

**Biotechnology and genetic modification – 2022 June O Level 5090****1. June/2022/Paper\_11/No.40**

Human insulin genes can be inserted into bacteria. The bacteria can then be cultured and will produce human insulin as a by-product.

What is an advantage to a patient of using this source of insulin rather than insulin from animals?

- A** It can be used to prevent the development of diabetes.
- B** It will allow the pancreas to regenerate.
- C** The insulin from animals has fewer side effects.
- D** It is much cheaper to produce.

**2. June/2022/Paper\_12/No.40**

Stages in the production of insulin on a commercial scale are listed.

- 1 bacteria produce human insulin
- 2 bacteria reproduce
- 3 human insulin gene extracted
- 4 human insulin gene inserted into bacterial DNA
- 5 human insulin produced on a commercial scale

What is the correct sequence of events?

- A** 3 → 4 → 1 → 5 → 2
- B** 4 → 3 → 5 → 2 → 1
- C** 4 → 2 → 5 → 3 → 1
- D** 3 → 4 → 1 → 2 → 5