i. **Initiation**

Repeats in the ori site are bound by DNA-A proteins which initiates strand separation. DNA-B (which is a helicase) is brought by DNA-C, and further unwinds the DNA strands. A *primase* will then bind and construct an RNA primer.

ii. **Elongation** and **Termination**

Remaining supercoiling is relieved by *topoisomerase II* (a DNA gyrase)

Elongation involves DnaB (a helicase) which unwinds the strand and *single stranded binding proteins* bind in order to keep the two strands separated. DNA polymerase then replicates each strand.

Termination – end of replication; is signalled by the *ter locus* which is rich in G and T. A protein known as ter protein is also involved. It is a *contrahelicase* preventing unwinding.

b. The ***lagging*** strand

This strand is **looped** around and replication then occurs 5'-3'. DNA polymerase II unclamps and then reclamps on the lagging strand whenever the primer of the okazaki fragments is encountered.

DNA polymerase I then **excises** the RNA primer and replaces it with DNA.

And enzyme called *ligase* then seals the resulting nicks.

4. **DNA replication is Eukaryotes**

Eukaryotes contain at least 19 different DNA polymerases

- a. The principle DNA replicase is DNA pol 8 – polymerase for the **lagging** strand synthesis and is highly processive

- b. DNA pol α – contains 4 subunits with a processivity of 200 and is involved in **initiation** of nuclear DNA replication

- c. DNA pol ε – involved in **leading** strand synthesis and is the sensor of DNA damage checkpoint control

*Replication* is similar to that of *E. coli* but is more *complex* in that the human cell contains 6 billion base pairs of DNA that needs to be copied and contains an origin of replication every 3 to 300 kbp

C. **RNA Replication (from RNA to DNA)**

This process is known as *Reverse transcription* and is carried out by means of the enzyme *reverse transcriptase*.

RNA functions as a single stranded template