AQA, OCR, Edexcel

A Level

A Level Biology

DNA Fingerprinting Answers

Name:

M M E

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Total Marks: /27

DNA Profiling

Answer	Marks
1. a) i) Highly repetitive sequences of DNA bases	2 marks
ii) VNTRs differ in size/length between different individuals -VNTRs occur in lots of different places in the genome between different individuals - The difference in size and location of VNTRs creates a genetic fingerprint unique to the individual which can be used to identify them.	3 marks
b) i)- PCR amplifies DNA - It copies the areas that contain VNTRs using primers - The result is a sample containing many copies of DNA strands that are different lengths. - A fluorescent or radioactive tag is then attached	4 marks
ii) – DNA placed in a well at one end of the gel. Buffer solution covers the gel so that it can conduct electricity -Electrical current is passed through the gel -Because DNA is negatively charged it moves towards the positive electrode -The DNA fragments are separated out depending on their charge with smaller fragments moving faster and further.	4 marks

iii) The greater the number of fragments that do not match each other means that the individuals are more genetically different/variable	2 marks
2. a) i) B – has the most DNA bands that match the location of the bands in the sample b) i) - Genetics can confirm a disease/ definitive diagnosis. - Sometimes the specific mutation isn't known. -There is more than one mutation that cause some diseases. -different versions of the same disease depending on which mutation. - Understanding which type of a certain disease can help to get the best treatment. ii) –<u>Advantage:</u> -prevents embryos that are positive for hereditary disease from being implanted into the mother -Embryo implanted will not have the genes for a hereditary condition from one of its parents -<u>Disadvantage:</u> - embryos that contain genes for disease are usually destroyed (ethical issues of destroying life) - Moving closer to the idea of 'designer babies'	2 marks 4 marks 2 marks

c) i) – artificial breeding involves breeding cows that have a high milk yield to increase productivity -However there is a risk of inbreeding if the breeding population is too small -Inbreeding decreases the gene pool/decreases genetic diversity equalling an increase in health problems - Genetic fingerprinting can identify how closely related two organisms are so that organisms that are more related will not be bred together -	4 marks