PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 4: NATURAL SELECTION AND GENETIC MODIFICATION (PACK 2)

SCORE	PERCENTAGE
/54	%

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Q1.

The population of humans on Earth has increased significantly leading to food shortages.

The growth of drought-resistant crop plants could lead to an increase in food supply.

Describe how drought-resistant crop plants can be produced.

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(Total for question = 3 marks)

Q2.

Describe how racehorses alive today have been selectively bred to run faster.

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(Total for question = 3 marks)

Q3.

Corn is one of the world's most important crop plants.

Native Americans grew an early form of corn called teosinte.
Modern corn has been developed by selective breeding of teosinte plants.

Describe how selective breeding has produced modern corn.

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(Total for question = 3 marks)

Q4.

Corn is one of the world's most important crop plants.

Native Americans grew an early form of corn called teosinte.
Modern corn has been developed by selective breeding of teosinte plants.

Genetic engineering can also be used to produce a new variety of modern corn.

Describe how the genome of this new variety of corn is different from the genome of corn that has not been genetically engineered.

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(Total for question = 2 marks)

Q5.

Alfred Russel Wallace travelled around Malaysia during the 1800s and wrote to Charles Darwin about the animal species he studied.

His main conclusions were very similar to those of Charles Darwin and they both contributed to the current understanding of evolution.

Describe the theory of evolution by natural selection.

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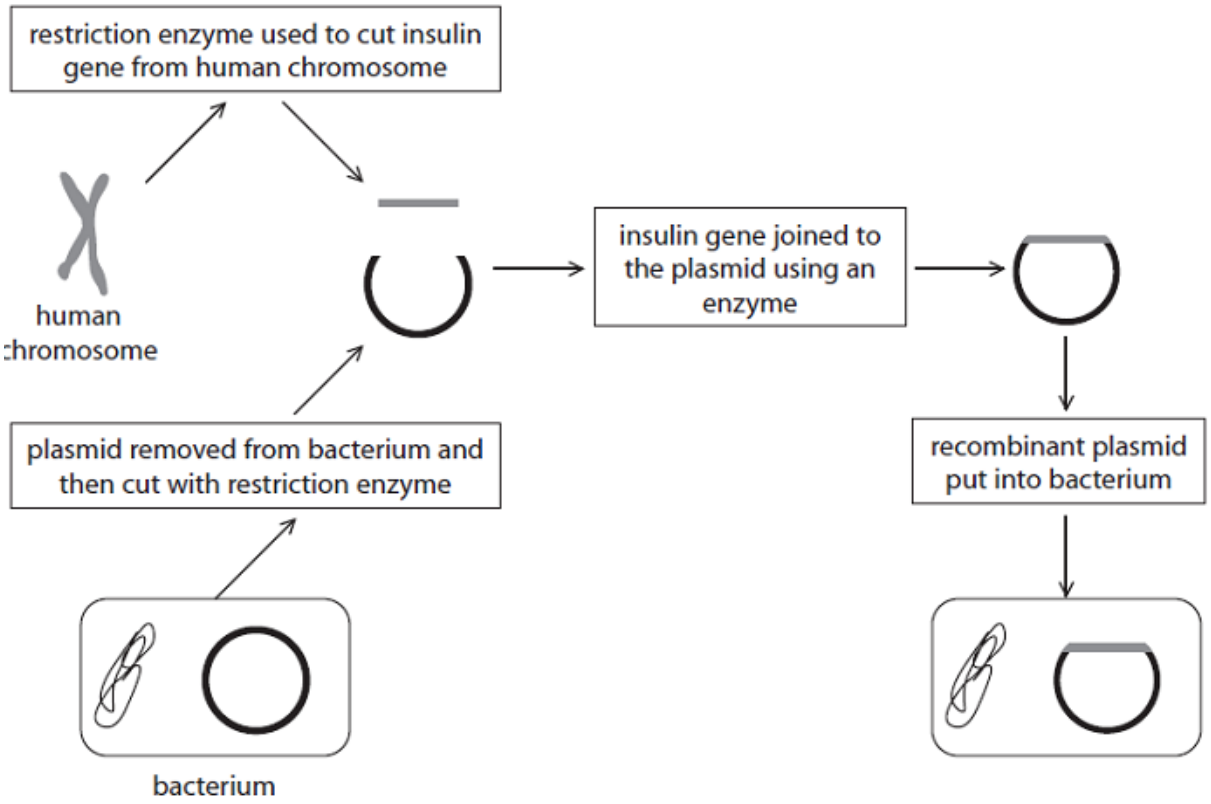
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(Total for question = 3 marks)

