

# Biotechnology and Genetic Engineering

## Question Paper 1

Level	IGCSE
Subject	Biology (0610/0970)
Exam Board	Cambridge International Examinations (CIE)
Topic	Biotechnology and Genetic Engineering
Sub-Topic	
Booklet	Question Paper 1

**Time Allowed:** 24 minutes

**Score:** /20

**Percentage:** /100

**Grade Boundaries:**

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

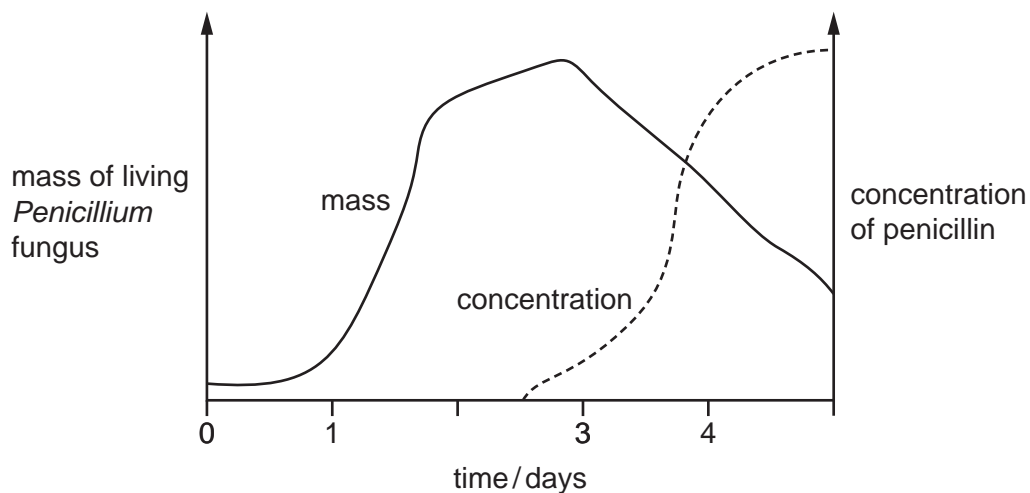
1 A gene for insulin is taken from a human cell and placed in a bacterium.

The bacterium can then make human insulin.

What is this process called?

- A artificial selection
- B genetic engineering
- C heterozygous inheritance
- D natural selection

2 Penicillin is produced in a fermenter by growing the fungus *Penicillium*. The graph shows how the mass of living *Penicillium* fungus and the concentration of penicillin changed over time.



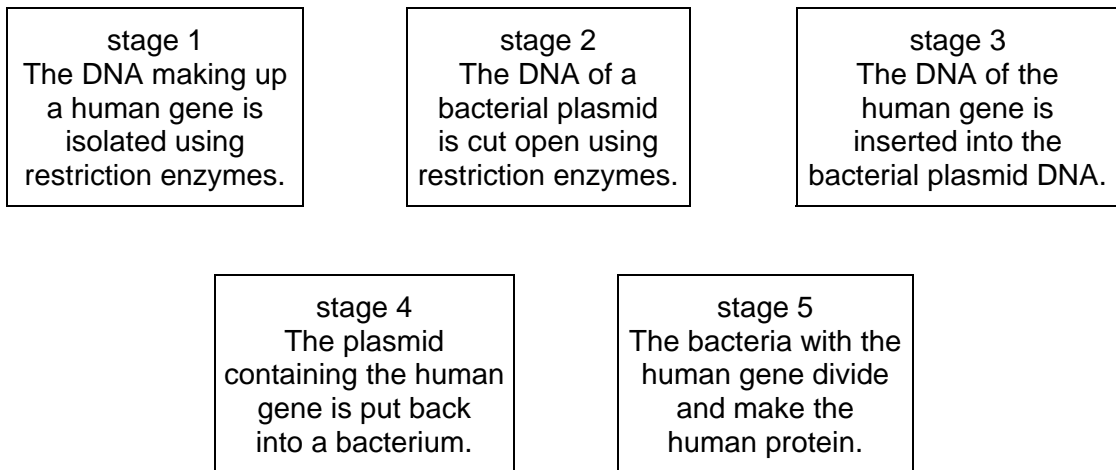
When is the best time to collect the penicillin?

- A at 1.5 days
- B at 3 days
- C at 3.5 days
- D at 5 days

3 When human DNA is inserted into the plasmid DNA of bacteria, which enzyme is used to cut the DNA?

- A DNA ligase
- B lipase
- C protease
- D restriction enzyme

4 The diagram shows five stages in genetic engineering.



Which stages involve the formation of sticky ends?

