Oxford Cambridge and RSA

A Level Biology A

H420/02 Biological Diversity

Question Set 6

1 **(a)** Fig. 21 shows some of the steps involved in producing a genetically modified bacterium.

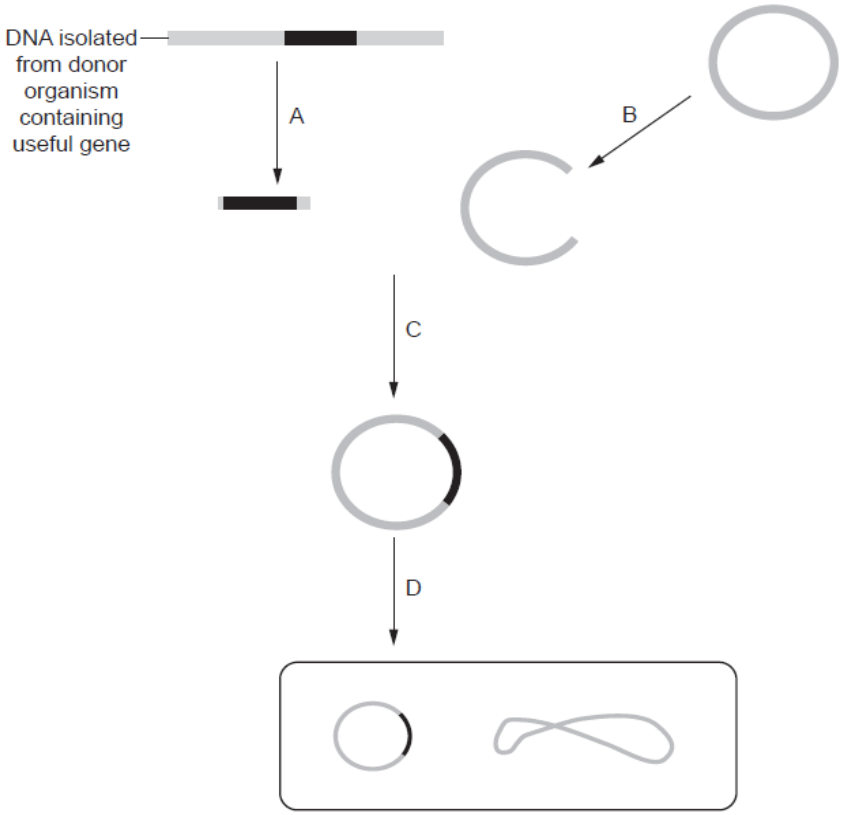

Fig. 21

The following passage describes steps A and B. Complete the passage using the mostappropriate terms.

A gene is cut from the DNA of the donor organism using a .....restriction..... enzyme..... .

The .....same..... enzyme is used to cut open a small piece of bacterial DNA so that the base sequences at the end of each piece of DNA are .....complementary..... **[3]**

(b) Describe the **events** that are taking place at the step labelled C. **[3]**

The gene with complementary bases with plasmid is inserted into plasmid. The complementary base pairs form hydrogen bonds. DNA ligase facilitate the joining of DNA fragement to the plasmid by catalysing the formation of phosphodiester bonds.

(c) Step D results in a transformed bacterium.

Many individual bacteria are not transformed successfully during this procedure.

Explain how scientists can determine the success of step D in this procedure.

Use a marker gene which will fluorescent when examined under uv light. Grow the bacteria in agar with antibiotic. Only transformed bacteria will grow. **[3]**

(d) Bacteria can be genetically modified to produce human insulin.

The process is similar to that shown in **Fig. 21** with some differences.

First, instead of isolating DNA that contains the insulin gene, mRNA that codes for insulin isextracted from human pancreas cells.

What needs to be done with the mRNA in order for the rest of the genetic modification to be completed? **[2]**

Form a cDNA using reverse transcriptase to make a double-stranded DNA using DNA polymerase.

(e) Some people are concerned about genetic modification.

State one valid concern that people have about the genetic modification of **bacteria**.

- It may increase in antibiotic resistance. **[1]**

Total Marks for Question Set 6: 12