Q6.

Enzyme technology

The diagram shows how the human insulin gene can be used to genetically modify bacteria.



(a) (i) Name the enzyme used to join the insulin gene to the plasmid.

(1)

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(ii) Suggest why the same restriction enzyme was used to cut the human chromosome and the plasmid.

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*(b) Enzyme technology can be used in the production of foods including sweets, vegetarian cheese and lactose-free milk.

Describe how enzyme technology can be used to produce these food products.

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(c) Washing powders can be biological or non-biological.

Describe how biological washing powders can make clothes cleaner than nonbiological washing powders.

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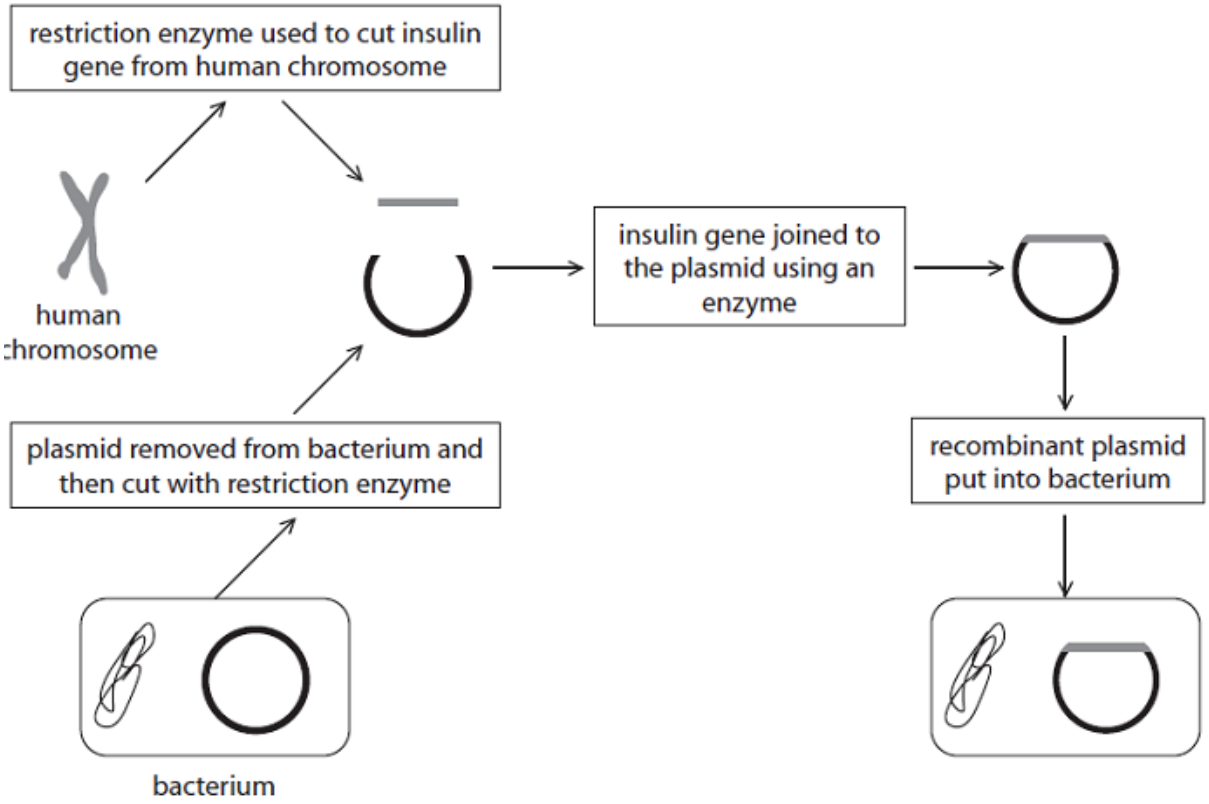
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(Total for question = 11 marks)

Q7.

