

# Nucleotides & Nucleic Acids

## Question Paper 2

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Foundations in Biology
Topic	Nucleotides & Nucleic Acids
Booklet	Question Paper 2

**Time allowed:** 49 minutes

**Score:** /36

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

## Question 1

The genetic code carries instructions for the synthesis of polypeptides.

(a) (i) State the number of DNA nucleotide bases that code for a single amino acid. [1]

(ii) There is a maximum of 64 different base combinations in DNA that could each code for an amino acid.

How is this number of combinations calculated? [1]

(iii) Twenty different amino acids are commonly used for protein synthesis. In theory, this would need only 20 different base combinations.

Explain the uses of the remaining 44 combinations. [2]

(iv) Which nucleotide bases are common to DNA and RNA? [1]

(b) Describe how a nucleotide base sequence in a gene is used to synthesise a polypeptide.



*In your answer you should describe the steps of the process in the correct order.*

[7]

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[Total: 12]

## Question 2

Fig. 5.1 is a circular representation of the genetic code.

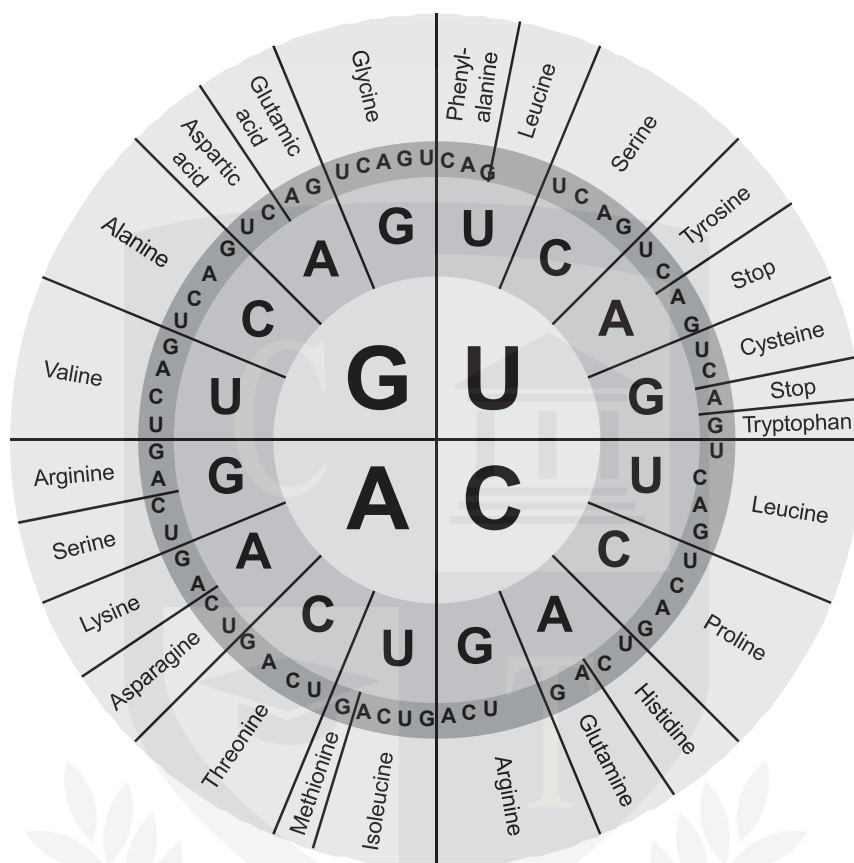
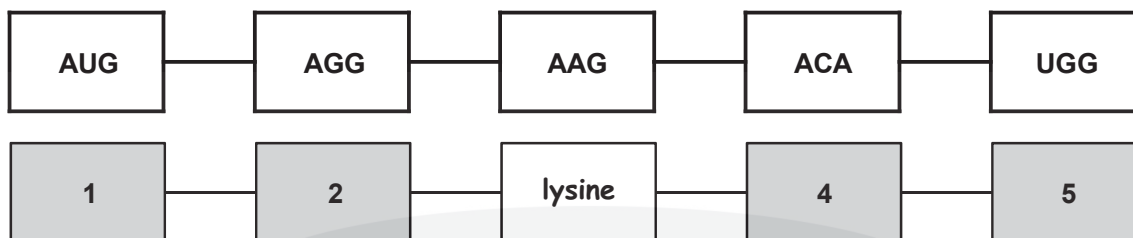


Fig. 5.1

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(a) **Fig. 5.2** shows a sequence of bases coding for a sequence of amino acids. The name of the third amino acid in the sequence has been filled in.



