Biotechnology and genetic modification – 2022 November IGCSE 0610

1. June/2023/Paper_0610/11/No.40

Which statement about genetic modification is correct?

A It involves choosing which individual organisms are used for breeding.

B It is always done using genes from the same species.

C It produces a new combination of genes.

D It produces exact copies of individual organisms.

2. June/2023/Paper_0610/12/No.40

Bacteria are useful for manufacturing products for human use.

Which statement explains why they are useful?

A Bacteria can be grown without nutrients.

B Bacteria do not have a nucleus.

C Bacteria infect human cells.

D Bacteria reproduce very rapidly.

3. June/2023/Paper_0610/13/No.33

Which statement is correct?

A Chromosomes are made of DNA.

B Chromosomes make up a gene.

C Each chromosome is a length of DNA that codes for a protein.

D Different forms of chromosomes are called alleles.

4. June/2023/Paper_0610/13/No.40

What is a reason for using bacteria in biotechnology?

A Bacteria are found inside the human body.

B Bacteria do **not** become resistant to antibiotics.

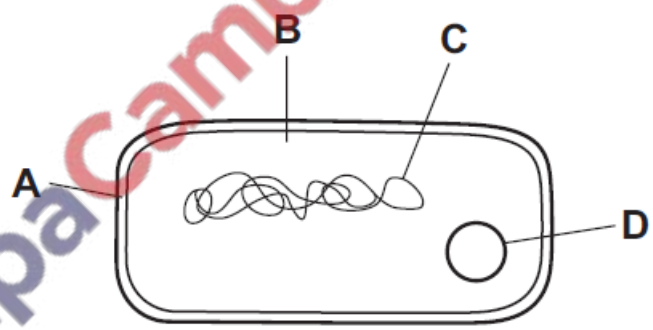
C Bacteria can make complex molecules.

D Bacteria reproduce slowly.

5. June/2023/Paper_0610/21/No.39

The diagram shows a bacterial cell.

Which part is useful in genetic modification?



6. June/2023/Paper_0610/21/No.40

Which statement about genetic modification is correct?

A It involves choosing which individual organisms are used for breeding.

B It is always done using genes from the same species.

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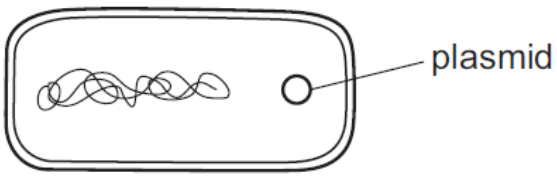
7. June/2023/Paper_0610/22/No.39

The diagram shows a bacterial cell containing a plasmid.



What is inserted into the plasmid if this cell is to be used for the production of 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

8. June/2023/Paper_0610/22/No.40

Yeast carries out anaerobic respiration, making carbon dioxide and ethanol as end-products.

Which end-products can be used to make biofuel and bread?

	biofuel	bread
A	carbon dioxide	carbon dioxide
B	carbon dioxide	ethanol
C	ethanol	carbon dioxide
D	ethanol	ethanol

9. June/2023/Paper_0610/23/No.39

Genetic modification has been used to produce human insulin in bacterial cells.

What is inserted into the bacterial cells to produce human insulin?

A a human nucleus

B human plasmids

C recombinant insulin

D recombinant plasmids

10. June/2023/Paper_0610/23/No.40

Penicillin is made in a fermenter by growing organisms.

Which type of organism is used in the production of penicillin?

A bacterium

B fungus

C protoctist

D virus

11. March/2023/Paper_ 0610/12/No.24

Why is yeast used in bread-making?

A Aerobic respiration produces alcohol.

B Aerobic respiration produces lactic acid.

C Anaerobic respiration produces alcohol.

D Anaerobic respiration produces carbon dioxide.

12. March/2023/Paper_ 0610/12/No.39

Vitamin A deficiency is a big health problem in some parts of the world and can cause problems such as blindness. Rice can be genetically modified to enable people to make vitamin A when they eat it.

150 g of this rice provides 60% of the adult recommended daily intake of vitamin A.

How much rice does an adult need to get 100% of the recommended daily intake of vitamin A?

A 190 g **B** 210 g **C** 250 g **D** 375 g

13. March/2023/Paper_ 0610/12/No.40
Which feature of bacteria makes them useful in genetic modification?

A They can only make simple molecules.

B They can reproduce rapidly.

C They can cause decomposition.

D They can cause disease.

14. March/2023/Paper_ 0610/22/No.22
Why is yeast used in bread-making?

A Aerobic respiration produces alcohol.

B Aerobic respiration produces lactic acid.

C Anaerobic respiration produces alcohol.

D Anaerobic respiration produces carbon dioxide.

