

# Protein synthesis and gene variants: practice questions

5 questions • 14 marks • mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name .....

Total ..... / 14

**1** **Triple only** **Higher tier** [1 mark]

What decides the order of amino acids in a protein?

- A. ☐ The shape of the ribosome
- B. ☐ The order of bases in a gene
- C. ☐ The number of chromosomes in the cell
- D. ☐ The type of enzyme in the nucleus

**2** **Triple only** **Higher tier** [3 marks]

Explain how the order of bases in a gene decides the shape of an enzyme.

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**3** **Triple only** **Higher tier** [4 marks]

Describe how a gene is used to make a polypeptide.

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4

Triple only Higher tier

[3 marks]

A variant in the non-coding DNA in front of a gene alters the phenotype of an organism. The protein made from the gene has the same sequence of amino acids. Explain how the variant can affect the phenotype.

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5

Triple only Higher tier

[3 marks]

A variant in the coding DNA of a gene for an enzyme stops the enzyme working. Explain how.

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# Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1] Triple only Higher tier

B B: The order of bases in a gene (1)

2. [3] Triple only Higher tier

- the order of bases decides the order of amino acids (1)
- the chain of amino acids folds (1)
- to produce a specifically shaped protein / active site (1)

3. [4] Triple only Higher tier

- RNA polymerase binds to non-coding DNA in front of the gene (1)
- RNA polymerase produces a complementary mRNA strand (1)
- from the coding DNA of the gene (1)
- mRNA attaches to a ribosome (1)
- codons / triplets of bases in the mRNA code for specific amino acids (1)
- tRNA transfers amino acids to the ribosome (1)
- amino acids are linked to form a polypeptide (1)
- Max 4

4. [3] Triple only Higher tier

- the variant affects the binding of RNA polymerase (1)
- so a different amount of mRNA is made (1)
- so the quantity of protein produced is altered (1)

5. [3] Triple only Higher tier

- the sequence of amino acids is altered (1)
- so the protein folds into a different shape / the active site changes shape (1)
- the substrate no longer fits so the enzyme activity is reduced or lost (1)