



QUESTION WORKBOOK

Pharming and synthetic biology: living factories for medicines

Gene regulation, genomics and biotechnology · Unit B17

OCR A 6.1.3 · Edexcel A 8.17, 8.18 · Edexcel B 7.4 vi · CAIE 19.2

7 questions · 25 marks

PRINT EDITION

Every question in this book has a code beside its number.
Type inklearning.co.uk/q/ followed by the code to open that question online.
© 2026 Ink Learning Ltd. All rights reserved.
inklearning.co.uk/biology/ · youtube.com/@InkPhysics

SECTION B · Standard, 3 to 5 marks**B1**

PS-Q1

A company will synthesise DNA of any sequence to order and sell it to research laboratories, and has patented the engineered yeast it uses in its own drug production. Evaluate the biosecurity and ownership concerns raised by work of this kind. [5]

B2

PS-Q2

Describe how a goat is engineered to secrete a human protein into its milk, and describe why the protein appears there and nowhere else in the animal. [4]

B3

PS-Q3

Discuss the welfare arguments for and against producing medicines in the milk of transgenic livestock. [4]

B4
PS-Q4

State the condition treated with recombinant factor VIII, state the condition treated with recombinant adenosine deaminase, and state what recombinant factor VIII replaced. [3]

B5
PS-Q5

Insulin is manufactured in genetically modified bacteria, but factor VIII is made in cultured mammalian cells. Explain why factor VIII cannot be produced usefully in *Escherichia coli*. [3]

B6
PS-Q6

A transgenic goat secretes antithrombin at 2.5 g per dm³ of milk and yields 800 dm³ of milk in a year. A mammalian cell culture yields 50 mg of the same protein per dm³ of medium. Calculate the mass of antithrombin one goat supplies in a year, and calculate the volume of culture medium needed to match it. [3]

B7
PS-Q7

Outline what synthetic biology adds to genetic engineering, referring to standard parts, genome synthesis and engineered pathways. [3]

THIS BOOK ONLINE

Scan the code, or type the address, to open the questions in this book online:

inklearning.co.uk/biology/practise/questions/pharming-recombinant-medicines-and-synthetic-biology/