

**Programme: Bachelor of Science (Second Year)**

**Subject: Microbiology**

**Paper Code: MIC 104**

**Paper Title: Molecular Biology**

**Unit II: Replication of DNA**

**Module Name: Models of Replication in Prokaryotes and Eukaryotes: Rolling Circle/Sigma and Theta**

**Module No: 13**

**Name of the Presenter: Ms. Sulochana A. Shet**

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### MCQ

1. Theta replication is the model of replication in prokaryotes wherein at a particular time the DNA structure resembles the shaped like the Greek letter theta ( $\theta$ ). Which following statement is true regarding the Theta replication?
  - a) Theta replication can be seen in DNA replication of viruses and eukaryotes.
  - b) In theta replication one strand of DNA is nicked, whereas the other remains intact.
  - c) In theta replication, two replication forks move outward from the origin of replication.
  - d) In theta replication, nick in the DNA is caused by a sequence specific endonuclease enzyme.
2. Select a correct option from below to complete the sentence: In rolling circle model of replication \_\_\_\_\_
  - a) Only one strand of DNA acts as a template for the synthesis of new DNA strand.
  - b) Both the strands of DNA acts as a template for the synthesis of new DNA strand.
  - c) Nick in DNA results into 3'-PO<sub>4</sub> and 5'-OH ends.
  - d) The single stranded tail cannot be converted into double stranded DNA and hence degraded by endonuclease enzymes.

### Completion type (fill-in-the-blanks)

1. Rolling circle replication is seen in ----- whereas, theta replication is seen in -----.
2. Direction of replication in Rolling circle is ----- whereas, in theta replication it is -----.

### Short Answer – I (short notes - say 20 to 50 words)

1. Why the model of replication in prokaryotes is known as theta structure?
2. Draw proper labelled schematic diagrams of theta model of replication.
3. Draw proper labelled schematic diagrams of rolling circle model of replication.

**Short Answer – II (extended – say 50 to 100 words)**

1. State the steps which are involved in theta model of replication.
2. State the steps which are involved in rolling circle model of replication.