15. March/2023/Paper_ 0610/22/No.39
Which component of bacteria is genetically modified to produce human insulin?

A cell membrane

B cell wall

C plasmids

D single circular DNA strand

16. March/2023/Paper_ 0610/22/No.40
Fermenters must have carefully controlled conditions.

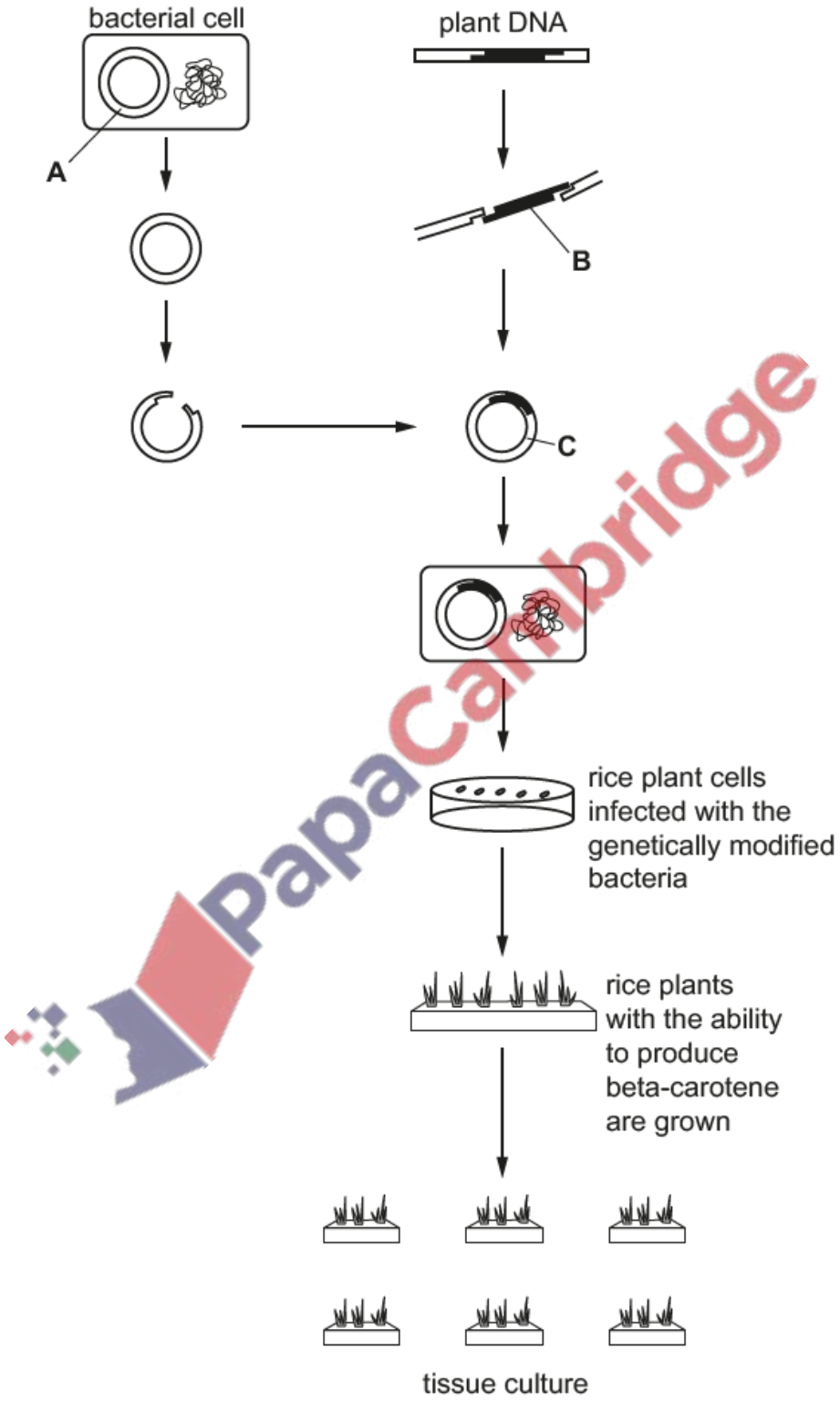
Which condition has the correct reason for controlling it?

	condition to be controlled	reason for controlling condition
A	supply of amino acids	for carbohydrate synthesis
B	supply of glucose	waste product to be removed
C	supply of oxygen	for anaerobic respiration
D	pH	to be optimum for enzyme activity

17. March/2023/Paper_ 0610/41/No.6

Golden rice is a type of rice that has been genetically modified to contain a nutrient called beta-carotene.

Fig. 6.1 shows the genetic modification process used to produce golden rice.



not to scale

Fig. 6.1

(a) Using the information in Fig. 6.1, complete the sentences to describe how rice is genetically modified to contain beta-carotene.

The part labelled **A** in the bacterial cell is a ..... .

Part **A** is extracted and cut using a ..... enzyme forming ..... ends.

The part labelled **B** is the ..... that codes for the production of beta-carotene.

The enzyme used to cut part **A** is also used to cut part **B** from the plant DNA.

Part **B** is inserted into the part labelled **A** using the enzyme ..... .

This forms the part labelled **C**, which is called a ..... .

Part **C** is put into a bacterium. The bacterium is taken up by rice plant cells, giving them the ability to produce beta-carotene.

Tissue culture is a form of ..... reproduction that is used to produce many identical rice plants producing beta-carotene for commercial use.

[7]

(b) Apart from structural features, state **two** reasons why bacteria are useful for genetic modification.

1 .....

2 .....

[2]

(c) Discuss the disadvantages of genetically modifying rice plants to produce beta-carotene.

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..... [3]

(d) Beta-carotene is required to produce vitamin A, which is essential for eye function.

State the nutrient required to prevent:

scurvy .....

rickets. .....

[2]

[Total: 14]