



CHEMISTRY ONLINE
— **TUITION** —

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BIOLOGY

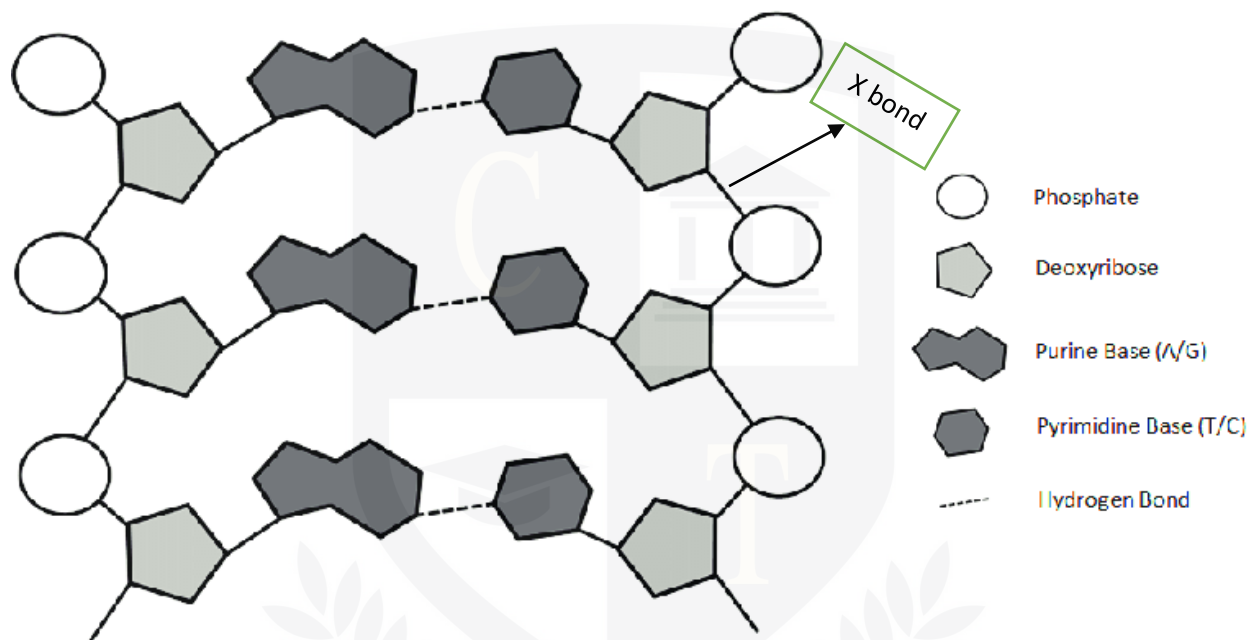
BIOLOGICAL MOLECULES

LEVEL & BOARD:	AQA (A - LEVEL)
TOPIC:	Nucleic Acids
PAPER TYPE:	QUESTION PAPER 3
TOTAL QUESTIONS:	03
TOTAL MARKS:	17

Nucleic Acid - 3

1.

In the diagram, a piece of a DNA molecule is seen.



(a) How many nucleotides are depicted in the given diagram? (1)

(b) Identify the kind of bond in the diagram with the label X. (1)

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(c) DNA replication is aided by the enzymes DNA helicase and DNA polymerase.

