Djilali Bounaama University – Khemis Miliana **Level: L3 – Microbiology**
Faculty of SNV/ST **Academic Year: 2024/2025**
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Course: Molecular Biology and Genetic Engineering (Tutorial Session)

Series No. 4

A. True or False

Answer **True** or **False** for each statement.

1. Radioactive labeling uses isotopes such as phosphorus-32 to render nucleic acids detectable.
2. Fluorescent labeling does not require a specific substrate for detection.
3. Probes used to label nucleic acids must be complementary to the target sequence.
4. The Northern blot is used to detect and quantify specific RNA molecules.
5. RNA samples are first digested with restriction enzymes before transfer to the membrane.
6. Detection in a Northern blot requires a probe complementary to the target sequence.
7. The Southern blot is used to detect specific DNA sequences.
8. The hybridization step requires prior denaturation of the DNA immobilized on the membrane.
9. The Southern blot can be used to detect mutations in DNA sequences.
10. Sanger sequencing uses modified nucleotides called dideoxynucleotides to terminate DNA synthesis.
11. All fragments produced after a Sanger sequencing reaction have the same length.
12. In automated Sanger sequencing, each base is identified by a specific fluorescent signal.

B. Practical exercise

1. A single-stranded DNA segment is represented below on the line. Its sequence is determined by the Sanger method. Examine the portion of the autoradiogram (film) of the electrophoresis gel provided and then:

   a. Write the nucleotide sequence as read directly from the autoradiogram (i.e., the sequence that can be read from the film lanes).

   b. Write the actual nucleotide sequence of the single-stranded DNA segment corresponding to that autoradiogram.