InkBiology

QUESTION WORKBOOK

Recombinant DNA technology: isolating, inserting and expressing a gene

Gene regulation, genomics and biotechnology · Unit B17

AQA 3.8.4.1 · OCR A 6.1.3 · Edexcel A Topic 2, Topic 6 · CAIE 19.1, 19.2

5 questions · 18 marks

NAVY SCREEN EDITION

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SECTION B · Standard, 3 to 5 marks

B1 Explain why the same restriction endonuclease must be used to cut both the gene and the plasmid, and explain what DNA ligase then contributes. [4]

B2 A polymerase chain reaction begins with 5 molecules of double-stranded target DNA and runs for 20 cycles. Calculate the number of molecules present at the end, and calculate how long the run takes if each cycle lasts 90 seconds. [4]

B3 Well under one bacterium in a hundred takes up a plasmid, and many plasmids close on their own sticky ends without accepting an insert. Suggest why a marker gene is needed at all, and suggest how placing the gene of interest inside a gene for a fluorescent protein allows the recombinant cells to be picked out. [4]

B4 State the three temperatures used in a cycle of the polymerase chain reaction, and state what each of them is for. [3]

B5 Explain why DNA fragments move towards the positive electrode during gel electrophoresis, and explain why the shortest fragments travel furthest. [3]