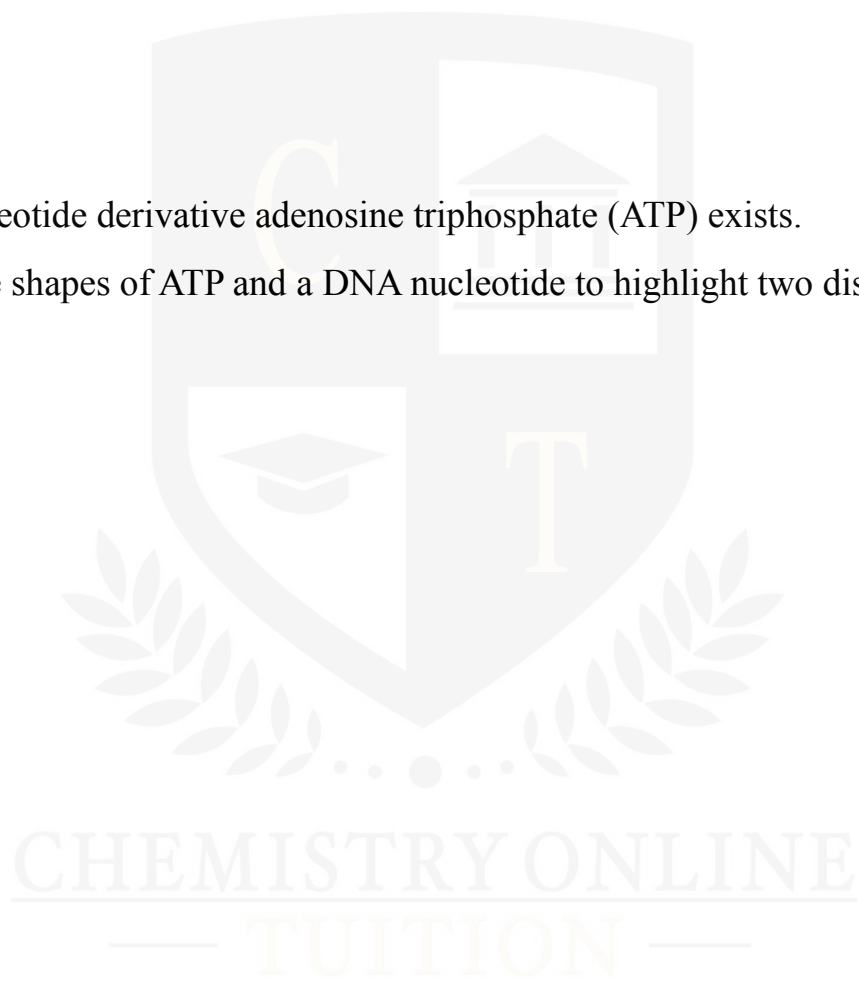
Describe how each of these enzymes works. (2)

DNA helicase

DNA polymerase

(d) The nucleotide derivative adenosine triphosphate (ATP) exists.

Compare the shapes of ATP and a DNA nucleotide to highlight two distinctions. **(2)**

