

AQA, OCR, Edexcel

A Level

A Level Biology

**DNA Probes and Hybridisation
Answers**

Name:

M M E

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Total Marks: /28

Probes and Hybridisation

| Answer | Marks |
|---|---|
| <p>1.</p> <p>a)</p> <p>i) – to look for evolutionary relationships between organisms</p> <ul style="list-style-type: none">- To detect a gene that may cause a genetic disorder in order to develop a cure/treatment <p>ii) -Short single strand of DNA</p> <ul style="list-style-type: none">- has complementary base sequence to a particular gene-If the specific gene is present to probe will bind/hybridise to the strand of DNA-Probe has a label attached for detection (either UV or radioactive) <p>iii) – The DNA strand was broken up by restriction enzymes</p> <ul style="list-style-type: none">- DNA fragments were incubated with the labelled DNA probe-Fragments were then separated by size via gel electrophoresis- Gel was the exposed to UV light to see if the gene was present/ probe had attached | <p>1 mark</p> <p>4 marks</p> <p>3 marks</p> |

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| <p>iv) – restriction enzymes cut the DNA into fragments -these are then separated by gel electrophoresis -The size of the fragment determines the location of the cut sites -This forms a restriction map which indicates the recognition sites of the restriction enzymes</p> <p>b) i) A – Single strand of DNA that is being sequenced B – DNA polymerase – to join the nucleotides together C-Free nucleotides – to build up new DNA strand D-Labelled Nucleotide – once this has bound, no other nucleotides can attach to the chain E – Primer – to start the nucleotides binding</p> <p>ii) Each test tube will contain a different labelled modified nucleotide (A/T/C/G)</p> <p>iii) The terminator nucleotide joins randomly at different points along different strands creating different lengths</p> <p>iv) T G A C G G A T C</p> | <p>3 marks</p> <p>5 marks</p> <p>1 mark</p> <p>2 marks</p> <p>2 marks</p> |
| <p>2. a) i) Multiple genes can be screened for at the same time</p> | <p>1 mark</p> |

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| <p>b) i) – it would help her to decide whether to be screened or not -If positive – she could be informed of her chances of developing cancer in the future -She would be better informed to make decisions about preventative measures – e.g. mastectomy</p> <p>ii) – identify the specific mutation that caused the cancer -the treatment can then be targeted to that mutation and its specific interactions on the cell -it is more efficient and increases the chances of survival -example of personalised medicine</p> | <p>3 marks</p> <p>3 marks</p> |
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