Sujet N°21
Please do not write on the exam paper, and do not forget to give it back at the end of the test.

PROBABILITIES

A screening test for a virus

The results will be given in decimal form rounded to 0.0001.
In one country, 2% of the population is infected with a virus.
There is a screening test for the virus that has the following properties:
  -the probability that an infected person has a positive test is 0.99 (test sensitivity).
  -the probability that a non infected person has a negative test is 0.97 (test specificity).

We decide to test a person chosen at random in that population.
We note V the event "The person is infected with the virus" and T the event "The test is positive".

1. Translate the situation with a tree diagram.

2. Prove that the probability of a positive test is 0.0492.

3. **a)** Justify the following sentence :
     "If the test is positive, there is an approximate 40% chance that the person is contaminated"

   b) Determine the probability that a person is not contaminated knowing that his test is negative.

Vocabulary: screening test: test de dépistage