OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



EXAM QUESTION PACK

B1.1 WHAT IS A GENOME AND WHAT DOES IT DO? (FOUNDATION)

SCORE	PERCENTAGE
/61	%

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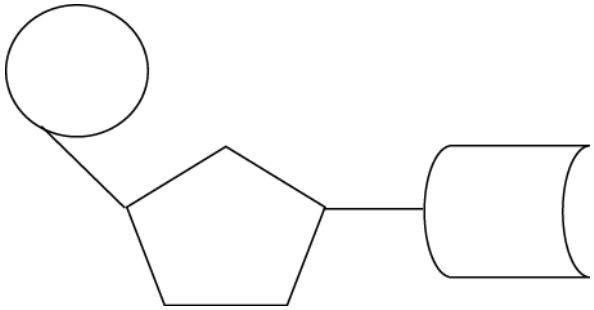
1(a).

(i) DNA is a polymer made of nucleotides.

Each nucleotide is made of three parts:

- A phosphate group
- A base
- A sugar.

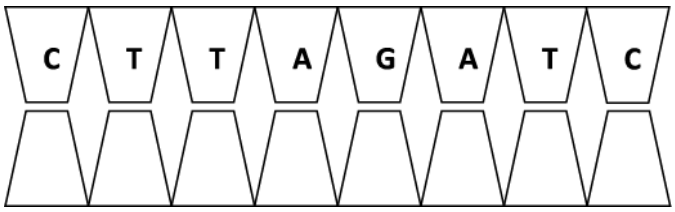
Draw a line and label the phosphate group on the nucleotide below.



[1]

(ii) DNA has four different bases. A, T, C and G.

Use these four bases to complete the base sequence of the complementary strand of DNA.



Complementary strand

[1]

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(b). The diagram below shows how genetic material is organised.

Choose a word from the list to label each structure.

Write the correct word next to the structure on the diagram.

gene chromosome DNA base pair cell nucleus



[3]

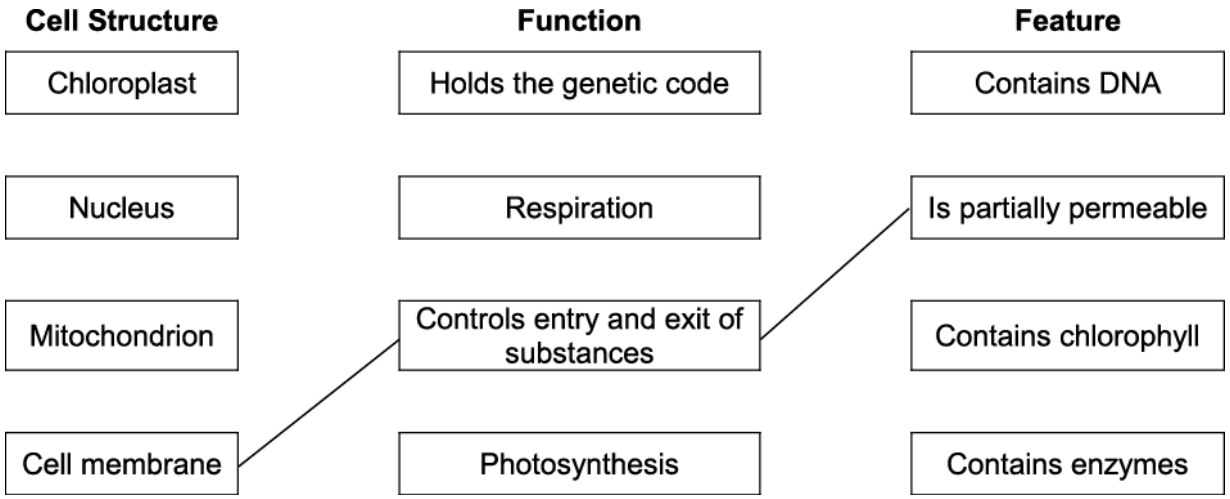
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2(a). Cells are the basic building blocks of life. They need to do many things in order to stay alive.

Structures within cells perform a variety of functions and have features that allow them to do these jobs.

Use straight lines to complete the diagram to show which cell structure links to the **function** and the **feature** that allows that structure to do its job.
Two lines have been drawn for you.



[3]

(b). Anna and Jess are identical twins.

Their parents can easily tell the difference between them.

Explain why Anna and Jess are described as genetically identical and suggest why their parents can tell the difference between them.

[4]

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3(a). Albinism is an inherited condition where affected people are unable to make a pigment called melanin. Skin, hair and eyes may all be affected and the person will be very pale skinned with white-blonde hair and possibly red eyes.