- A 1, 2 and 3    B 1 and 2 only    C 1 and 3 only    D 2 and 3 only

5 Why is yeast used in bread-making?

- A to provide carbon dioxide
- B to provide ethanol
- C to provide lactic acid
- D to provide oxygen

6 What term is used for the transference of a gene from one organism to another?

- A artificial selection
- B genetic engineering
- C mutation
- D natural selection

7 What is the role of anaerobic respiration in bread-making?

- A to produce alcohol to flavour the bread
- B to produce gas to make the bread rise
- C to release enough energy to bake the bread
- D to release enough lactic acid to kill the yeast

8 Which products of anaerobic respiration are important for making beer and bread?

	beer	bread
<b>A</b>	carbon dioxide	simple sugar
<b>B</b>	ethanol	carbon dioxide
<b>C</b>	lactic acid	ethanol
<b>D</b>	simple sugar	lactic acid

9 Why is yeast used in bread-making?

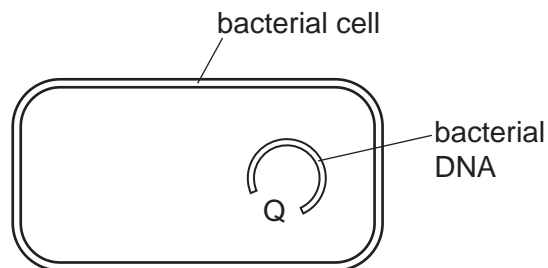
- A Aerobic respiration produces alcohol.
- B Aerobic respiration produces carbon dioxide.
- C Anaerobic respiration produces alcohol.
- D Anaerobic respiration produces carbon dioxide.

10 When making commercial apple juice, the fruit is crushed to separate cells and to release the cell contents. Chemical Q is found between the cells. It holds the cells together but it makes the extracted juice cloudy.

Which process is used to produce a clear juice?

- A adding more water to dissolve chemical Q
- B adding pectinase to digest chemical Q
- C boiling the juice to destroy chemical Q
- D crushing the apples to release chemical Q

11 The diagram shows a bacterial cell that will be used to produce human insulin.



What is inserted into gap Q?

- A a gene from a healthy human
- B cells from a human pancreas
- C DNA from another bacterium
- D molecules of human insulin

- 12** Ligase enzymes are used in genetic engineering to
- A** cut open plasmid DNA.
  - B** insert plasmids into bacteria.
  - C** isolate the DNA making up a human gene.
  - D** join human DNA to plasmid DNA.
- 13** Why are bacteria useful in biotechnology and genetic engineering?
- A** Bacteria do not have cell vacuoles.
  - B** Bacteria do not have mitochondria.
  - C** Bacteria have cell walls.
  - D** Bacteria share their genetic code with all other organisms.
- 14** Which is a reason for using bacteria in biotechnology?
- A** Bacteria are found inside the human body.
  - B** Bacteria can become resistant to antibiotics.
  - C** Bacteria can make complex molecules.
  - D** Bacteria reproduce slowly.

- 15 Why is yeast used in breadmaking?
- A to produce alcohol
  - B to produce carbon dioxide
  - C to use up oxygen
  - D to use up sugar
- 16 A crop plant has been genetically modified to make it resistant to herbicides.  
Which is a possible disadvantage of introducing this new crop plant?
- A Loss of weeds reduces competition.
  - B Some weeds might become resistant to the herbicide.
  - C The crop plant is unharmed and produces a higher yield.
  - D The new gene will appear in new generations of the crop.
- 17 Which is an example of genetic engineering?
- A altering the DNA in crop plants so they are resistant to herbicides
  - B only breeding from crop plants that are resistant to insect pests
  - C production of insulin in the pancreas
  - D using yeast to produce ethanol for biofuels
- 18 What is inserted into a bacterium to make the bacterium produce insulin?
- A a length of DNA from a human
  - B a length of DNA from another bacterium
  - C a molecule of insulin
  - D an enzyme

19 Genes are isolated from human DNA using .....1..... enzymes.

A bacterial plasmid is cut with the same enzyme forming .....2..... .

The human DNA is inserted into the bacterial plasmid using the enzyme .....3..... forming a .....4..... plasmid.

Which row correctly completes gaps 1, 2, 3 and 4?

	1	2	3	4
<b>A</b>	ligase	sticky ends	protease	restriction
<b>B</b>	recombinant	new DNA	ligase	daughter
<b>C</b>	restriction	daughter plasmids	ligase	diploid
<b>D</b>	restriction	sticky ends	ligase	recombinant

20 Which enzyme is used to produce clear apple juice?

- A** amylase
- B** lipase
- C** pectinase
- D** protease