

Selective Breeding and Genetic Engineering

Q:1 Scientists have produced many different types of GM (genetically modified) food crops.

(a) Use words from the box to complete the sentence about genetic engineering.

clones	chromosomes	embryos	genes
--------	-------------	---------	-------

GM crops are produced by cutting _____ out of the _____ of one plant and inserting them into the cells of a crop plant.

(2 marks)

(b) Read the information about GM food crops.

Herbicide-resistant GM crops produce higher yields.

Scientists are uncertain about how eating GM food affects our health.

Insect-resistant GM crops reduce the total use of pesticides.

GM crops might breed naturally with wild plants.

Seeds for GM crops can be bought from only one manufacturer.

The numbers of bees will fall in areas where GM crops are grown.

Use this information to answer these questions.

(i) Give two reasons why some farmers are in favour of growing GM crops.

1 _____

2 _____

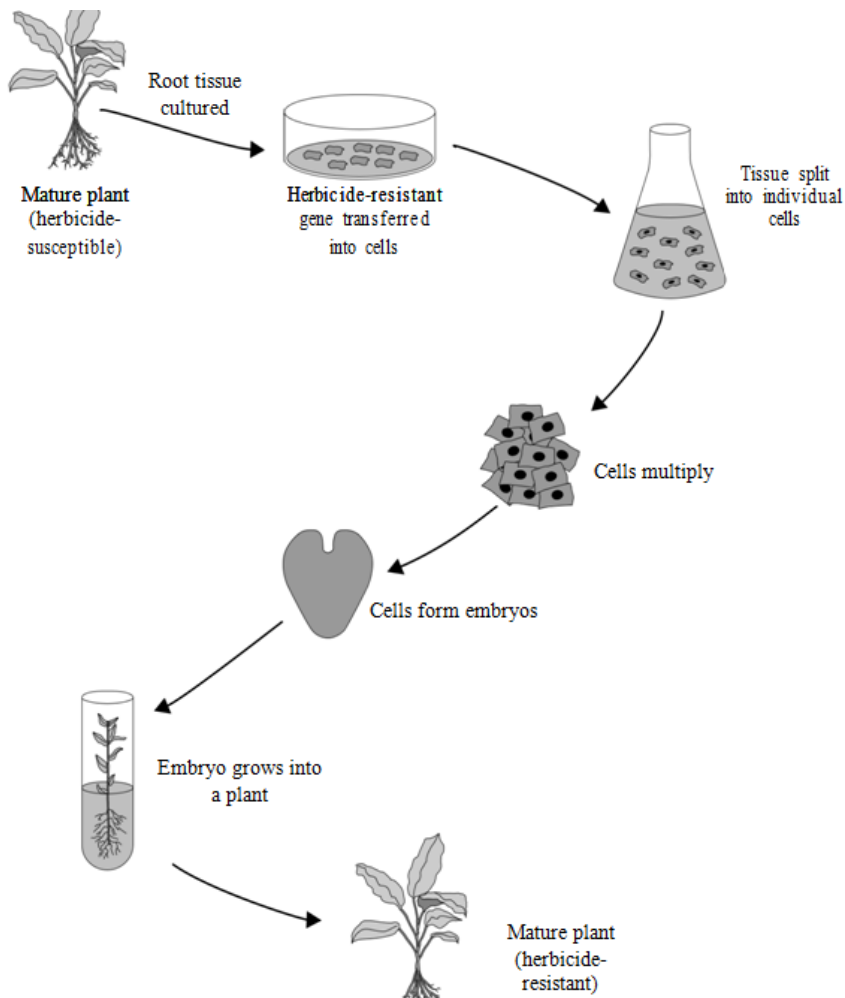
(2 marks)

(ii) Give two reasons why many people are against the growing of GM crops.

1 _____

(2 marks)

Q:2 The diagram shows one method of producing herbicide-resistant crop plants.



(a)(i) The herbicide-resistance gene is obtained from a herbicide-resistant plant. Which structure in a cell carries the genes?

(1 mark)

(ii) How is the herbicide-resistance gene cut out of this structure?

(1 mark)

(b) Apart from having the herbicide-resistance gene, the herbicide-resistant plants are identical to the herbicide-susceptible plants.

Explain why.

(2 marks)

(c) Suggest one advantage to a farmer of growing herbicide-resistant crops.

(1 mark)

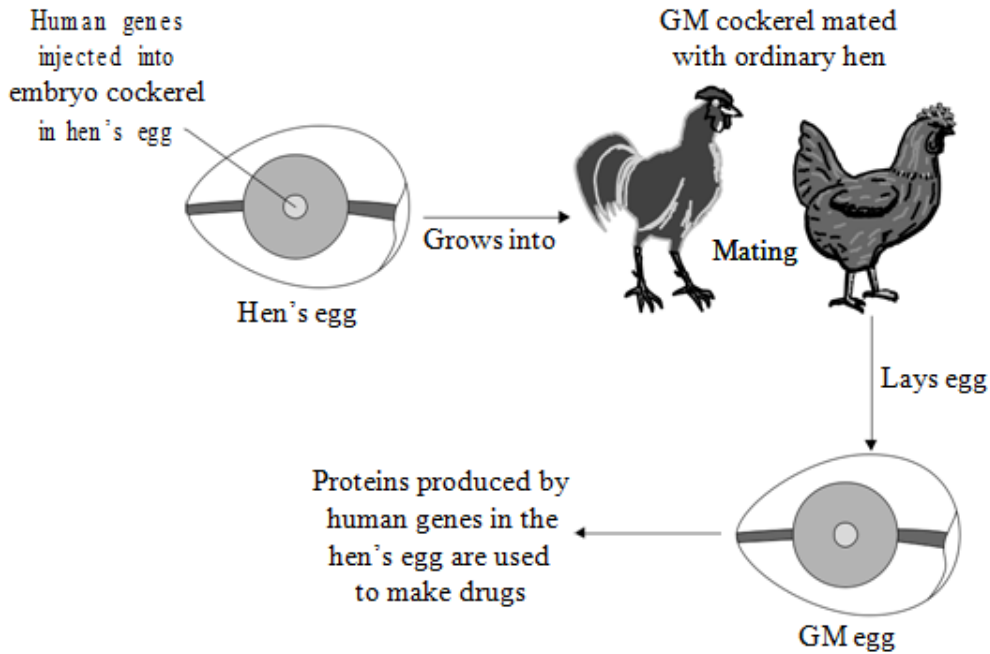
(d) Many people are opposed to the growing of herbicide-resistant crops produced in this way.

