **1. The Cell Cycle**

- Name the three stages of interphase (G<sub>1</sub>, S, G<sub>2</sub>) and describe what occurs in each.
- List the four phases of mitosis in order: Prophase, Metaphase, Anaphase, Telophase.

#### **2. Chromosome Structure**

- Distinguish between chromatin and chromosomes.
- After DNA replication, what are sister chromatids? When do they separate?

#### **3. Cytokinesis**

- Compare cytokinesis in animal cells (cleavage furrow) and plant cells (cell plate).

### **Part 2: Application**

#### **1. Cell Cycle Checkpoints**

- What are the three main checkpoints (G<sub>1</sub>, G<sub>2</sub>, M)? What is evaluated at each?
- Why are checkpoints critical for preventing cancer?

#### **2. Cancer Biology**

- **Scenario:** A mutation inactivates the Rb (retinoblastoma) protein, a tumor suppressor.
- **Apply:** Predict the effect on cell division.

## **Part 3: Analysis & Evaluation**

### **1. Mitosis vs. Cancer**

- Normal cells divide approximately 50 times before senescence (Hayflick limit).  
Cancer cells are "immortal." Analyze how telomerase reactivation contributes to this.

### **2. Binary Fission**

- Compare mitosis in eukaryotes with binary fission in prokaryotes. Which is faster? Why?