Enzyme technology

The diagram shows how the human insulin gene can be used to genetically modify bacteria.



(a) (i) Name the enzyme used to join the insulin gene to the plasmid.

(1)

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(ii) Suggest why the same restriction enzyme was used to cut the human chromosome and the plasmid.

(2)

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*(b) Enzyme technology can be used in the production of foods including sweets, vegetarian cheese and lactose-free milk.

Describe how enzyme technology can be used to produce these food products.

(6)

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Describe how biological washing powders can make clothes cleaner than nonbiological washing powders.

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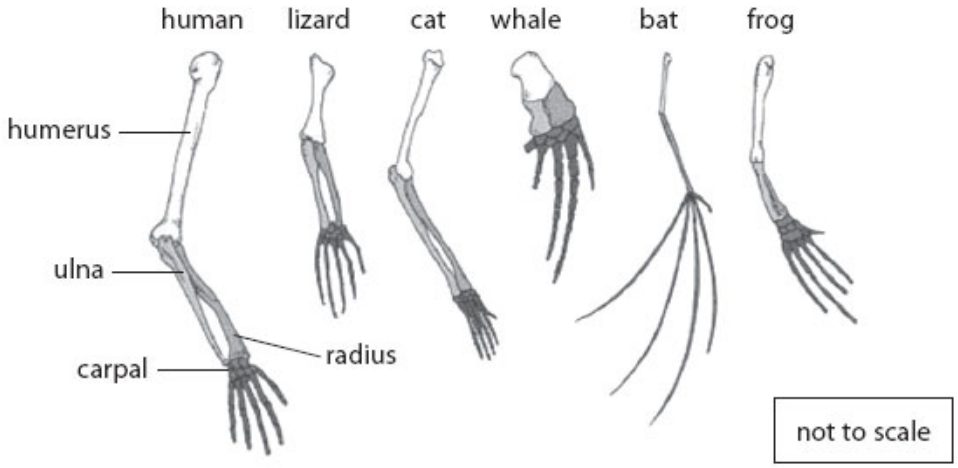
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(Total for question = 11 marks)

Q8.

The diagrams show the limbs of six organisms.



(a) Many scientists believe that these six organisms evolved from one common ancestor.

Describe the evidence shown in the diagrams that supports this belief.

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(b) Fossils can provide evidence for evolution.

Explain why the fossil record is incomplete.