Suggest one reason why.

(1 mark)

Q:3 Scientists have discovered how to produce genetically modified (GM) hens' eggs. Some proteins produced in GM eggs can be used as drugs to treat humans.

The diagram shows how this is done.



(a) Which type of reproduction is involved when the cockerel mates with the hen? Tick () one box.

Asexual

Cloning

Sexual

(1 mark)

(b) From which part of a human are the genes cut? Tick () one box.

Chromosome

Embryo

Gland

(1 mark)

(c) Read the information about genetically modified animals. GM animals might escape and breed with wild animals.

Genetic modification can produce fast-growing animals for food.

Genetic modification can be used to clone animals in danger of extinction. Using GM animals can reduce the number of animals used in medical research.

Animals have the right to be free from genetic modification.

Use only this information to answer these questions.

(c)(i) Give two reasons why many people are in favour of genetically modified animals.

1 _____

2 _____

(2 marks)

(c)(ii) Give two reasons why many people are against genetically modified animals.

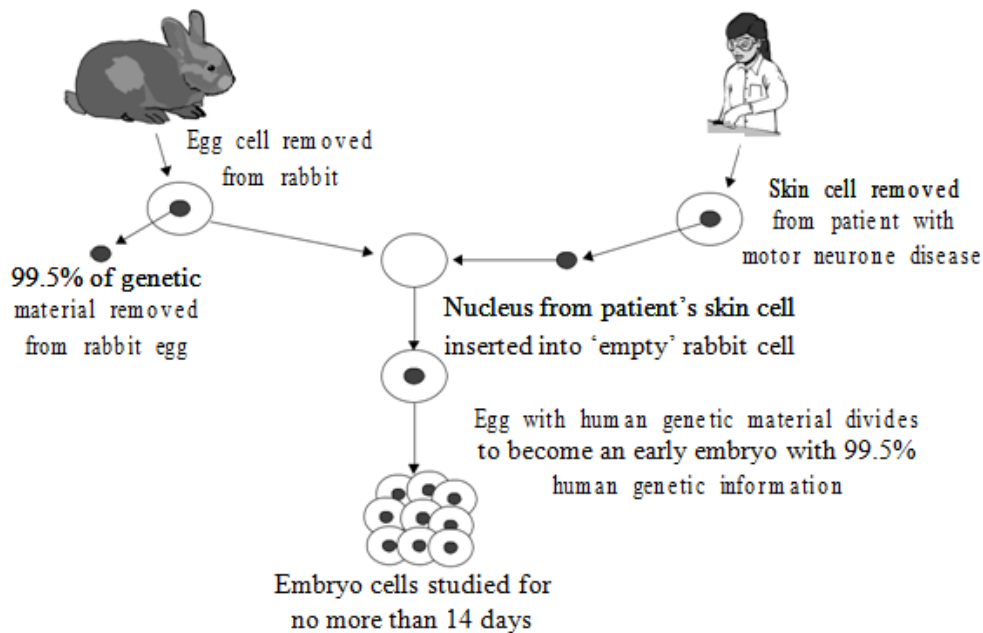
1 _____

2 _____

(2 marks)

Q:4 Scientists in Korea have discovered a method of producing rabbit–human embryos. Rabbit–human embryos could provide cells for research into human diseases such as motor neurone disease. Rabbits produce large numbers of eggs. Rabbit–human embryos could overcome a shortage of human embryo cells for research.

The diagram shows how rabbit–human embryos are produced.



(a) Which structures in the nucleus contain 99.5 % of a cell's genetic information?

(1 mark)

(b) Use the above information and your own knowledge and understanding to evaluate how the production of rabbit–human embryos may help research into human diseases.

Remember to give a conclusion as part of your evaluation.

(4 marks)

Q:5 We can now produce organisms with the characteristics we want the organisms to have.

List A gives the names of four ways of producing organisms. List B gives information about the ways of producing organisms.

Draw one line from each way of producing organisms in List A to the correct information in List B.

List A
Ways of producing organisms

Embryo transplantation

Genetic engineering

Taking cuttings

Tissue culture

List B
Information

Taking part of the stem from a plant, then putting this part of the stem in wet soil in a plant pot.

Growing groups of cells from a plant on special jelly.

Transferring genes from one organism to a different organism.

Growing plants from seeds in a garden.

Separating groups of cells from a very young developing animal then putting the groups of cells into host mothers.

(4 marks)

TOTAL MARKS=35