**Fig. 5.2**

Identify the remaining amino acids in the sequence.

[2]

1 .....

2 .....

3 **lysine**

4 .....

5 .....

(b) State the name of the stage of protein synthesis represented in Fig.5.2 **and** name the organelle in the cell where this takes place.

[2]

(c) Identify the type of nucleic acid that holds the sequence of bases shown in Fig. 5.2.

[2]

(d) Using the information in **Fig. 5.1**, list the **three** triplet codons that would cause termination of a polypeptide chain (stop codons) **and** explain why these codons have this effect.

[2]

(e) What name would be given to a mutation that resulted in a change of the codon **UUU** to **UUC**?

[1]

[Total: 9]

### Question 3

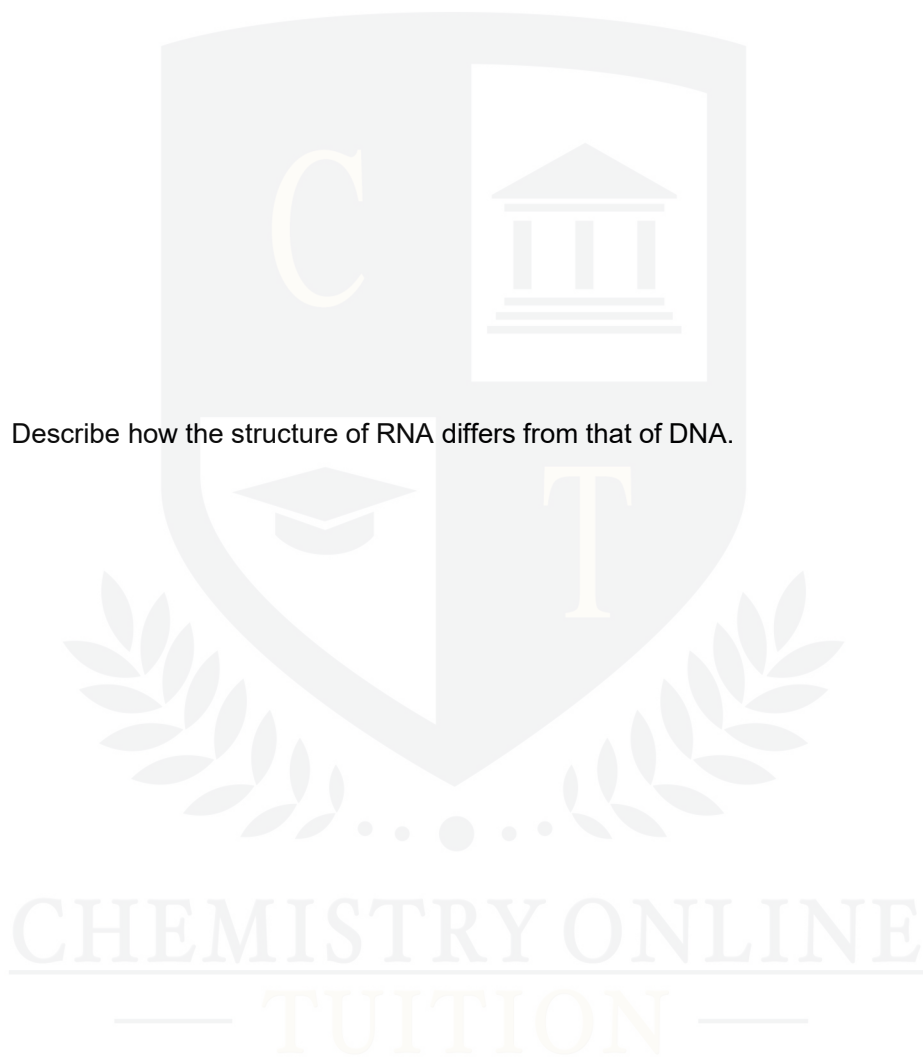
DNA and RNA are nucleic acids.

(a) (i) State the components of a **DNA** nucleotide.

[3]

(ii) Describe how the structure of RNA differs from that of DNA.

[2]



**(b)** Before a cell divides, the DNA needs to be accurately replicated.

Describe how a DNA molecule is replicated.



*In your answer you should make clear how the steps in the process are sequenced.*

**[7]**



**(c) (i)** State what a gene codes for.

**[1]**

**(ii)** Suggest how changing the sequence of DNA nucleotides could affect the final product the DNA codes for.

**[2]**

**[Total: 15]**