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

Answer: B. Metaphase

Detailed Explanation: During metaphase, spindle fibers pull the chromosomes until they line up perfectly along the center of the cell, known as the metaphase plate or equator.

12. The specialized complex tissue responsible for the translocation of manufactured organic food substances in plants is the:

- A. Xylem
- B. Phloem
- C. Parenchyma
- D. Cambium

Answer: B. Phloem

Detailed Explanation: Phloem transports dissolved sugars and amino acids from the leaves (sources) to growing or storage parts of the plant (sinks). Xylem conducts water and mineral salts.

13. During which stage of meiotic division does crossing over and genetic recombination occur between homologous chromosomes?

- A. Prophase I

D. Nucleolus

Answer: B. Rough Endoplasmic Reticulum

Detailed Explanation: The Rough Endoplasmic Reticulum (RER) is called "rough" because its surface is coated with ribosomes. It folds and transports proteins synthesized by those ribosomes.

16. Which of the following represents the correct hierarchical order of biological organization from simplest to most complex?

A. Cell $\rightarrow$ Tissue $\rightarrow$ Organ $\rightarrow$ System $\rightarrow$ Organism

B. Tissue $\rightarrow$ Cell $\rightarrow$ Organ $\rightarrow$ System $\rightarrow$ Organism

C. Cell $\rightarrow$ Organ $\rightarrow$ Tissue $\rightarrow$ System $\rightarrow$ Organism

D. Organism $\rightarrow$ System $\rightarrow$ Organ $\rightarrow$ Tissue $\rightarrow$ Cell

Answer: A. Cell $\rightarrow$ Tissue $\rightarrow$ Organ $\rightarrow$ System $\rightarrow$ Organism

Detailed Explanation: Cells form tissues, different tissues group to create organs, organs link structurally into systems, and multiple systems work together to sustain an individual organism.

17. Plant cells maintain structural rigidity and do not burst in pure water due to the counter-pressure exerted by the:

- A. Necrosis
- B. Apoptosis
- C. Lysis
- D. Plasmolysis

Answer: B. Apoptosis

Detailed Explanation: Apoptosis is a clean, regulated process of programmed cell death used to clear away unwanted or damaged cells without harming surrounding tissue. Necrosis is unprogrammed cell death from injury.

39. Sieve tubes and companion cells are structural components characteristic of which plant tissue?

- A. Xylem parenchyma
- B. Phloem
- C. Medullary rays
- D. Cork cambium

Answer: B. Phloem

Detailed Explanation: Sieve tubes conduct the organic nutrients, while neighboring companion cells maintain their metabolic functions, as mature sieve elements lack a nucleus and ribosomes.

40. Which of the following describes the function of microfilaments and microtubules inside a living cell?

- A. Maintaining structural shape and powering intracellular transport as a cytoskeleton
- B. Absorbing photons of solar light during photosynthesis

- A. Purpling of the leaf margins
- B. Stunted structural growth and chlorosis of older leaves
- C. Prolific root branching with zero shoot growth
- D. Excessive fruit ripening ahead of schedule

Answer: B. Stunted structural growth and chlorosis of older leaves

Detailed Explanation: Nitrogen is essential for synthesizing proteins, nucleic acids, and chlorophyll. A deficiency prevents normal cell growth and reduces chlorophyll, causing leaves to turn yellow (chlorosis).

43. The proteolytic enzyme secreted in its inactive form by gastric glands in the mammalian stomach is:

- A. Trypsin
- B. Pepsinogen
- C. Amylase
- D. Rennin

Answer: B. Pepsinogen

Detailed Explanation: Gastric chief cells secrete pepsinogen. Hydrochloric acid (HCl) in the stomach activates it into pepsin, which digests proteins into smaller polypeptides. Trypsin works in the small intestine.

44. Which vitamin deficiency in a human diet reduces the body's ability to absorb calcium, leading to rickets in children?

- A. Vitamin A

75. The rhythmic, wave-like muscular contractions that move food along the alimentary canal are called:

- A. Mastication
- B. Peristalsis
- C. Deglutition
- D. Assimilation

Answer: B. Peristalsis

Detailed Explanation: Peristalsis involves the coordinated contraction and relaxation of circular and longitudinal smooth muscles in the walls of the digestive tract, pushing food through the esophagus, stomach, and intestines.

76. The major nitrogenous waste product excreted in the urine of mammals is:

- A. Ammonia
- B. Uric acid
- C. Urea
- D. Amino acids

Answer: C. Urea

Detailed Explanation: Mammals convert toxic ammonia from protein metabolism into urea, which is soluble and safe to transport in blood. Birds and reptiles excrete uric acid as a semi-solid paste to conserve water.

77. Which component of mammalian blood plays a key role in forming clots at a wound site?

- A. Erythrocytes

surroundings (the abiotic component, including soil, water, and air).

94. The specific functional role or position that an organism fills within its community habitat is its:

- A. Ecological niche
- B. Trophic level
- C. Biosphere
- D. Biotic index

Answer: A. Ecological niche

Detailed Explanation: An ecological niche describes how an organism survives, obtains resources, reproduces, and interacts with other species within its habitat (e.g., its specific diet and activity patterns).

95. In a terrestrial food chain, organisms that feed directly on green plants are classified as:

- A. Primary producers
- B. Primary consumers
- C. Secondary consumers
- D. Decomposers

Answer: B. Primary consumers

Detailed Explanation: Green plants are primary producers because they synthesize food via photosynthesis.

Herbivores that eat these plants are primary consumers, while carnivores that hunt herbivores are secondary consumers.