

GCSE Biology B (Twenty First Century Science)
J257/02 Depth in Biology (Foundation)

Question Set 10

1 Cystic fibrosis is a disease caused by a person's DNA.

(a) Describe the structure of DNA.

[4]

Cystic fibrosis is caused by a single gene.

There are two alleles of the gene:

- the dominant allele, **F**, does not cause cystic fibrosis
- the recessive allele, **f**, causes cystic fibrosis.

(b) (i) What is the phenotype of a person who has the alleles **FF**?

[1]

(ii) What is the phenotype of a person who has the alleles **Ff**?

[1]

(iii) What is the genotype of a person who has cystic fibrosis?

[1]

(c) A couple is thinking about having a baby.

The woman and the man both have the alleles **Ff**.

The Punnett square shows the possible combinations of alleles in their offspring.

	F	f
F	FF	Ff
f	Ff	ff

Use the Punnett square to help you answer the questions.

(i) What proportion of their offspring is likely to have the allele combination **FF**?

..... in every [1]

(ii) What percentage of their offspring is likely to have the allele combination **Ff**?

Percentage = % [2]

(iii) What is the probability that any one of their offspring will have cystic fibrosis?

Probability = [2]

(d) A different couple is also thinking about having a baby.

- The woman has had a genetic test. It showed that she has the **f** allele.
- She does **not** have cystic fibrosis.
- The man does not know what alleles he has.
- He does **not** have cystic fibrosis.

Explain the possible genotypes and phenotypes of their baby **and** explain what things the couple should consider before deciding to have a baby.

[6]

Total Marks for Question Set 10: 18

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