Advanced High School Biology Assessment

Biology · Practice Test · 12 Questions

1. Which specific enzyme is responsible for synthesizing a short RNA primer during DNA replication to initiate the activity of DNA polymerase III?

A) Helicase
B) Primase
C) Ligase
D) Topoisomerase

2. In the context of the lac operon in E. coli, what is the direct function of the allolactose molecule?

A) It acts as a repressor protein
B) It serves as the promoter site
C) It binds to the repressor protein to prevent it from binding to the operator
D) It catalyzes the hydrolysis of lactose into glucose and galactose

3. During the light-dependent reactions of photosynthesis, which molecule is the final electron acceptor in the electron transport chain, leading to the reduction of NADP+?

A) Ferredoxin
B) Plastoquinone
C) Cytochrome b6f
D) Photosystem II

4. What is the primary function of the Golgi apparatus in a secretory cell?

A) Synthesis of proteins via ribosomes
B) Modification, sorting, and packaging of proteins
C) Degradation of worn-out organelles
D) Generation of ATP via oxidative phosphorylation

5. Which type of mutation results in the substitution of a single nucleotide that changes a codon for an amino acid into a stop codon?

A) Missense mutation
B) Silent mutation
C) Nonsense mutation
D) Frameshift mutation

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6. In the human kidney, which part of the nephron is primarily responsible for the reabsorption of water through aquaporins, regulated by antidiuretic hormone (ADH)?

A) Proximal convoluted tubule
B) Loop of Henle
C) Distal convoluted tubule
D) Collecting duct

7. What is the role of the enzyme Rubisco in the Calvin cycle?

A) Fixation of atmospheric CO2 to RuBP
B) Regeneration of RuBP
C) Reduction of 3-PGA to G3P
D) Oxidation of NADPH

8. Which phase of meiosis is characterized by the separation of homologous chromosomes moving toward opposite poles of the cell?

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

9. Which hormone, secreted by the corpus luteum, is responsible for maintaining the endometrial lining during the luteal phase of the menstrual cycle?

A) FSH
B) LH
C) Progesterone
D) Oxytocin

10. What is the significance of the 'wobble' position in the genetic code?

A) It allows for the initiation of transcription
B) It explains why multiple codons can encode the same amino acid
C) It prevents DNA polymerase errors
D) It marks the termination of translation

11. In cellular respiration, where specifically is the enzyme ATP synthase located within the mitochondrion?

A) Outer mitochondrial membrane
B) Intermembrane space
C) Mitochondrial matrix
D) Inner mitochondrial membrane

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12. Which component of the cytoskeleton is composed of actin subunits and plays a vital role in muscle contraction and cell shape maintenance?

A) Microtubules
B) Intermediate filaments
C) Microfilaments
D) Centrioles

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