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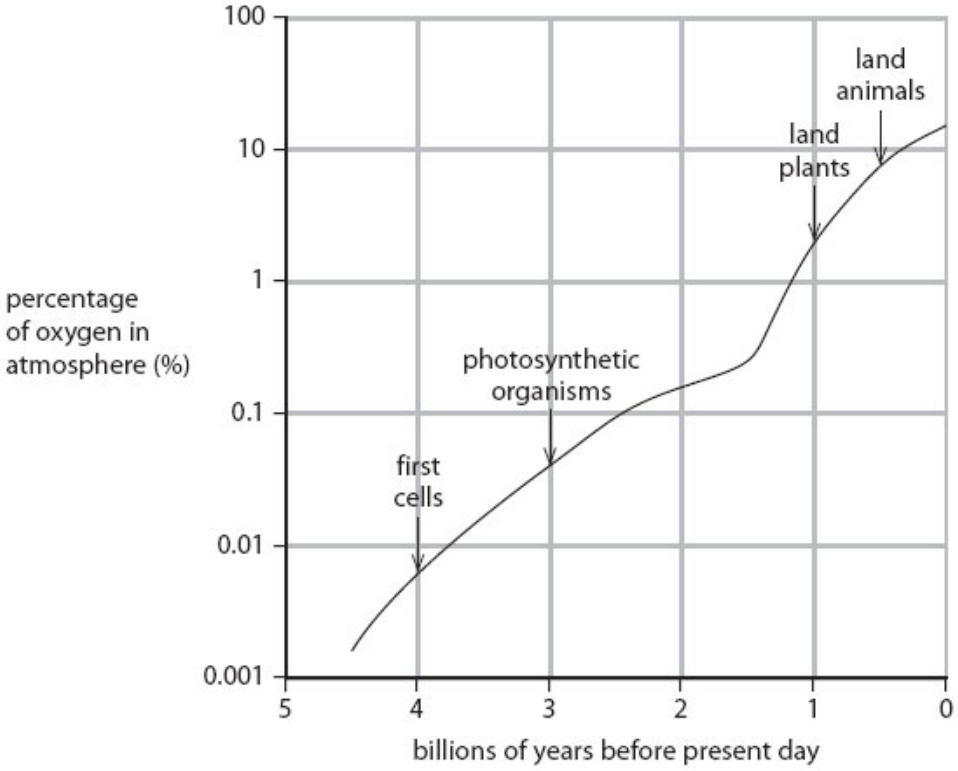
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(c) The graph suggests that the level of oxygen in the atmosphere was important for the evolution of many living organisms.



(i) How much oxygen was needed in the atmosphere for the evolution of land animals?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** 0.009%

☒ **B** 0.09%

☒ **C** 0.9%

☒ **D** 9.0%

(ii) Suggest how photosynthesis could have changed the gas content of the atmosphere.

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(iii) Suggest why such a high percentage of oxygen in the atmosphere was needed for large land animals to evolve.

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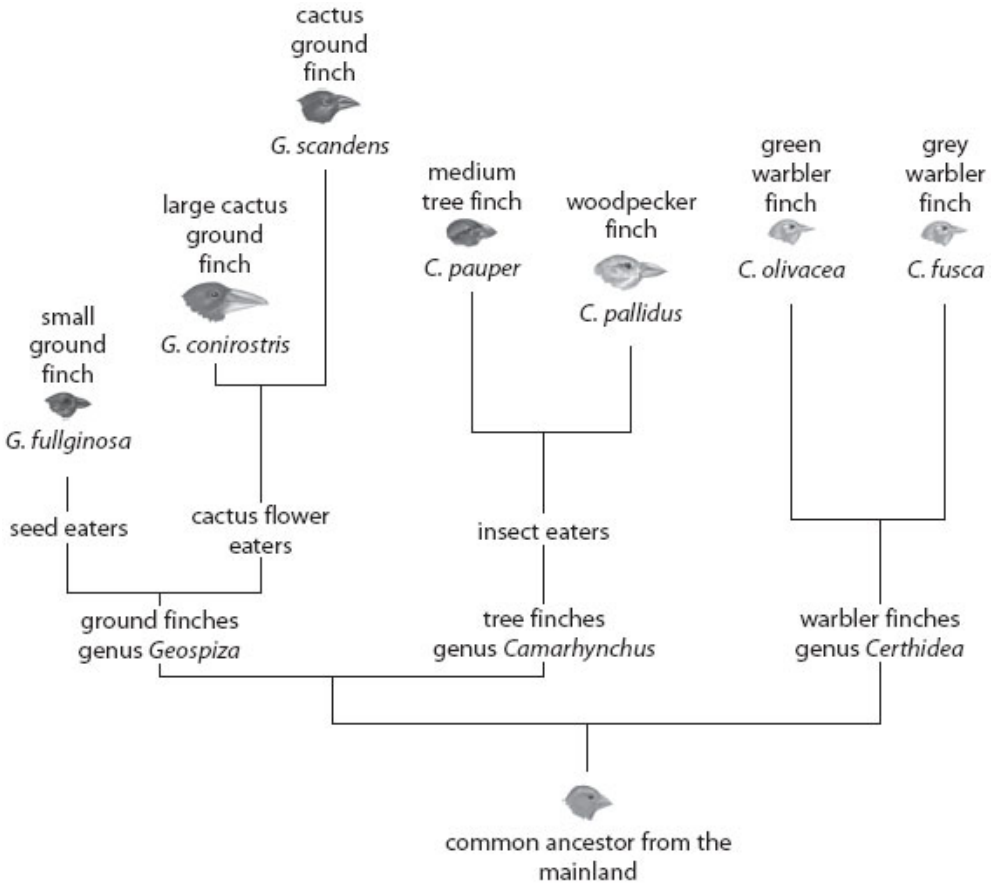
(Total for Question = 10 marks)

