AQA, OCR, Edexcel

A Level

A Level Biology

DNA Fingerprinting Questions

Name:

M M E

Mathsmadeeasy.co.uk

Total Marks: /27

DNA Profiling

Genetic fingerprinting is the technique used to compare individuals to one another. This technique is commonly used in identifying individuals, but also has many medical uses.

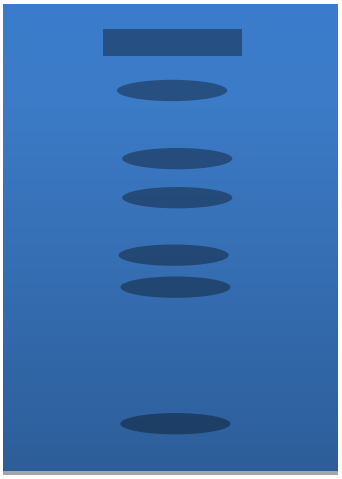
1. Certain features of the genome allow it to be used for identification purposes, this process is called genetic fingerprinting.

   a)
   i) What is meant by the term Variable Number Tandem Repeat (VNTR)? (1 mark)

   ii) Using VNTRs, explain how the structure of the genome allows it to be used for genetic fingerprinting. (3 marks)

   b) In order for a genetic fingerprint to be obtained, the DNA must first be separated out - this is called electrophoresis.

   i) DNA is obtained from a small sample of blood from an individual; what must happen to this sample before electrophoresis can be carried out? (4 marks)

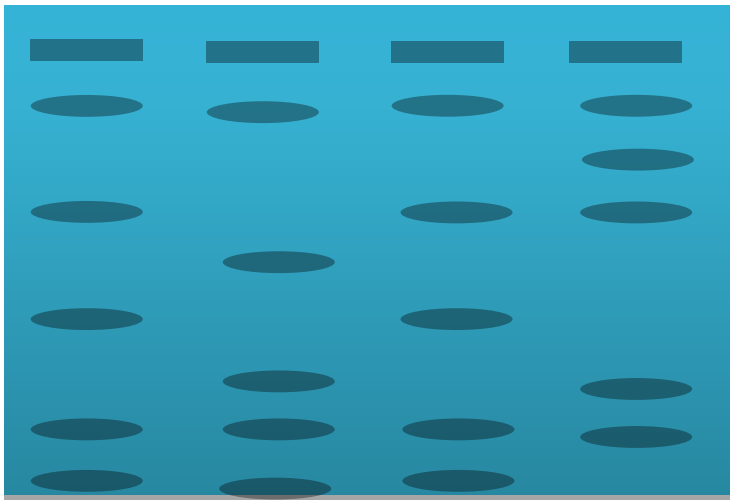


   ii) The diagram above shows the results after electrophoresis is carried out. Explain how electrophoresis causes the DNA to move across the gel. (4 marks)

iii) How can genetic fingerprinting be used to determine genetic variability within a population? (2 marks)

2. One of the biggest uses of genetic fingerprinting is in forensic science, to link individuals to DNA evidence found at crime scenes.

a) The result of electrophoresis carried out on a DNA sample found at a burglary is shown below.



i) Explain which suspect is most likely to have committed the crime. (2 marks)

b) Genetic fingerprinting is used in medical diagnosis and in a technique called Preimplantation Genetic Haplotyping; where it is used to screen embryos created for IVF to look for specific hereditary diseases.

i) Why is genetic fingerprinting useful in medical diagnosis? (4 marks)

ii) Identify one advantage and one disadvantage of Preimplantation Genetic Haplotyping. (2 marks)

c) i) Explain how genetic fingerprinting can benefit modern farmers in the way it helps them to overcome the issues involved in artificially selecting cows for maximum milk yield. (4 marks)