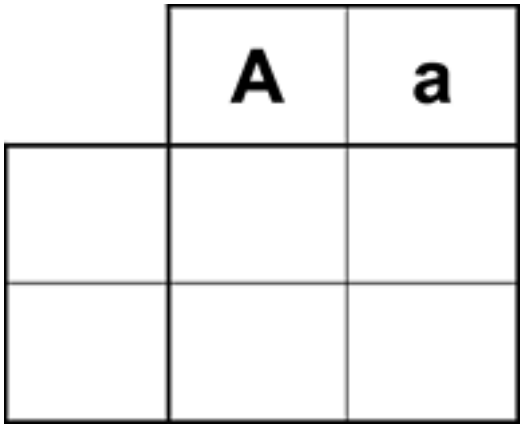
Esther and Simon's daughter, Livvy, has albinism.

Esther and Simon are both heterozygous (carriers).

Complete the Punnett square below to show how Esther and Simon passed the alleles for albinism to Livvy.

Use **A** to represent the allele for normal melanin production and **a** to represent the allele for albinism.

Livvy's genotype is aa.



[2]

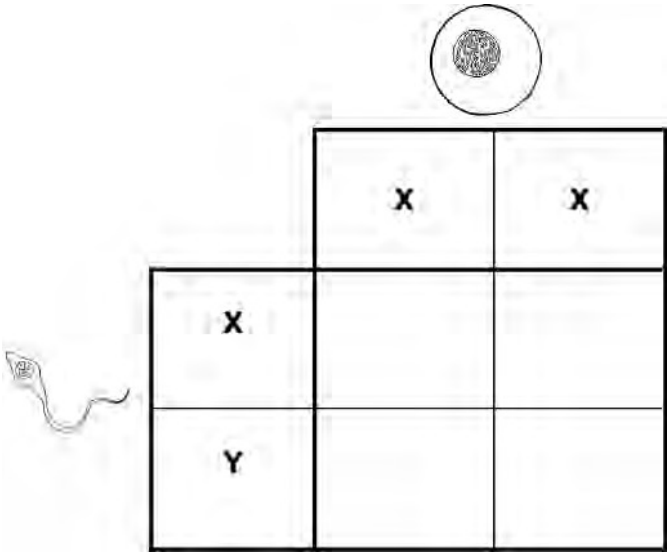
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(b). In humans, sex chromosomes determine gender.

Esther and Simon are having another child.

Use the diagram below to show the probability of Esther and Simon's second child being a boy.



Probability _____

[2]

(c). Use the example of the inheritance of albinism to describe the difference between **homozygous** and **heterozygous**.

_____

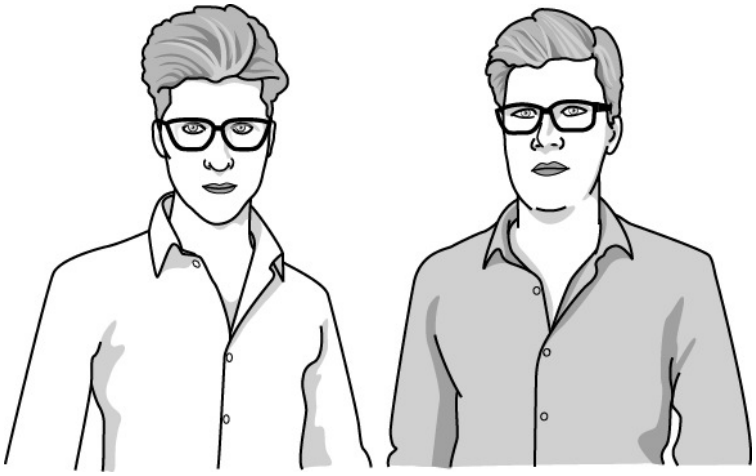
_____

_____

_____ [2]

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4. Jack and Ted are identical twins.



Explain why Jack and Ted look very similar but will not always look exactly the same.

The quality of written communication will be assessed in your answer.

[6]

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5. Our genes control how we develop and function.

Draw a ring around the correct word to complete each of the sentences about genes.

Genes are **cells / instructions / nuclei** that describe how to make proteins.

Genes are sections of DNA molecules that make up **chromosomes / enzymes / proteins**.

Different versions of the same gene are called **alleles / chromosomes / proteins**.

[2]

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6. Steve and Jane have a baby.
Some features of the baby are like Steve and some are like Jane.
However some features look different to both Steve and Jane.

Use ideas about genes, alleles and the environment to explain these observations.

The quality of written communication will be assessed in your answer.

[6]

7. Chromosomes contain a molecule called DNA.

Describe the structure of DNA and its job in the cell.

The quality of written communication will be assessed in your answer.

[6]

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8. Every person has two alleles for a gene.

These alleles can be dominant or recessive.

Draw **one** straight line from each **pair of alleles** to the **characteristic** that the person would have.