Q9.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



Suggest how these species of finches could have evolved.

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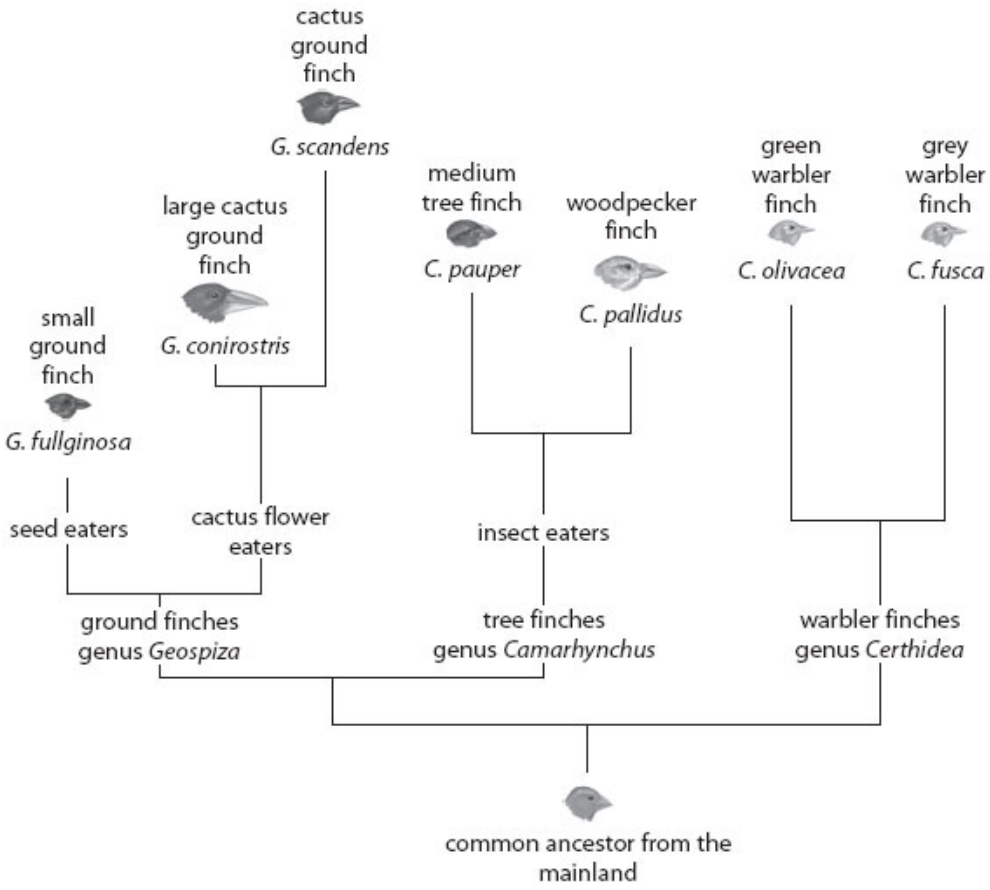
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Q10.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



Suggest how these species of finches could have evolved.

