

# **21. Biotechnology and genetic modification**

## **21.1 Biotechnology and genetic modification**

### **Paper 3 and 4**

Question Paper

## Paper 3

Questions are applicable for both core and extended candidates

1 (c) Bacteria are another type of microorganism that is used in biotechnology.

Tick **two** boxes to show why bacteria are useful in biotechnology.

cause disease	<input type="checkbox"/>
have the same structure as plant cells	<input type="checkbox"/>
make complex molecules	<input type="checkbox"/>
have a rapid reproduction rate	<input type="checkbox"/>
reproduce sexually	<input type="checkbox"/>

[2]

2 (c) State **two** reasons why bacteria are useful in biotechnology and genetic modification.

1 .....

2 .....

[2]

## Paper 4

**Questions are applicable for both core and extended candidates unless indicated in the question**

**3** Bacteria are used in many biotechnological processes.

(a) Explain why bacteria are useful in biotechnology. **(extended only)**

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

[3]

**4 (c)** Bacteria are useful in genetic engineering because they contain plasmids.

(i) Describe how a plasmid is cut so that a new gene can be inserted into the plasmid. **(extended only)**

.....  
.....  
.....

[2]

(ii) List **two** reasons, other than the presence of plasmids, that make bacteria and single-celled fungi useful to biotechnology industries. **(extended only)**

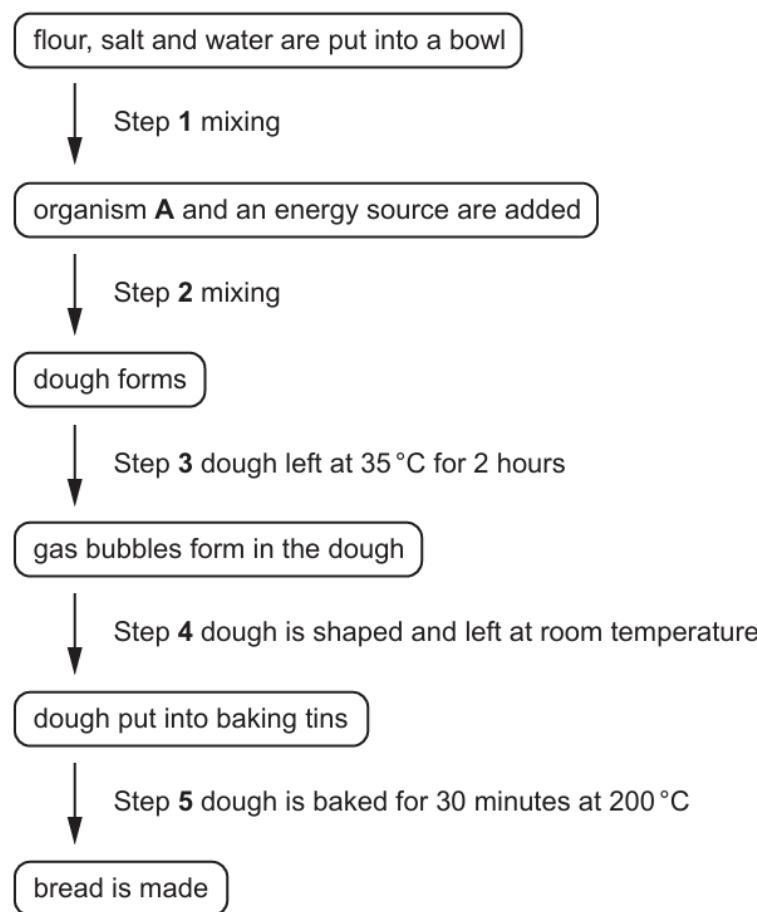
1 .....

2 .....

[2]

**5** Biotechnology is used in the process of bread-making.

Fig. 1.1 shows some of the steps in making bread.



**Fig. 1.1**

**(a)** State the name of organism A in Fig. 1.1.

..... [1]

**(d)** State the name of **two** products of biotechnology, other than bread, that make use of microorganisms.

1 .....

2 .....

[2]

6 (d) Some bacteria and viruses cause disease but many are useful to the biotechnology industry.

Explain why bacteria are useful in biotechnology. **(extended only)**

..[3]