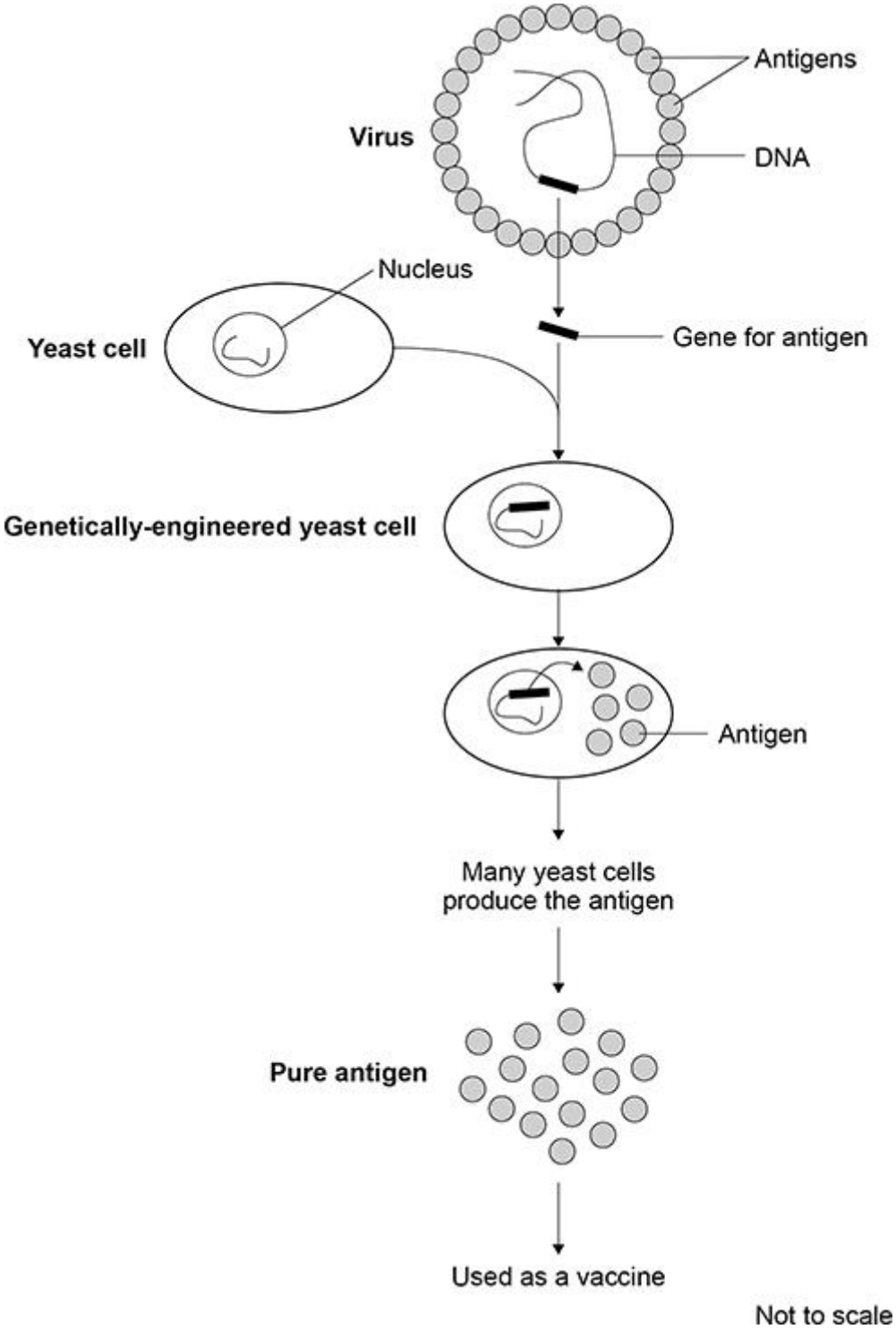
**Questions are for both separate science and combined science students unless indicated in the question**

## Q1.

Genetic engineering can be used for making many useful products.

The figure below shows how a vaccine against a virus can be made by genetic engineering.



Use information from above figure to answer parts (a) and (b).

(a) Which part of the virus is put into the yeast cell? **(HT only)**

_____

**(1)**

(b) Which part of the virus is made by the yeast cell? **(HT only)**

_____

**(1)**

(c) A long time ago, vaccines were made in a different way.

The virus was heated to stop it reproducing.

The vaccine contained whole viruses.

Why might the vaccine containing heat-treated viruses be dangerous? **(HT only)**

Tick (✓) **one** box.

| | |
|---|---|
| The viruses may be inactive. | ☐ |
| The viruses may cause an infection. | ☐ |
| The viruses will not mutate. | ☐ |

**(1)**

Genetic engineering can also be used in agriculture.

Weeds are a problem for farmers because the weeds compete with crop plants.

(d) Give **three** factors that the weeds and crop plants compete for.

1 _____

2 _____

3 _____

**(3)**

Glyphosate is a weed killer used in agriculture.

Genetically modified (GM) maize is a food crop that is resistant to glyphosate weed killer.

Farmers can spray glyphosate on a field to kill the weeds where the GM maize is growing.

(e) Suggest **one** advantage of using glyphosate on fields where GM maize is growing. **(biology only)**

_____

_____

**(1)**

(f) Suggest **one** problem of using glyphosate on fields where GM maize is growing.

Do **not** refer to cost in your answer. **(biology only)**

_____

_____

**(1)**

**(Total 8 marks)**