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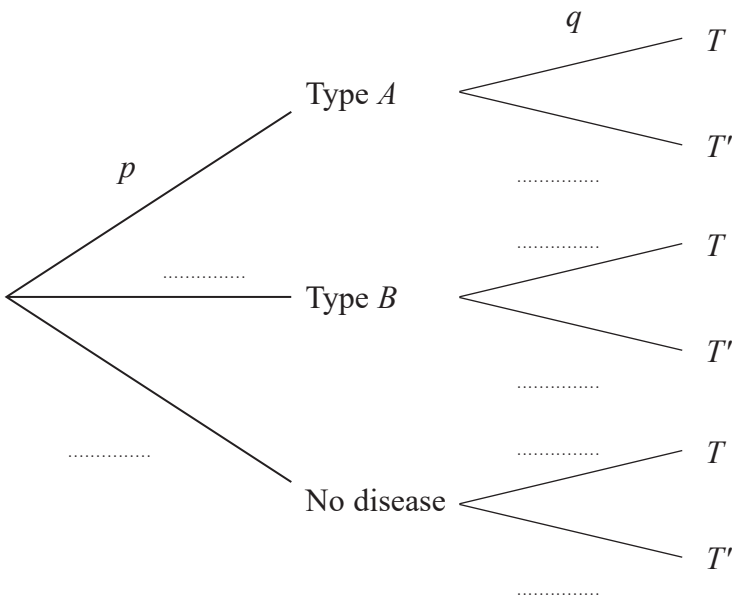
3. A certain disease occurs in a population in 2 mutually exclusive types.

It is difficult to diagnose people with type A of the disease and there is an unknown proportion p of the population with type A.
It is easier to diagnose people with type B of the disease and it is known that 2% of the population have type B.

A test has been developed to help diagnose whether or not a person has the disease. The event T represents a positive result on the test. After a large-scale trial of the test, the following information was obtained.

For a person with type B of the disease the probability of a positive test result is 0.96
For a person who does not have the disease the probability of a positive test result is 0.05
For a person with type A of the disease the probability of a positive test result is q

(a) Complete the tree diagram.



(2)

The probability of a randomly selected person having a positive test result is 0.169
For a person with a positive test result, the probability that they do not have the disease is $\frac{41}{169}$

(b) Find the value of p and the value of q.

(7)

A doctor is about to see a person who she knows does not have type B of the disease but does have a positive test result.

(c) (i) Find the probability that this person has type A of the disease.

(3)

(ii) State, giving a reason, whether or not the doctor will find the test useful.

(1)

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Question 3 continued

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Q3