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**DEPARTMENT: NURSING**

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**Assignment**

**1) Highlight the steps of DNA replication**

During cell division, each daughter cell gets an exact copy of the genetic information of the mother cell. This process of copying the DNA is known as DNA replication.

How it starts:

An RNA primer, about 100-200 nucleotides long, is synthesised by the RNA primase.

DNA REPLICATION:

Origin of replication I identified. Then unwinding of parental DNA to form a replication fork.

RNA primer complementary to the DNA template is synthesised by RNA primase.

DNA synthesis I continuous in the leading strand (toward replication fork) by DNA polymerase.

DNA synthesis is discontinuous in the lagging strand (away from the fork), as Okazaki fragments.

Elongation: In both strands, the synthesis is from 5’ to 3’ direction.

Then the RNA pieces are removed; the gaps filled by deoxynucleotides by DNAP and the pieces are ligates by DNA ligase.

Proofreading is done by the DNA polymerase.

Finally organized into chromatin.

**2) Outline the functions of DNA replication enzymes**

The enzymes required for DNA replication are:

* DNA polymerase,
* Topoisomerase,
* DNA ligase.

DNA polymerase:

This enzyme synthesizes a new complementary strand of DNA, by incorporating dNMP sequentially in 5’ to 3’ direction, making use of single stranded DNA as template.

Topoisomerase:

This enzyme falls under DNA helicases and it unwinds the DNA. Helicases moves in both directions, separating the strands in advance for replication, thus forming a **replication bubble** with two **replication forks.**

DNA ligase:

This enzyme ligates the gaps filled by deoxynucleotides by DNAP and the RNA pieces which are removed.