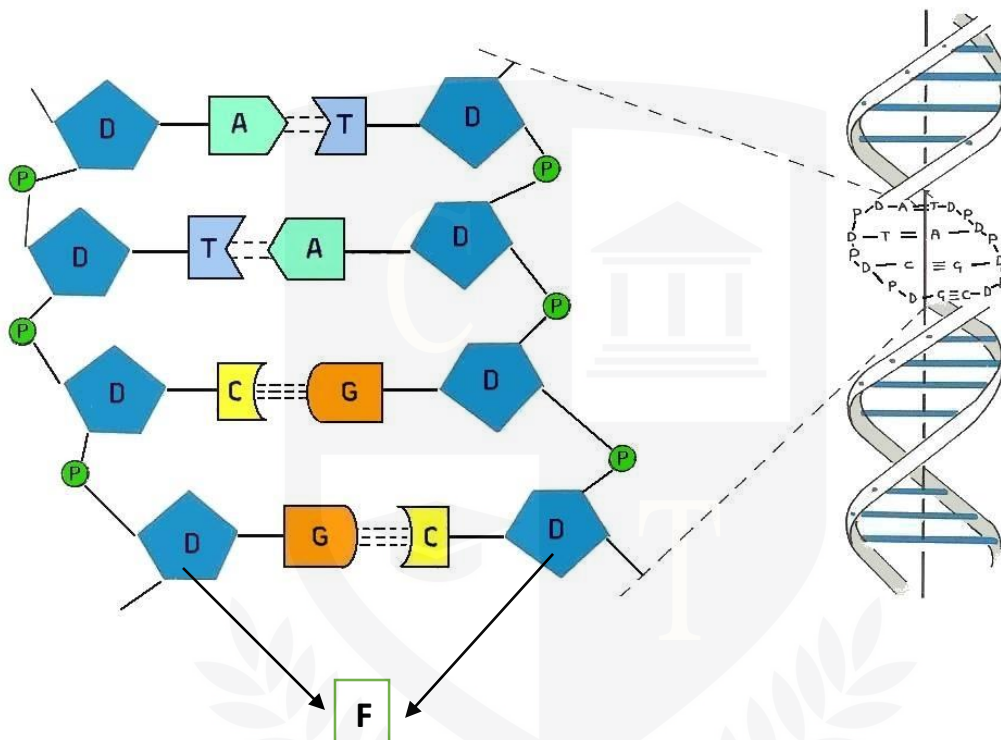


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2.

One DNA base pair is seen in Figure 1.

Figure 1



(a) Name each nucleotide's part F. (1)

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(b) Researchers found that adenine made up 18% of a DNA sample.

What proportions of guanine and thymine did this DNA sample contain? (2)

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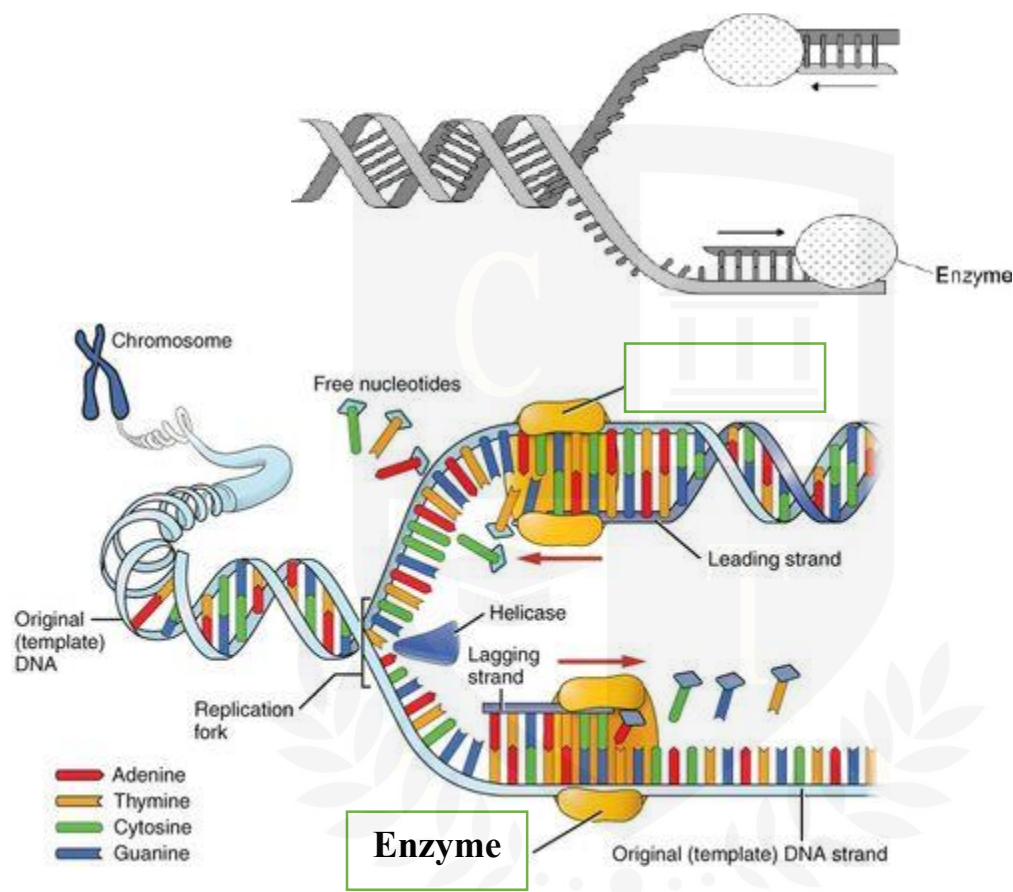
Percentage of thymine

Percentage of guanine

The two DNA strands split apart during replication and each serves as a template for the creation of a new strand.