Pair of alleles	**Characteristic**
two dominant alleles	the dominant characteristic
one dominant and one recessive allele	the recessive characteristic
two recessive alleles	

[2]

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9. Everyone has different characteristics.

This means we all look and behave differently.

Explain how our characteristics are determined.

Include specific examples of characteristics in your answer.



The quality of written communication will be assessed in your answer.

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[6]

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10(a) This question is about DNA and genes.

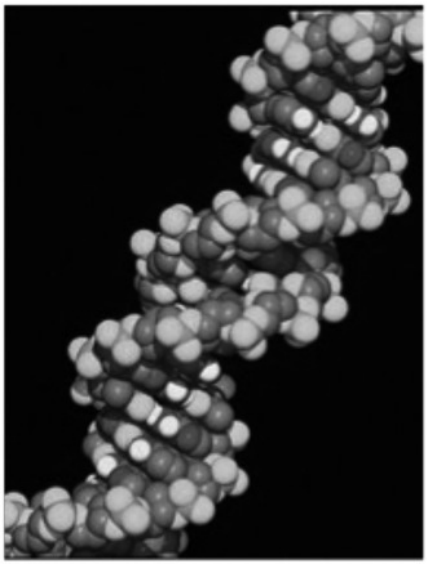
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DNA is a double helix.

The double helix is divided into genes along its length.

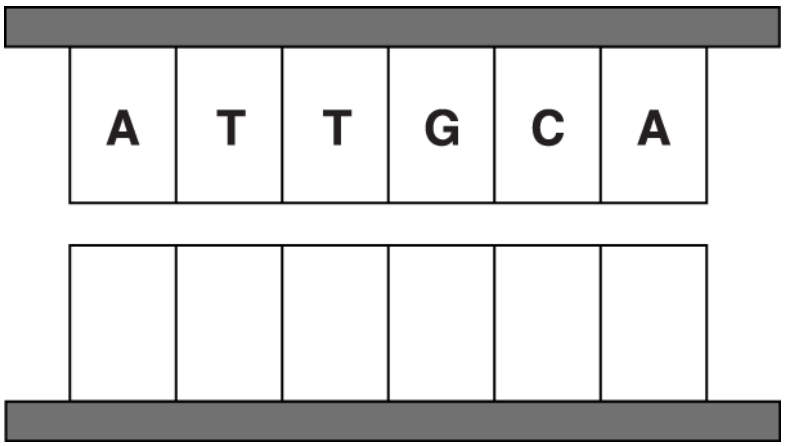
The two strands are held together by bonds between pairs of bases.

The bases always pair up in the same way.



Complete the model of DNA to show the missing bases.

Write **A, T, C** or **G** in each box.



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[2]

(b). **36%** of the bases found in a particular gene are type **G**.

(i) What is the percentage of type **C** bases in this gene?

Explain your answer.

---

[2]

(ii) A second gene has a different percentage of type **G** bases.

Suggest **why** the percentage of type **G** bases is different in this gene.

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[2]

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(c). A copy of a gene is produced to carry the genetic code to the cytoplasm.

Complete the sentence to explain why.

Use the correct words from the list.

cell membrane

cell wall

cytoplasm

nucleus

vacuole

Genes are found in the _____ of the cell but protein synthesis takes place in the _____ of the cell.

[1]

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11. Humans have different characteristics.

These characteristics have different causes.

Complete the table by writing each **characteristic** in the correct column to show its **cause**.

dimples **scars** **weight** **eye colour**

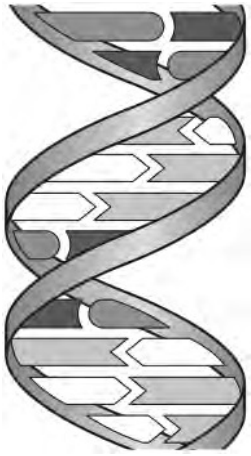
Cause		
Genes	Environment	Both genes and environment

[2]

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12. DNA is a polymer made of nucleotides. A nucleotide is made of a sugar, a phosphate and a base.

The diagram shows the structure of DNA.



(i) On the diagram label the location of a base.

[1]

(ii) On the diagram label the location of the sugar and phosphate group.

[1]

13. Nina is learning about substances absorbed by plants. She finds out that plants absorb nitrate ions from the soil.

Explain why nitrate ions are essential for plant growth and survival.

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[2]

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14. DNA has four different bases.

A always pairs with T.
C always pairs with G.

A scientist is analysing a sample of DNA. She works out that 23% of DNA is made up of the base A.

Which **two** statements about the sample are correct?

Tick (✓) **two** boxes.

23% of the sample will be the base T. ☐

23% of the sample will be the base C. ☐

27% of the sample will be the base T. ☐

27% of the sample will be the base C. ☐

77% of the sample will be the base T. ☐

[2]

END OF QUESTION PAPER

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