3 **(a)** Genetic engineering is a modern method for producing crop plants with improved characteristics.

One example of a crop plant with improved characteristics is soybean, *Glycine max*, which has been genetically modified to make it resistant to a herbicide. This genetically modified soybean is called GM soybean.

To create GM soybean, a bacterial gene and a section of regulatory DNA were introduced into soybean cells.

Outline the roles of enzymes and a section of regulatory DNA in the creation of genetically modified organisms such as GM soybean.

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(b) In 2018, an area of 123.5 million hectares was used to grow soybean crops worldwide. GM soybean was grown in 73% of this area.

In 2018, soybeans accounted for 50% of the total GM crop area worldwide.

Calculate the total area used to grow GM crops worldwide in 2018.

Show your working.

..... hectares [2]

(c) Discuss the social implications of growing GM crops.

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[Total: 11]