Figure 2 illustrates the replication of DNA.

Figure 2



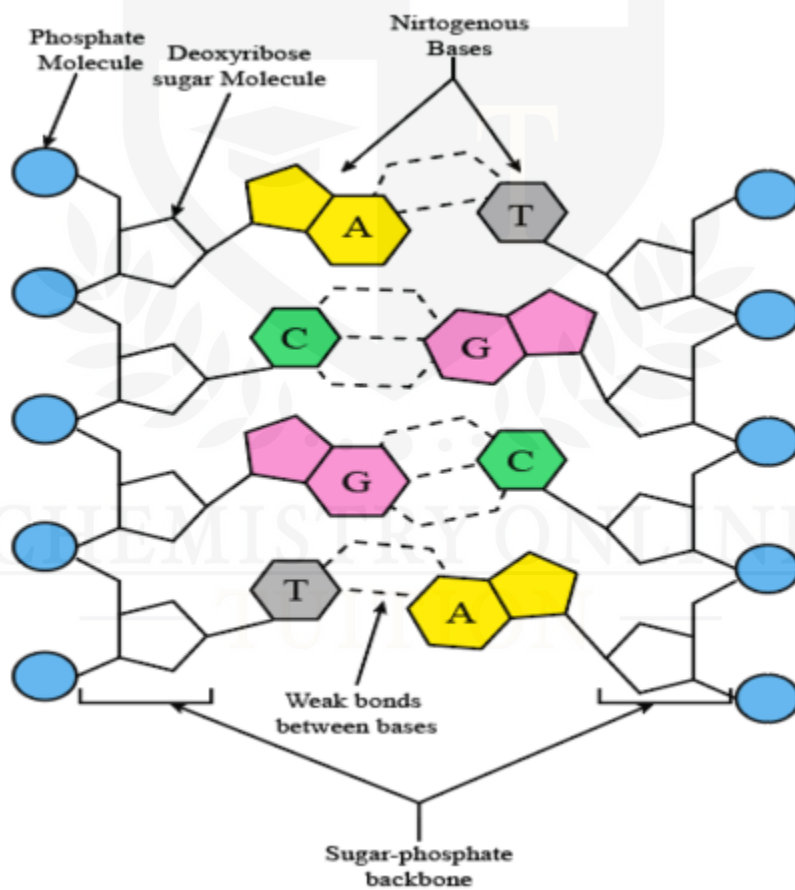
(c) Identify the enzyme in Figure 2 by name. (1)

Each new DNA strand is created in the direction indicated by the arrows in

Figure 2.

(d) Explain why the arrows point in different directions using Figures 1, 2, and your understanding of how enzymes work. (4)

3. Part of a DNA molecule is seen in the accompanying figure.



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(a) Define a box around each nucleotide.

The percentage of bases in each of a DNA molecule's strands is displayed in the table below. **(1)**

DNA strand	Percentage of each base			
	A	C	G	T
Stand 1	16			
Stand 2		21	34	

(b) Add the missing values to the table to complete it. **(2)**

The two DNA strands split apart during replication and each serves as a template for the creation of a new strand. Nucleotides can only be introduced in the 5' to 3' direction for creating new DNA strands.

Explain why new nucleotides can only be inserted in a 5' to 3' direction using the image in part (a) as well as your understanding of enzyme action and DNA replication. **(4)**

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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
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