

Multiple Choice Questions

1. Which enzyme is responsible for separating the two strands of DNA during replication?
A. DNA polymerase
B. DNA ligase
C. DNA helicase
D. RNA polymerase
2. What type of reaction joins adjacent DNA nucleotides together?
A. Hydrolysis
B. Condensation
C. Oxidation
D. Reduction
3. In semi-conservative replication, each new DNA molecule consists of
A. two new strands
B. two original strands
C. one new and one original strand
D. one RNA strand and one DNA strand
4. Which statement best explains why DNA replication is described as “semi-conservative”?
A. Each new molecule is completely different from the original.
B. Each new molecule contains one strand from the original DNA and one newly synthesised strand.
C. Half of the original molecule is broken down.
D. Both strands of the original DNA are used to form a single new molecule.

Structured Question

(a) Describe the role of DNA helicase in DNA replication. [1 mark]

(b) Explain how complementary base pairing ensures accurate DNA replication. [2 marks]

(c) Describe the roles of both DNA helicase and DNA polymerase in the semi-conservative replication of DNA. [3 marks]

Answers and Mark Scheme

1. C

2. B

3. C

4. B

- (a) DNA helicase unwinds the DNA double helix; it breaks hydrogen bonds between the two strands.
- (b) Each base can only pair with its complementary base, A with T, C with G; ensures that the new DNA is an exact copy of the original.
- (c) DNA polymerase joins adjacent nucleotides; via condensation reactions; forming phosphodiester bonds, (producing two DNA molecules each with one original and one new strand).