(3)

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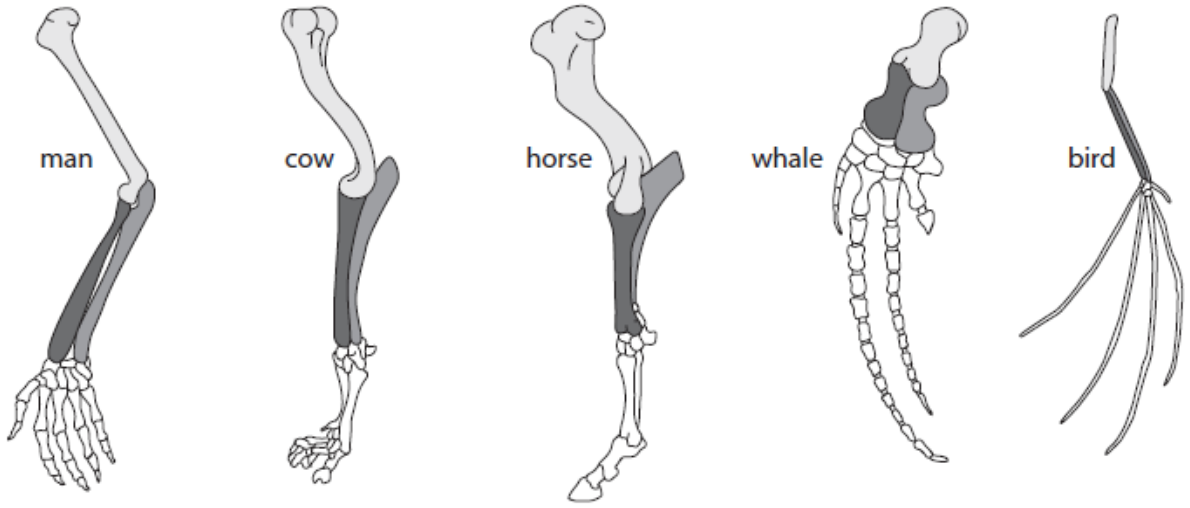
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Q11.

* The diagram shows some limbs of modern-day animals.



Explain how the study of the limbs of different species of vertebrates provides evidence for evolution.

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Q12.

Figure 11 shows a Petri dish containing E. coli bacteria. The bacteria have been genetically modified to contain a phosphorescent gene so they glow in the dark.

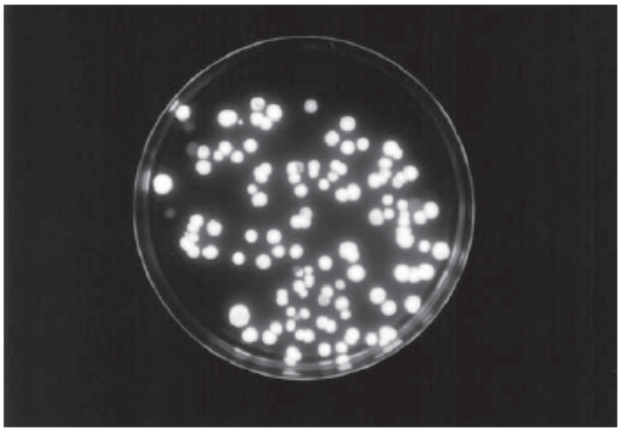


Figure 11

Explain how a bacterial cell can be genetically modified to glow in the dark.

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(Total for question = 4 marks)

Q13.

* Bacteria have been genetically engineered to produce human insulin since 1978.

Explain how bacteria can be genetically engineered to produce human insulin.

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(Total for question = 6 marks)

Q14.

Bacterial cells can be genetically modified using enzymes to produce the hormone insulin.

Explain how enzymes are used to produce a genetically modified plasmid in a bacterial cell.

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(Total for question = 3 marks)

Q15.

Yeast cells can be genetically modified to produce a painkiller.

This painkiller is usually obtained from opium poppies.

One method for genetically modifying a yeast cell uses a plasmid containing the desired gene.

(i) Explain how a gene can be inserted into a plasmid.

(2)

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(ii) Discuss the possible benefits and risks of producing painkillers from genetically modified yeast cells rather than extracting the painkillers from poppies.

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(Total for question = 5 marks)